

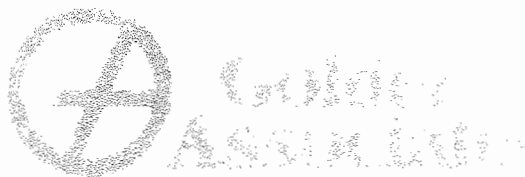
REPORT ON CORRECTIVE MEASURES STUDY



buffalo
COLOR CORPORATION

BUFFALO, NEW YORK

PREPARED BY:



PROJECT NO. 993-9206

JANUARY 2000

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REPORT ON

**AREA ABCE
CORRECTIVE MEASURES STUDY
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Submitted to:

Buffalo Color Corporation
100 Lee Street
Buffalo, New York 14240

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January 2000

993-9206

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January 28, 2000

993-9206

Buffalo Color Corporation
100 Lee Street
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Attention: Mr. David E. Sauer, Senior Environmental Engineer

RE: REPORT ON AREA ABCE
CORRECTIVE MEASURES STUDY
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

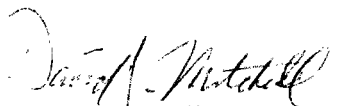
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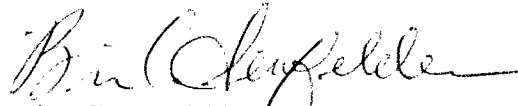
Golder Associates Inc. (Golder) is pleased to submit this report of the Area ABCE Corrective Measures Study (CMS) for the Buffalo Color Corporation (BCC), located in Buffalo, New York as required by Module III E.11(a) of the 6 New York Code of Rules and Regulations (NYCRR) Part 373 Post-Closure Permit (Permit) for the BCC facility. In addition, copies of the final report on the Area "A" groundwater pump test and modeling performed by Parsons Engineering Science, Inc. (Parsons, 1999) are also being provided with this CMS report to the Agencies on the project distribution list as a separate document.

Golder appreciates the opportunity to provide these services to BCC. If you have any questions regarding this report, please do not hesitate to call.

Very truly yours,

GOLDER ASSOCIATES INC.


David J. Mitchell, P.G., P.E.
Senior Geological Engineer


Brian C. Senefelder, CHMM
Associate/Project Director

Attachment

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1. INTRODUCTION

1.1 Objectives

The Buffalo Color Corporation (BCC) is currently implementing a Resource Conservation and Recovery Act (RCRA) Corrective Action Program for the Solid Waste Management Unit (SWMU) Area ABCE at the BCC facility located in Buffalo, New York. The specific objectives of the BCC CMS include:

- Estimating human health and environmental risks based on existing contaminant levels and plausible exposure pathways through the recognized, four stage framework of (a) risk screening, (b) toxicity assessment, (c) exposure assessment, and (d) risk characterization;
- Identifying remedial objectives for soil and groundwater that address these risks for Area ABCE;
- Identifying and evaluating potential remedial alternatives for soil and groundwater in Area ABCE; and,
- Developing a risk management strategy and proposed corrective measures that satisfy the remedial objectives.

1.2 Report Organization

This CMS is organized as follows:

- Section 2.0 presents the BCC Area ABCE facility background information including site location, site conditions, history of operations, summary of the RCRA corrective action program activities, and nature of soil and groundwater contamination;
- Section 3.0 describes the risk assessment that was performed for soil and groundwater;
- Section 4.0 describes the corrective measures objectives for soil and groundwater;
- Section 5.0 describes the screening and evaluation of technologies for soil and groundwater;

- Section 6.0 describes the groundwater modeling activities, corrective measures alternatives, evaluation criteria, evaluations of these alternatives, and proposed corrective measures; and
- Section 7.0 discusses the schedule for implementation of the proposed corrective measures.

2. FACILITY DESCRIPTION

2.1 Site Location and History

The BCC plant, located at 100 Lee Street within the City of Buffalo, Erie County, New York, exclusive of Area D, (Figure 1) occupies approximately 42 acres near and adjacent to the Buffalo River. The area surrounding the BCC site is zoned for heavy industry. North and west of the facility are former Conrail, (now CSX) railroad tracks. Allied Signal Inc.'s, (now known as Honeywell International, Inc.) research facility is located north of the facility. South and east of the facility is PVS Chemicals Inc., which is involved with production of inorganic acids, and the Buffalo River. Area A of the plant is the only area of Area ABCE that fronts the Buffalo River. To the south of Area A is an inactive rail line and Area D and to the east of Area E is industrial property reportedly owned by Mobil Oil Company. The nearest residential areas are about 150 feet north and east of the site, across Elk and Orlando Streets.

There has been continuous production of various dyestuffs and organic chemicals at the facility for over 100 years. The plant was originally built in 1879 by a predecessor of Schoellkopf Aniline and Dye Company, which became National Aniline Chemical Company (NACCO) in 1917. NACCO was the result of a merger of five companies, including Schoellkopf Aniline and Dye Company, which later became Allied Chemical Corporation (Allied Chemical). On July 1, 1977, BCC purchased certain assets from Allied Chemical, including the plant and the right to produce certain chemicals, and has operated it since that date.

2.2 Resource Conservation and Recovery Act (RCRA) Facility Investigation

BCC conducted a RCRA Facility Investigation (RFI) at the facility in response to the corrective action requirements of RCRA and the Hazardous and Solid Waste Amendments of 1984 (HSWA). The RFI was performed to assess the nature and extent of releases of hazardous wastes and/or constituents from solid waste management units (SWMUs) and areas of concern (AOCs) at the facility.

The requirement to perform the RFI for the SWMU Area A, B, C, and E (Area ABCE) is specified in Module III (E)(5)(a) of the Part 373 Post-Closure Permit (Permit), New York State Department of Environmental Conservation (NYSDEC) Identification (ID) Number 9-1402-00076/00-112-0) issued to BCC on February 10, 1995.

2.3 Solid Waste Management Units

Module III-A(3) of the Permit identifies the following SWMUs and AOCs at the facility:

2.3.1 Area ABCE

This area, which contains chemical handling areas and numerous sewer lines, is bounded by the Conrail tracks to the west, Elk Street to the north, Orlando Street to the east, Prenatt Street (railroad tracks), Lee Street, South Park Avenue, the Buffalo River, and Area D (abandoned DL&W railroad tracks). Area ABCE contains the following features:

- Active Features

- a) Sewer lines (throughout entire area); and
- b) Building 324 Container Storage Area (Area E)

The indoor area was built in the mid-1980s to replace the Old Container Storage Area. Hazardous waste in drums is accumulated and stored here (for less than 90 days) to be shipped off-site. The area is exempt from RCRA permitting. This unit has operated from 1986 until the present. Module III E(1) of the Permit does not identify any corrective action requirements for this area;

- Inactive Features

- a) Abandoned sewer lines (throughout entire area);
- b) Old Container Storage Area (Area E)

This area operated from 1949 to 1986. After 1980, hazardous waste was stored in drums for less than 90 days before being shipped off-site. A drum storage area west of Lagoons 1, 2, and 3 on which drums of solid waste were stored in the early 1980s was clean-closed in 1990, and approved by the NYSDEC. As part of the corrective action program at the facility, a detailed sampling plan was developed for this

SWMU by BCC in order to comply with the Sampling Visit portion of the RFA. The sampling work plan was approved by the NYSDEC on April 26, 1990. In accordance with the approved plan, BCC submitted the analytical report, dated December 20, 1990, on the 2-foot borings taken at five locations in the Old Container Storage Area. Based upon these activities, and as defined in the Part 373 Permit Module III-E(1), this SWMU requires no further action.

c) Deep Well (Area E)

Used by Allied Chemical for the disposal of ammonium sulfate solution from about 1957 to 1963. The deep well was used to a depth of 180-feet (ft) from surface level from 1957 to 1960, and then from late 1960 to 1963 to a depth of 744-ft. A closure plan was submitted to the NYSDEC Division of Mineral Resources (DMR) on December 15, 1988. The closure plan was approved by the NYSDEC on March 1, 1989, and the deep well was plugged, in accordance with the approved closure plan, by April 14, 1989. This unit requires no further action, as specified in Module III E(1) of the facility's Permit.

d) Surface Impoundments (Area E)

Lagoons 1, 2, and 3

Process waste, in the form of process wastewater (1,000,000 to 2,000,000 gallons per day (gpd) in the 1970s and 200,000 to 600,000 gpd in the 1980s) was transported via the process waste sewer to the pretreatment plant. The surface impoundments received the wastewater and regulated variations in flow and concentration to prevent "slug" discharges. After the effective date of RCRA, the process wastewater was a characteristic hazardous waste due to corrosivity, having a pH in excess of 12.5. Other constituents detected in the wastewater included aniline, N-methylaniline, N,N-dimethylaniline, N-ethylaniline, N,N-diethylaniline, and cyanide. From June 1977 through December 1984, dilute (1 to 10-percent) sulfuric acid wastewater was also pumped into the alkaline surface impoundments from the adjacent Allied Chemical and later PVS Sulfuric Acid plant. This material was a RCRA characteristic hazardous waste due to corrosivity, having a pH less than 2.0;

The process wastewater was then pumped to three reactors in series where it was neutralized with slaked lime and later sulfuric acid to render it non-corrosive and no longer a RCRA characteristic hazardous waste under NYSDEC regulations, and acceptable to the Buffalo Sewer Authority (BSA) under their Sewer Use Ordinance (SUO).

The operational periods of the three lagoons were as follows:

- Lagoon 1: June 23, 1971 - June 30, 1988;
- Lagoon 2: June 23, 1971 - January 27, 1987; and
- Lagoon 3: June 30, 1977 - August 31, 1984.

Following a period of operation between 1971 to 1976, according to documents obtained from Allied Signal Corporation, during the time period of 1976 to 1977 the original two surface impoundments were cleaned out and relined (with clay soils) and the third impoundment was constructed. These surface impoundments were constructed as follows:

- Excavation of all fill, sand, and other extraneous material;
- The bottom of the impoundments were in the same undisturbed clay region;
- The sides of the impoundments were built of natural soil with a surface containing at least three feet of compacted clay at a 1:1 slope.

In 1983, the Lagoon 1 sideslopes were changed to a 1:2 slope and one foot of clay, and a 3-inch layer of crushed stone were added.

These impoundments were closed under NYSDEC-approved closure plans that involved removal and off-site disposal of over 4,000 cubic yards of sludge and clay. These impoundments were certified closed according to the approved plans, as follows:

- Lagoon 1: May 25, 1989;
- Lagoon 2: May 3, 1989; and
- Lagoon 3: August 12, 1986.

Clay remaining in Lagoon 1 was collected into a central position and resampled. Lagoons 1 and 2 samples were analyzed for hazardous constituents and Lagoon 3 samples were analyzed for hazardous characteristics and aniline. As stated in Module V-A of the BCC Permit, these tests indicated elevated levels of some hazardous constituents in the remaining soils for Lagoon 1 and 2. The results of the sampling were made a part of the recorded land records of the facility property.

These closed units (former Lagoons 1, 2 and 3) are required by Module III-E(15) to have corrective action through post-closure due to hazardous constituents detected in groundwater monitoring wells along the downgradient edge of the closed lagoons. The units are subject to groundwater corrective action and post-closure care requirements, including groundwater monitoring, as specified in the Post-Closure Care Module of the Permit.

e) Buildings 351 and 352/Wastewater Treatment Plant (Area E)

Wastewater from the facility was pretreated in this plant, which went on-line in June 1971. This project entailed the construction of a new sewer system in the plant that separated the flows between process waste and non-contact cooling water. The process waste sewer directed the organic and inorganic waste streams to the pretreatment facility where the extreme acidity and later alkalinity of the wastewater were neutralized. Suspended solids were precipitated and subsequently sent to off-site permitted landfills. Pretreated wastewater was sent to the BSA while non-contact cooling water from the plant discharged to the Buffalo River through 13 plant outfalls (presently only two outfalls, Numbers 006 and 011, remain active). This unit was operated from 1971 until 1988, and requires no further action, as specified in Module II E(1) of the Permit.

2.3.2 Area D

Area D is bounded by the Conrail tracks, Area ABCE (abandoned DL&W tracks), and the Buffalo River. This area contains the following features:

1. Active Features

- a) None.

2. Inactive Features

- a) Metal Sludge Weathering Area;
- b) Incinerator; and
- c) Iron Oxide Sludge Lagoons.

As indicated in Module III E (17) of the Permit, remediation of Area "D" has been addressed separately by Allied Signal Inc. through a NYSDEC Consent Agreement Number (No.) B9-0014-84-01RD.

2.3.3 Areas of Concern

1. Active Features

- a) None.

2. Inactive Features

- a) Idle Building 320 in Area E.

BCC is required by Module III E (2) to develop an RFA Sampling Visit (SV) work plan to address floor sweeping and cleanup materials at least 60 days prior to demolition of Building 320. Building 320, currently an inactive production area, is not scheduled for demolition, and, therefore, no work plans have been prepared at this time.

2.3.4 Summary of the RFI

The RFI was performed during 1997 and 1998 in accordance with the NYSDEC approved RFI Work Plan. The RFI was performed in two phases. The initial investigation (Phase I) activities focused on developing a thorough hydrogeologic characterization of the facility (Area ABCE) and emphasized evaluating groundwater quality and potential migration of hazardous constituents at the perimeter of Area ABCE. Also, this initial phase included a groundwater study relative to the closed former surface impoundments (Lagoons 1, 2, and 3) at the facility.

Fourteen (14) shallow aquifer wells, four (4) confined aquifer wells, and five (5) piezometers were installed under Phase I of the RFI with two (2) rounds of sample collection and analyses from the monitoring wells. During the installation of the monitoring wells and piezometers, fifty-four (54) soil samples were collected at various depths for chemical screening analyses and twenty-three (23) soil samples were collected

at various depths for confirmatory chemical analyses. In addition, ten (10) soil samples were collected for geotechnical analyses.

The second phase (Phase II) of the project involved obtaining additional data from the interior of the facility to further characterize and evaluate potential release sources, migration pathways, and extent of release(s) through sampling of soil and groundwater for chemical constituents. Twenty-four (24) soil borings were completed which included collection and chemical screening analyses of twenty (20) near-surface soil samples and twelve (12) multiple depth soil samples. Confirmatory chemical analyses were performed on four (4) soil samples as well as four (4) groundwater samples collected from each of the multiple depth borings.

Review of the results of groundwater sampling analytical data and groundwater flow data from completion of the Phase I and Phase II investigation activities indicated that hazardous constituents were detected in groundwater samples collected from monitoring wells located at the perimeter of Area ABCE. Consequently, a supplemental investigation was performed to characterize and evaluate the potential migration and extent of hazardous constituents in groundwater from SWMU Area ABCE to off-site and apparently hydraulically downgradient areas bordering BCC, specifically, the PVS facility and areas along the eastern edge of the site including the BSA sewer and Orlando Street. This included the installation of ten (10) additional shallow aquifer wells. Samples were collected from these wells and also two (2) off-site piezometers. Six (6) additional surficial soil samples were also collected from unpaved areas in Area ABCE. The soil and groundwater samples were analyzed for VOCs, SVOCs, metals, and specific inorganic parameters.

The draft Final RFI Report (Golder Associates, 1997) was submitted to the NYSDEC and USEPA by BCC in November 1997. Comments were received from the NYSDEC regarding the draft Final RFI Report on March 4, 1998.

A second supplemental environmental investigation was also performed in 1998 at locations off-site of the BCC property. These additional investigations were performed to further address the NYSDEC's comments regarding the BCC draft Final RFI Report and potential sources of hazardous constituents detected in samples collected from off-site shallow aquifer groundwater monitoring wells RFI-38 and RFI-40 on the PVS facility. These field investigations were performed during August 1998.

This second supplemental investigation included the installation of eight (8) additional shallow aquifer wells and six (6) additional piezometers. Samples were collected from these additional wells and also one (1) off-site piezometer. The groundwater samples were analyzed for VOCs, SVOCs, metals, and specific inorganic parameters. Ten (10) archived soil samples from locations in Area ABCE were also analyzed for total organic carbon.

As a result of completing the RFI activities, review of the investigation data and assessment of these findings, the following conclusions were made:

- Hazardous constituents have been detected in soil/fill and subsoil/fill samples at concentrations that exceed typical background concentrations and/or NYSDEC guidance action or cleanup levels. There is, therefore, a potential for exposure to hazardous constituents in subsoils/fill and surficial soil/fill in Area ABCE through contact, runoff of particles to surface water and leaching of constituents to groundwater in unpaved areas;
- Contaminated groundwater is migrating through the shallow aquifer in Area A and is discharging to the Buffalo River, which is a receptor. Hazardous constituents have been detected in the shallow aquifer beneath Area A at concentrations which exceed Class GA groundwater standards. However, neither the shallow aquifer nor the Buffalo River are used as sources of potable water;
- Hazardous constituents detected in the shallow aquifer in Areas B, C and E are not migrating to any significant extent beyond the southern and eastern boundaries of these Areas;

- Hazardous organic constituents have been detected in the shallow aquifer in the area of the riverfront wells RFI-38, RFI-44 and RFI-46 on the PVS property which exceed the Class GA groundwater standards. However, no such exceedances were detected in the monitoring wells located between BCC Area B and these PVS riverfront wells;

Hazardous organic constituents have also been detected in the shallow aquifer in the area of riverfront well RFI-40 on the PVS property which exceed the Class GA groundwater standards. However, no such exceedances were detected in the monitoring points located between BCC Areas C and E and riverfront well RFI-40;

Based on differences in groundwater chemistry and considering over 100 years of continuous operations involving the production of dyestuffs, organic chemicals and inorganic acids and the generation of associated wastes within the study area, the constituents exceeding Class GA groundwater standards detected in the areas of RFI-38, RFI-44, RFI-46 and RFI-40 located on the PVS property cannot be attributed to migration of hazardous constituents in the shallow aquifer on Areas B, C, and E. The source of the hazardous constituents detected on the PVS property has not been determined; and

- Hazardous constituents have also been detected to a lesser degree in the confined aquifer beneath Area ABCE at concentrations exceeding Class GA groundwater standards. In addition to Area ABCE, the source of benzene, toluene, ethylbenzene, and xylenes may also be upgradient off-site sources. However, the confined aquifer is not used as a source of potable water and potential impacts to human health and the environment would be expected to be limited.

The NYSDEC provided comments on the Final RFI Report in a letter to BCC dated March 19, 1999. In that letter, the NYSDEC indicated that sufficient information was available from the RFI to begin the preparation of a Corrective Measures Study (CMS) for the entire facility. In addition, given the findings of the RFI for Area A of the facility, the NYSDEC requested that an Interim Corrective Measures Study (ICMS) be prepared for Area A to evaluate remedial alternatives to provide hydraulic control of groundwater in this area. As specified in BCC's Permit under Module III (B)(6)(a), without a permit modification, interim corrective measures are limited to groundwater extraction and/or treatment. With regard to potential remedial measures for Area A groundwater, Allied Signal Inc. requested that BCC allow it to conduct a pumping test in Area A. In a letter dated April 13, 1999, BCC requested that the NYSDEC accept this pumping test and

associated work plan in lieu of the ICMS. The NYSDEC subsequently approved this request in correspondence with BCC on May 10, 1999. The final Work Plan for the CMS was submitted to the Agencies on May 14, 1999. On July 6, 1999, the NYSDEC issued a letter approving BCC to proceed with the CMS that also expressed NYSDEC concerns regarding the risk evaluation and potential issues regarding sediments in the Buffalo River. On July 15, 1999, BCC submitted a response to this NYSDEC letter, which presented BCC's position regarding these issues and indicated that BCC would proceed with the CMS in accordance with the submitted work plan. The pumping test for Area A was completed by Parsons Engineering Science Inc. on behalf of Honeywell International Inc. and the report of these results was provided to BCC in October 1999. This report is provided as a separate document.

2.3.5 BCC's Current Status

Since the issuance of the RCRA post-closure permit in 1995 and the initiation of the RFI activities in 1997, there have been a number of significant changes in BCC's business which likely will impact BCC's ability to implement the corrective action that is selected by the NYSDEC following the completion of the CMS process. Those changes include the following:

1. BCC's parent and sole shareholder, Lanesborough Corporation, defaulted on \$40 million in outstanding bonds. Lanesborough has no assets other than the BCC stock, and the BCC stock was pledged as security for the bonds. As a result of the default, the bondholders' Indenture Trustee currently has the power to vote all of the BCC stock. BCC's board of directors that had been elected by Lanesborough resigned, and the Indenture Trustee has elected two bondholder representatives as BCC's board members.
2. BCC's primary product, indigo dye, represents approximately 75% of its annual revenues. Beginning in 1998, the domestic and world-wide prices declined precipitously as a result of a flood of low priced Chinese produced indigo available in essentially all of BCC's markets. Prices in 1998 and 1999 were below the level that existed in 1977 when BCC purchased the plant and dye business from Allied Chemical. For the first time in its corporate history, BCC operated at a loss during the fourth quarter of 1998 and during all of 1999.

3. In order to address the economic challenges described above, BCC has implemented a number of cost saving measures related to its operations, including reduction in personnel, alternative sources of raw material supplies, and it filed with the United States Department of Commerce and the International Trade Commission a claim against the Peoples Republic of China asserting that Chinese indigo was being "dumped" in the United States in violation of federal anti-dumping law. BCC has received favorable preliminary rulings in that case, but a final determination will not be issued for several more months. A favorable final determination may lead to some recovery in the domestic price for indigo, but there can be no provision for the recovery of BCC's past losses.
4. At the same time, NAFTA has lead many of BCC's domestic denim mill customers to open new plants in Mexico, resulting in the closing of some of the domestic mills and a substantial reduction in the output of other mills. While BCC is now supplying most of those new mills, BCC's margins in the international indigo market historically have been lower than its domestic margins.
5. As a result of the foregoing, BCC has suffered some significant adverse impacts to its financial condition. Because of its current limited financial resources, it is highly unlikely that BCC will be able to provide any financial assurance that might be required in a modified permit requiring the implementation of corrective action at Areas A, B, C and E. Moreover, BCC's financial condition will impact the extent to which BCC can implement any corrective action required in a modified permit, as well as the rate at which any such work might be done.

2.4 Facility Geology

The discussion of the facility specific geology (Area ABCE) is based on characterization of the subsurface underlying the site from advancement of twenty-three (23) Phase I soil borings, four (4) Phase II soil borings, and ten (10) Supplemental Investigation soil borings during the RFI. In addition, data from studies performed at Area ABCE or in the vicinity of Area ABCE were also utilized as applicable.

The subsurface geology of the BCC facility and adjacent PVS facility can be characterized by 0 to 20 feet of fill material overlying as much as 50 feet of unconsolidated sediments of glacial or alluvial origin. Geologic cross-sections of the RFI study area have been developed from the RFI soil boring logs and existing pre-RFI piezometer and monitoring well logs and are presented within the Final RFI Report

(Golder, 1998a) and Addendum to the Final RFI Report (Golder, 1998b). The following discussions summarize the characteristics of the subsurface units encountered within the study area. The units are described in the sequence in which they are encountered in the subsurface of the study area.

Fill

Fill material is pervasive over the surface of the majority of the study area. Typically the fill consists of variable proportions of re-worked clay and silt till, crushed stone or gravel, brick, foundry sand, and building demolition debris. The fill thickness was found to range from 0 feet to 20 feet with the maximum observed thickness occurring along the Buffalo River at boring RFI-24.

Alluvium

The alluvial deposits found within the study area are typically comprised of very loose to compact, brown, fine to very coarse sands and less commonly clayey silt to clayey sand. Interbedded thin seams of leaves and/or wood particles were also commonly observed within samples obtained from the alluvium. This unit was encountered in nine RFI Phase I borings and five RFI Supplemental Investigation borings and ranged in thickness from 0 feet to 21 feet with the maximum observed at boring RFI-40 which is located in close proximity to the Buffalo River.

Beneath the overlying fill, a transition from the alluvium to clay and silt tills occurs within the subsurface as proximity to the Buffalo River decreases. This transition represents an erosional contact between the alluvium and the clay and silt tills and appears to delineate the lateral extent of historic Buffalo River deposits in the study area.

Clay and Silt Tills (Upper Tills)

Clay and silt tills, described hereafter as Upper Tills to differentiate from the deeper Basal Till unit, were observed at twelve RFI Phase I borings and four RFI Supplemental Investigation borings. The Upper Tills are described as soft to firm, light brown to gray-

brown, silty clays to clayey silts with occasional gray clay infilling of vertical fractures and interbedded fine to medium sand partings and seams. In addition, as a till, the unit exhibits a significant fraction of granular material. The unit ranges in thickness from 0 feet to 10 feet and underlies a majority of Areas B, C, and E of the BCC facility as well as portions of Area A and the supplemental investigation study areas.

Glaciolacustrine Clay

Beneath the alluvium and Upper Tills, a lacustrine silty clay unit was encountered in each RFI Phase I and Supplemental Investigation boring (the exception being three Phase I piezometer borings completed near the invert of the BSA sewer). This unit can be described as soft to very soft, brown to gray-brown, uniform silty clay to clay with reddish brown varving and occasional silt to fine sand seams and partings. Based on logs of borings which completely penetrated the glaciolacustrine clay, the clay ranges in thickness from 24 feet to as much as 36 feet beneath the site. Geotechnical testing of the glaciolacustrine clay has indicated that this unit is comprised of nearly 100-percent clay size particles.

Basal Till

Underlying the glaciolacustrine clay is a relatively thin Basal Till unit comprised of a loose to compact, gray-brown, mixture of sand, silt, and gravel with little to some clay. The Basal Till was encountered within the four RFI deep wells (RFI-16, RFI-19D, RFI-21D, and RFI-23D) as well as other deep wells located in the vicinity of the study area (Malcolm Pirnie, 1989; Engineering Science, Inc., 1989; Thomsen Associates, 1987). This unit has been found in the study area to range in thickness from 2 feet to 5 feet.

Onondaga Limestone

Immediately underlying the Basal Till, the Onondaga Limestone bedrock was encountered in four RFI Phase I borings (RFI-16, RFI-19D, RFI-21D, and RFI-23D). These borings were advanced just to the top of bedrock, and consequently minimal sample material of the bedrock was retrieved, however, the sample fragments of bedrock

As part of the RFI, four water level monitoring events were performed to characterize the potentiometric surface and flow regimes of each aquifer. The following discussions describe the characteristics of the shallow and confined aquifers.

2.5.1 Shallow Aquifer

A potentiometric surface contour map for the shallow aquifer during August 1998 is presented as Figure 3. In general, flow in the shallow aquifer of Area ABCE is from the west and north towards the Buffalo River. However, some underground utilities and manmade features appear to influence local groundwater flow conditions. A location map of BSA lines, BCC process and clear water sewers, and PVS sewers is presented as Figure 4. This figure has been compiled from available historic and current record drawings for utilities within the study area and includes relative locations of lines, materials of construction, and invert elevations. A predominant natural feature of the shallow aquifer flow regime is the stratigraphic transition between the Upper Tills and alluvium (shown as a dashed line on the potentiometric maps). This transition results in an increased gradient across this boundary corresponding to the head loss between the low permeability fill/Upper Tills and the higher permeability alluvium.

Hydraulic gradients span a wide range in the shallow aquifer from a high of 0.25 foot per foot (ft/ft) at a breach in the BSA sewer sheet piling at Area E to a low of 0.001 ft/ft within the alluvium on the east side of the PVS property (July 1997 event). With the exception of an area near the center of the PVS facility, it is noted that beyond the influence of the stratigraphic transition described previously, gradients are low to essentially flat within the alluvium.

Several areas of groundwater mounding are apparent in the study area. A mound is present on the northwest side of Area B most likely due to the influence of fill placed within a former building foundation at this location. A second notable mounding of groundwater occurs within the central portion of the PVS facility. Mounding at this location could be attributed to retention of water within the low permeability Upper Tills

been developed for industrial use and the banks drop off quickly, only a small amount of shallow, protected nursery habitat for young fish exists. Areas upstream and downstream of BCC are frequently disturbed by propwash from boats and the water is turbid.

There were no known releases from the former Lagoons (1, 2 and 3) Area to surface water or the Buffalo River during the period of their operation (1971 to 1988). BCC currently has two permitted outfalls (Numbers 006 and 011) to the Buffalo River for discharge of non-contact cooling water and stormwater runoff from the site. PVS currently has two permitted outfalls (Numbers 001 and 002) to the Buffalo River. Surface water and sediment samples were not required to be collected as a component of the RFI.

Groundwater can be found locally in both the unconsolidated deposits and the limestone bedrock of the region. The unconsolidated deposits exhibit a wide range of permeability and can yield varying quantities of water, or none at all. Groundwater within the bedrock is transmitted through fractures such as horizontal and vertical joints, which are widened by dissolution processes. The availability of groundwater in the bedrock can vary widely based on the occurrence of fractures and the size of the solution openings.

Surface water sources provide most of the water used in the area. The City of Buffalo's municipal water supply source is Lake Erie.

Consistent with previous investigations performed in the vicinity of the BCC facility (Malcolm Pirnie, 1989), two aquifers have been identified within the study area. The first aquifer encountered beneath the site, designated the Shallow Aquifer, represents a continuously saturated unconfined system within the fill and sediments above the glaciolacustrine clay unit which underlies the study area. The second aquifer designated as the Confined Aquifer occurs within the Basal Tills and weathered upper surface of the Onondaga Limestone and is under apparent confined conditions. The thick deposition of uniform glaciolacustrine clay underlying the study area serves to act as an aquitard for the Shallow Aquifer and as a confining unit for the deeper aquifer found at its base.

that were collected were described as fractured and weathered, dark gray limestone. The approximated slope of the top of bedrock beneath the BCC facility is to the south at a rate of 1.2 feet per 100 feet.

The stratigraphy underlying the study area and described above is generally consistent with that found by previous investigators performing studies in or around the general vicinity of the BCC facility. These studies include investigation of Area D (Malcolm Pirnie, 1989), investigation of the former Lagoons Area of BCC (Thomsen Associates, 1987), investigation of the Allied Signal facility (Remcor, 1995), and investigation of the former Allied Signal facility now operated as PVS (Engineering Science, Inc., 1989).

2.5 Facility Hydrogeology

The BCC site is situated within the Lake Erie and Niagara River drainage basin. The Buffalo River is the predominant surface drainage near the site. The river is approximately eight miles in length and is classified as a Class C waterway suitable for secondary contact recreation. The Buffalo River generally flows from east to west and eventually drains into Lake Erie several miles west of the site, although periodic flow reversals occur due to Lake Erie seiche conditions. The Buffalo River has a reported median summer low monthly flow of 48 cubic feet per second (cfs) but, during the spring, runoff conditions may exhibit monthly flows as high as 1,200 cfs. Historically, the banks of the Buffalo River have been altered for industrial development. Fill has been placed in several areas of the study area for this purpose. The river is presently used by commercial shipping barges. The Buffalo River is not used as a drinking water source.

The Buffalo River was considered to be a generally poor habitat for fish and invertebrates (Makarewicz, 1982), but recent studies have shown that an increasing variety of fish species are living and propagating in the water (Adrian and Merckel, 1989). Bank vegetation is sparse and completely lacking in many areas. As stated previously, the bank of the Buffalo River has been extensively altered by industrial development, and the Buffalo River channel is periodically dredged. Since much of the Buffalo River bank has

observed underlying this area accentuated by the influence of the BSA sewer located to the north and alluvium located to the south.

Hydrogeologic Characteristics of the Shallow Aquifer

Variable head tests (rising or falling) were conducted in each of the shallow aquifer and BSA backfill Phase I monitoring wells and piezometers as well as in the Supplemental Investigation monitoring wells to determine the hydraulic conductivity of the subsurface materials adjacent to the screened interval at each location.

As indicated in the RFI, hydraulic conductivities for monitoring wells screened within the Upper Tills of the investigation area ranged from 8.7×10^{-5} centimeters per second (cm/s) to 7.23×10^{-7} cm/s. The range of hydraulic conductivity determined for the Upper Tills is typical of a clayey silt to silty clay deposit.

Three piezometers (RFI-PZ-16, RFI-PZ-17, and RFI-PZ-18) and one monitoring well (RFI-42) were screened within backfill of the BSA sewer. The hydraulic conductivity of the sewer backfill was found to range from 4.74×10^{-3} cm/s to 3.08×10^{-6} cm/s.

Ten monitoring wells and two piezometers were screened within the alluvium underlying the investigation area. The hydraulic conductivity for the alluvium was found to range from a low of 1.09×10^{-4} cm/s at RFI-PZ-19 to a high of 2.09×10^{-2} cm/s at RFI-25. This range of hydraulic conductivity is typical for alluvial sands and gravels.

No RFI monitoring wells or piezometers were screened exclusively within the glaciolacustrine clay underlying the investigation area. However, this unit has been determined to extend beyond the investigation area to other properties in the vicinity including the Allied Signal research facility where hydraulic testing of a monitoring well screened within the glaciolacustrine clay indicated a hydraulic conductivity of 3.5×10^{-9} cm/s for this unit (Remcor, 1995).

2.5.2 Man-Made Features Influencing Shallow Groundwater Flow in Area ABCE

The following summarizes observations regarding the influence of manmade features on shallow groundwater flow:

- Groundwater flow within the interior of Area ABCE is influenced by the network of subsurface utilities found within the study area. It is possible that groundwater flow within the vicinity of the lines of this network may be affected by potential infiltration to and exfiltration from these subsurface features. Additionally, preferential flow of groundwater within bedding and backfill of these features is likely occurring;
- No distinct influence on groundwater flow direction by BCC Outfalls 006 and 011 (non-contact cooling water and storm water) is indicated on the shallow aquifer potentiometric maps. The potential influence of Outfalls 006 and 011 on localized groundwater flow within the alluvium is minimized given that these lines are at or below the water table and within the alluvial deposits that exhibit high hydraulic conductivities similar to the range found in pipe bedding materials. Outfalls 006 and 011 are fully submerged at their discharge point to the Buffalo River. However, where sections of Outfall 006 and 011 piping extend beyond the alluvium/upper tills transition and are found within fine grain soils where groundwater elevations are higher than the river, the bedding and backfill of these lines likely represent localized sinks and preferential pathways for groundwater flow;
- Headwalls along the Buffalo River in Area A and on the PVS facility do not appear to extend deep enough into the alluvium to act as barriers to groundwater flow to the river;
- The steep gradient observed along the Buffalo River near the central portion of the PVS property may be attributable to potential leakage from the facility's high volume effluent discharge outfalls located in close proximity to monitoring well RFI-39;
- A BSA trunk sewer extends west to east across the BCC facility and along the property line between PVS and Area E (Figure 4). As indicated on the potentiometric maps, the BSA sewer and/or the sewer backfill appear to act as a sink for groundwater flow between Area B and Area C as well as between Area E and a portion of the PVS property. Additionally, underground features located interior to Area C appear to be directing groundwater flow to the BSA sewer at this portion of the facility; and

- The RFI included a subsurface investigation in the vicinity of closed Lagoons 1, 2, and 3 in order evaluate shallow groundwater flow conditions between the lagoons and the Buffalo River. Specifically, the area investigated included a section of the BSA sewer extending west-east just south of the closed Lagoons, and in the vicinity of BCC's Outfall 011 which transverses the BSA line. Within the study area, the BSA sewer is bound by sheet piling consisting of wood planking and steel piling. In the area where Outfall 011 crosses the sewer line, a 5-ft to 10-ft section of the sheet piling has been reportedly removed. Past reports have indicated that shallow groundwater flow in the vicinity of the former lagoons is toward this area and may also be occurring along the outfall line or the BSA sewer line (Empire Soils Inc., 1990).

The results of this sub-investigation of the RFI indicated that the breach in the BSA sewer sheet piling does act as a confluence for groundwater flow from Area E to the BSA sewer/backfill and the alluvium located downgradient from Area E. However, the steep gradients within this part of Area E may be in part due to the transition between the Upper Tills and alluvium which apparently occurs at the south-east corner of Area E. Beyond the breach in the BSA sheet piling, Outfall 011 does not appear to act as a preferential flow pathway as the outfall piping is bedded approximately at the water table and within the permeable alluvial deposits.

2.5.3 Confined Aquifer

Groundwater in the confined aquifer flows under apparent confined conditions within the Basal Till unit and upper portion of the Onondaga Limestone found beneath the base of the glaciolacustrine clay. Potentiometric surface contour maps for the confined aquifer during June 1997 and July 1997 were presented in the Final RFI report (Golder, 1998a). The potentiometric maps for the confined aquifer are constructed from water levels obtained from four RFI monitoring wells and eight pre-RFI monitoring wells screened within the Basal Till and upper portion of the Onondaga Limestone (all located within Area ABCE). Based on water levels from the deep monitoring wells, a groundwater divide, or zone of no flow is apparently present within the confined aquifer below the central portion of Area E. Flow was generally to the west and east of this divide during both the June 1997 and July 1997 monitoring events. This general flow pattern was also observed during the April 1996 and August 1996 monitoring events.

Vertical gradients across the glaciolacustrine clay unit were calculated from water level measurements obtained from seven shallow/deep well pairs during each of the four water level monitoring events recorded during the RFI. The average vertical gradient calculated for the June 1997 and July 1997 monitoring events was -0.13 ft/ft and -0.11 ft/ft, respectively, indicating a slight downward gradient.

Hydrogeologic Characteristics

Rising head tests were conducted in each of the RFI monitoring wells screened within the confined aquifer to determine the hydraulic conductivity of the subsurface materials adjacent to the screened interval at each location. As indicated in the RFI report, hydraulic conductivities for monitoring wells screened within the Basal Till/upper portion of the Onondaga Limestone ranged from 1.50×10^{-2} cm/s to 4.04×10^{-7} cm/s.

2.6 Nature and Extent of Contamination

The following sections summarize the nature and extent of soil and groundwater contamination identified within Area ABCE. A detailed discussion of the constituents and concentrations detected is presented in the Risk Assessment in Section 3.

2.6.1 Soil

Soil/fill sample analyses performed during the RFI indicated the presence of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals and cyanide. These were detected primarily in shallow subsoils/fill (0-4ft. below ground surface (bgs)) samples and also at greater depths (>4 ft. but <16 ft. bgs.) in specific sample locations. Most sample concentrations were below the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 (January 1994) soil cleanup objective concentrations. Figure 5 indicates the locations of these exceedances and sample depths.

A summary of the constituents detected in soil samples is presented in the Final RFI Report (Golder, 1998a).

2.6.2 Groundwater

The following describes the organic and inorganic constituents detected in the shallow and confined aquifers in Area ABCE. A summary of the constituents detected is presented in the Final RFI Report (Golder, 1998a).

Shallow Aquifer Groundwater Quality

A wide range of organic and inorganic constituents were detected in shallow aquifer groundwater samples that exceeded the 6NYCRR Part 703 Class GA groundwater standards/NYSDEC action levels. These exceedances are shown on Figure 6. The major chemical classes of the hazardous constituents present in shallow groundwater include:

- SVOCs:
 - Aromatic Amines
 - Nitro-Aromatic Compounds
 - Chlorinated Aromatic Compounds
 - Polynuclear Aromatic Hydrocarbons
- VOCs;
- Heavy Metals; and
- Inorganics (Cyanide, Sulfide, Sulfate, Chloride).

Confined Aquifer Groundwater Quality

Constituents were detected at concentrations that exceeded the 6NYCRR Part 703 Class GA groundwater standards/NYSDEC action levels in the confined aquifer and were limited to:

- VOCs (Benzene, Chlorobenzene, Ethylbenzene, Toluene, Xylenes);
- SVOCs (Bis(2-ethylhexyl)phthalate, Phenolics, Aniline); and
- Inorganics (Iron, Sulfate, Sulfide, Chloride, pH).

Benzene, toluene and alkaline pH values were also observed in confined aquifer samples collected during investigations performed by other parties on the PVS property. While benzene, toluene, ethylbenzene and xylenes have been reported to be constituents associated with historic chemical and dye production operations and wastes in Area ABCE, other potential off-site sources were identified in the RFI.

3. RISK ASSESSMENT

A site-specific risk assessment (RA) for Area ABCE was performed as outlined in the Work Plan for Area ABCE, Corrective Measures Study (CMS), (Golder, 1999a). The RA is provided in Appendix A. Previous environmental investigations, under the RFI for Area ABCE (Golder, 1998a), encountered contaminants at specific locations on this site where soil and groundwater concentrations of these contaminants exceeded the criteria detailed in New York State Department of Environmental Conservation (NYSDEC) Technical and Guidance Memorandum (TAGM) and exceeded the criteria in Technical and Operational Guidance Series (TOGS).

As presented in the RFI and CMS Work Plan, the primary issue of concern was the shallow groundwater quality at the perimeter of Area ABCE. Accordingly, this RA examines the consequences of potential soil contaminants within Areas A, B, C and E and groundwater contaminants within Areas B, C and E that could theoretically pose a risk to human and ecological health. The effects on the Buffalo River from the impacted shallow groundwater in Area A were not included in the RA since hydraulic containment has been proposed as a corrective measure in this area. Potential human and ecological receptors and exposure pathways have been identified to determine the level of risk potentially present from the identified contaminants.

This RA was carried out to support the CMS and to characterize the potential risk resulting from contaminants in Area ABCE. The methods used in the RA are consistent with U.S. EPA Risk Assessment Guidance for Superfund (RAGs) (U.S. EPA, 1989) including the updated methodology outlined in the U.S. EPA's Soil Screening Guidance (SSG) (U.S. EPA, 1996a and 1996b). Golder Associates Ltd. was retained to perform this site specific risk assessment and GlobalTox International Consultants Inc. were retained to critically assess the report.

The process used for the RA followed the U.S. EPA RA process, (U.S. EPA, 1989) which has four stages:

1. Hazard Identification/Problem Formulation
2. Exposure Assessment
3. Toxicity Assessment
4. Risk Characterization

These four steps drive the RA process and evaluate the possibility of adverse effects on human or ecological health following exposure from a contaminant. A brief description of the stages of the RA is presented below:

- *Hazard Identification / Problem Formulation*

Chemicals of potential concern are identified through a screening process which compares site-specific analytical data to health-based or risk-based criteria. Potential receptors (i.e. people, plants, animals) and pathways of exposure (i.e. mechanisms and media through which substances of concern can reach receptors) are screened using information about site-specific land use. The three risk components are then synthesized into a conceptual pathways model (CPM) that describes complete exposure pathways from sources (chemicals) to receptors through contact pathways.

- *Exposure Assessment*

Physiological parameters, such as body weight and breathing rate, for people that may be exposed to different environmental media (e.g. air, water, soil) are identified from standard exposure factor guidance and integrated with the frequency, duration and magnitude of the potential exposures from plausible exposure scenarios. The result is a quantitative estimate of the dose received by the receptors (i.e. people) under consideration.

- *Toxicity Assessment (Dose-Response Assessment)*

For this RA, the dose-response assessment makes extensive use of available sources of chemical-specific toxicity reference values. Reference doses (R_fD) for non-carcinogens and cancer potency or slope factors (SF) were identified from agency sources and the literature (HEAST, 1997; IRIS, 1999; U.S. EPA, 1999a,b).

- *Risk Characterization*

The estimated exposures are compared to their respective reference toxicity values to obtain a quantitative estimate of the risk for carcinogenic substances or Hazard Quotient (HQ) for non-carcinogens. The magnitude of the numerical cancer risk (NCR) for carcinogens and the hazard quotients (HQ) for non-carcinogens are then discussed in the context of potential health risks. The risk characterization component also identifies and discusses the significance of areas of uncertainty and these uncertainties are treated within the RA.

The RA is presented in Appendix A. Based on the RA, the following conclusions were made for soil and groundwater:

Soil

Metals and organics in soil and fill were detected at various locations and depths in the investigation Areas ABCE. However, the direct contact exposure pathway was generally recognized as being blocked (i.e. by surface capping such as concrete or asphalt) or managed by administrative controls (i.e. access restrictions, health and safety procedures). Moreover, substances identified as being of potential concern based on the step-wise chemical screening outlined above were generally those that (a) have not been detected, but for which method detection limits were not sufficiently low (due to sample matrix) to evaluate comparison with risk-based levels, or (b) have no corresponding regulatory criteria or derived Industrial/Commercial risk-based levels, preventing their elimination from further consideration during screening.

It is concluded that there are likely no unacceptable health risks to on- and off-site human and environmental receptors from soil-borne contaminants.

Groundwater

A number of substances were identified as being of potential concern in shallow groundwater at Areas A, B, C and E. A hydraulic containment system is proposed for Area A which is adjacent to the Buffalo River. For the remaining investigation areas (B, C and E) identification of the potential substances of concern was based on a conservative screening approach, involving comparison with concentrations to corresponding TAGM 3028 GALs and TOGS 1.1.1 criteria. For many substances, detection limits were not sufficiently low (due to sample matrix effects) to determine whether the TAGM values were exceeded, and these substances were, therefore, considered to be present at a concentration equal to the detection limit. Potential pathways for on-site and off-site receptors to be exposed to substances in groundwater

were evaluated. The only plausible potential exposure pathway identified in the CPM was the discharge of shallow groundwater to the Buffalo River.

Several assumptions were made to determine if resultant concentrations in the river were such that TOGS 1.1.1 surface drinking water criteria were exceeded. A key assumption was that the maximum concentration of a compound, no matter where it is located in Area B, C and E, was transported to the river. This is an unrealistic and very conservative assumption which also ignores processes which would cause contaminant concentrations in groundwater to decrease during transport to the Buffalo River. Therefore, this scenario is a "worst case" scenario and used only as an exercise to evaluate potential risk. Even with the use of these assumptions, no BCC-derived chemicals from Areas B, C and E were identified as reaching the Buffalo River.

Nevertheless, risk calculations were performed to determine if a potential risk existed by incidental ingestion of Buffalo River water using the maximum concentrations observed in Areas B, C and E. One metal, arsenic, was identified as having a potential risk with a NCR of 5.03×10^{-5} . However, this calculation is conservative since it ignored dilution and sorption processes, that would reduce the concentration of the contaminant. In any event, the calculated NCR is within the range of incremental life time cancer risks (ILCRs) generally considered to be acceptable by the U.S. EPA ($10^{-6} - 10^{-4}$). Assuming containment in Area A, it is concluded that there are likely no unacceptable health risks to on- and off-site human and environmental receptors from groundwater-borne contaminants arising from Areas A, B, C and E.

The RA assumed that the site will continue its operation as a chemical manufacturing facility. Any potential risks identified also assume this continuing use. Any significant change in the facility's future compared with its current industrial purpose will necessitate a review of the site and RA.

4. CORRECTIVE ACTION OBJECTIVES

Corrective action objectives and general response actions are both media-specific. The media of concern identified for BCC Area ABCE are the shallow aquifer and surface/shallow (0-2 ft. bgs) subsurface soils. The following sections describe the site-specific corrective action objectives and the general response actions developed for Area ABCE.

4.1 Groundwater

For purposes of this CMS due to the site characteristics, groundwater contamination in the shallow aquifer in Area A will be addressed separately from groundwater contamination in Areas BCE.

Area A

Contaminated groundwater is migrating through the shallow aquifer in Area A and is discharging to the Buffalo River, which is a receptor. Hazardous constituents have been detected in the shallow aquifer beneath Area A at concentrations which exceed Class GA groundwater standards. However, neither the shallow aquifer nor the Buffalo River are used as sources of potable water.

Consequently, the corrective action objective for shallow groundwater in Area A is to provide hydraulic containment to prevent hazardous constituents from continuing to discharge into the Buffalo River.

Area BCE

As presented in the RFI conclusions discussed in Section 2 of this report, hazardous constituents detected in the shallow aquifer in Areas B, C and E are not migrating to any significant extent beyond the southern and eastern boundaries of these areas given the existing site conditions and RFI groundwater monitoring data.

Consequently, the corrective action objective for shallow groundwater in Areas BCE is to address the potential for off-site migration of groundwater contaminants as necessary so that there is not an unacceptable risk to human health and the environment.

4.2 Soil

The corrective action objective for surficial and shallow subsoils is to contain, isolate or treat the soils contaminants as necessary so that there is not an unacceptable risk to human health and the environment.

5. IDENTIFICATION AND SCREENING OF REMEDIAL TECHNOLOGIES

5.1 General

Corrective measures describe those actions that could satisfy the corrective action objectives. These actions may include treatment, containment, excavation, disposal, institutional controls, or a combination of these measures. Based on the corrective action objectives established for Area ABCE, the corrective measures alternatives could include:

Shallow Groundwater

- Restrict future groundwater use and potential exposure to contaminants through institutional controls;
- Contain and extract shallow groundwater to prevent contaminant migration using hydraulic barriers;
- Capping of unpaved soils to minimize infiltration;
- Treat extracted groundwater using physical, chemical, or biological processes;
- Dispose of pretreated or untreated groundwater either on-site or off-site; or
- Continue to monitor the concentrations and extent of shallow groundwater constituents.

Soil

- Restrict site access, future land use to industrial/commercial uses, and potential exposure to soil contaminants through institutional controls;
- Contain exposed soils using a cap/cover system;
- Remove soil for off-site treatment and/or disposal; or
- Treat soil using chemical, biological, or thermal processes.

5.2 Initial Screening of Remedial Technologies

A focused approach to the evaluation of potential remedial alternatives was used for Area ABCE. Consequently, a limited number of potential remedial alternative scenarios were evaluated for impacted media within Area ABCE. Emphasis was placed on identifying practical, reliable, and implementable remedies appropriate for the site environmental conditions, spatial constraints, infrastructure, and ongoing operations at the facility.

The Task I Corrective Measures Identification Report (Golder, 1999b) screened a range of potential remedial technologies for the facility. From this screening process, a focused list of potentially applicable corrective measures for both soil and shallow groundwater in Area ABCE was developed. The initial screening of remedial technologies was based on the site-specific characteristics of Area ABCE, the constituents and concentrations present in soil and groundwater, and technology limitations. Screening of remedial technologies for Area A considered the differences in the physical setting of Area A from Area BCE including proximity to the Buffalo River, soil types present and subsurface conditions. The objective of the Area A groundwater corrective measure is to provide hydraulic control of groundwater in this area. Remedial alternatives evaluated for ex-situ treatment of groundwater include the use of and potential upgrades to the existing Area D groundwater treatment system (GWTS) located in Area A of the BCC facility.

Corrective measure technologies and alternatives retained from the initial screening were further evaluated in this CMS using information obtained from the USEPA sponsored Federal Remediation Technologies Roundtable (FRTR) technology database, Area D feasibility study (Wehran-New York, 1991), inquiries to remedial contractors and similar project experience.

5.3 Institutional Controls

This technology uses administrative controls and management procedures to limit and control potential exposures to hazardous constituents. Areas A, B, C, and E at the BCC facility are currently, and for the foreseeable future, active industrial areas associated with the current dye production activities. These areas are controlled and maintained by BCC on a daily basis. Access to the BCC facility is restricted to BCC employees, their subcontractors, and authorized visitors. All visitors must sign in and obtain a visitors badge prior to admittance to the facility. The BCC facility is surrounded by a chain-link fence with locking gates, except for cross streets and railroad track areas. The facility also has a 24-hour uniformed guard security service.

Routine maintenance of the existing facilities is performed by BCC. This includes maintenance of the existing soil/vegetative covers for the former Lagoons 1, 2 and 3 in Area E and concrete and asphalt pavement over the facility soils.

BCC's health and safety rules require employees, visitors and contractors working on site to follow specific procedures and use personal protective equipment while at the facility. Any excavation or intrusive sub-surface activity requires a project specific health and safety plan to be developed to control potential exposures to soil contaminants.

No drinking water wells are known to be located within the cities of Buffalo or Lackawanna, or within four miles of the facility. Potable water is provided by local municipalities.

BCC, through their legal counsel, plans to execute restrictions to the property deed to restrict the BCC property to industrial/commercial uses so long as residual soil or groundwater contaminant concentrations require this restriction. In addition, institutional controls are proposed to be a component of any of the groundwater corrective measures alternatives. Consequently, institutional controls are retained for further evaluation.

5.4 Groundwater Monitoring

Groundwater monitoring is performed to monitor the presence, concentration and potential for migration over time of hazardous constituents in groundwater. BCC currently performs routine post closure groundwater monitoring associated with the closed former Lagoons (1, 2 and 3) as required by Appendix V-C of BCC's Post Closure Permit. Water levels are measured on a quarterly basis for all the BCC pre-RFI wells and piezometers including three PVS shallow aquifer wells (GW-1, GW-2 and GW-3) and two PVS confined or deep aquifer wells (B1 and B2). The current shallow aquifer point of compliance wells include R09, R11, R13, and R14; well R15 is the upgradient well. Samples are collected from these Area E BCC shallow aquifer wells on a semi-annual basis and are analyzed for selected VOCs and SVOCs and annually for metals and inorganics.

The current BCC confined aquifer point of compliance wells include R03, R04, R06, and R12. Wells R02 and R07 are designated as confined aquifer upgradient wells for the former Lagoons area. Analyses of samples from these wells are performed on an annual and biennial basis for specific organic and inorganic parameters. In addition, during the RFI, fourteen (14) shallow aquifer wells, four (4) confined aquifer wells, and five (5) piezometers were installed during Phase I of the RFI with two (2) rounds of sample collection and analyses from the monitoring wells. As part of the RFI supplemental investigation, ten (10) additional shallow aquifer wells and two (2) off-site piezometers were also installed. These wells and piezometers were used to characterize and evaluate potential migration of hazardous constituents in groundwater from SWMU Area ABCE to off-site and hydraulically downgradient areas bordering BCC. These areas include the PVS Chemicals Inc. facility and areas along the eastern edge of the site including the Buffalo Sewer Authority (BSA) sewer and Orlando Street.

Groundwater monitoring will remain a requirement for the post closure care period for the former Lagoons 1, 2 and 3. In addition, a groundwater monitoring program is proposed to be a component of any of the groundwater corrective measures alternatives. Consequently, groundwater monitoring is retained for further evaluation.

5.5 Containment

Containment involving physical impervious barrier systems is often utilized to prevent, or significantly reduce, the migration of contaminants in soils or groundwater. Containment is necessary whenever contaminated materials are to be buried or left in place at a site. In general, containment is performed when extensive subsurface contamination at a site precludes excavation and removal of wastes because of potential hazards, unrealistic cost, or lack of appropriate treatment technologies.

5.5.1 Capping

Capping or cover systems can be used to:

- Minimize exposure to soils on the surface of the facility;
- Prevent vertical infiltration of water into soil that would create contaminated leachate;
- Control volatile emissions and limit risks of inhalation from underlying soil; and
- Create a land surface that can support vegetation and/or be used for other productive purposes.

Low Permeability Soil Caps

Soils used as barrier materials generally are clays that are compacted to a hydraulic conductivity no greater than 1×10^{-6} cm/sec. Compacted soil barriers are generally installed in 6-inch minimum lifts to achieve a thickness of 2 feet or more. These barriers include a vegetated soil layer to reduce erosion and loss of soil moisture. These barrier systems can be effective if well maintained.

Asphalt and Concrete Caps

The most effective single-layer caps are composed of concrete or bituminous asphalt. They are used to form a surface barrier between contaminated soils and the environment. The selection of material and design is dependent on its intended use. Paved areas

designed and constructed appropriately can be used for productive uses such as storage or parking areas.

In conjunction with water diversion and detention structures, these types of cover systems may be designed to route surface water away from the impacted area while minimizing erosion. Grading is also performed for these activities. As with any cover system, these caps must be inspected and maintained on a routine basis. In addition, precautions must be taken to assume that the integrity of the cap is not compromised by land use activities.

Cover systems do not lessen toxicity, mobility, or volume of hazardous wastes or contaminated media, but they do mitigate infiltration and potential exposure. These systems are commonly used in areas where buildings and subsurface utilities are a consideration. Cover systems are a practical technology and alternative because they are non-intrusive, involve limited disruption of facility activities, limit exposure to contaminants, are generally less expensive than other technologies, and can effectively reduce the potential risks associated with contaminated soils.

Based on these considerations and the Area ABCE site traffic conditions, and continued industrial use, the asphalt capping technologies for isolation of contaminated soils is retained for further evaluation.

5.5.2 Hydraulic Barriers

Hydraulic containment systems involve the use of groundwater barriers to contain and control groundwater flow and contaminant migration.

Vertical Barriers

- **Slurry Walls**

Slurry walls are a common subsurface barrier that have been used for decades as long-term solutions for controlling groundwater flow in unconsolidated soils. These subsurface barriers consist of vertically excavated trenches filled with slurry. The slurry, usually a

mixture of bentonite and water, hydraulically shores the trench to prevent collapse and retard groundwater flow. Slurry walls are used to contain contaminated groundwater, divert contaminated ground water, divert uncontaminated groundwater flow, minimize infiltration of water from other sources and/or provide a barrier for groundwater treatment systems. Slurry walls often are used where the waste mass is too large for treatment and where soluble and mobile constituents pose an imminent threat to a water resource. They are often used in conjunction with capping. The technology has demonstrated its effectiveness in containing greater than 95% of the uncontaminated groundwater; however, in contaminated groundwater applications, specific contaminant types may degrade the slurry wall components and reduce the long-term effectiveness.

Most slurry walls are constructed of a soil, bentonite, and water mixture. The bentonite slurry is used primarily for wall stabilization during trench excavation. A soil-bentonite backfill material is then placed into the trench (displacing the slurry) to create the cutoff wall. Walls of this composition provide a barrier with low permeability and chemical resistance at low cost. Other wall compositions, such as cement/bentonite, pozzolan/bentonite, attapulgite, organically modified bentonite, or slurry/geomembrane composite, may be used if greater structural strength is required or if chemical incompatibilities between bentonite and site contaminants exist.

Slurry walls are typically placed at depths less than 30 feet and are generally 2 to 4 feet in thickness. The most effective application of the slurry wall for site remediation or pollution control is to base (or key) the slurry wall 2 to 3 feet into a low permeability layer such as clay or bedrock. This "keying-in" provides for an effective foundation with minimum leakage potential.

Factors that may affect the applicability and effectiveness of the process include:

- Most of the approaches involve a large amount of heavy construction.;
- The technology only contains contaminants within a specific area;

- Soil-bentonite backfills are not able to withstand attack by strong acids, bases, salt solutions, and some organic chemicals. Other slurry mixtures can be developed to resist specific chemicals; and
- There is the potential for the slurry walls to degrade or deteriorate over time.

Factors that have the most significant impact on the cost of slurry wall installation include:

- Type, activity, and distribution of contaminants;
 - Depth, length, and width of wall;
 - Geological and hydrological characteristics;
 - Distance from source of materials and equipment;
 - Requirements for wall protection and maintenance;
 - Type of slurry and backfill used; and
 - Other site-specific requirements as identified in the site assessment (e.g., presence of subsurface features, obstructions or debris).
- Grout Curtain

Grout curtains are subsurface barriers constructed by pressure injecting a grout material through a pipe, auger or beam into the subsoils using a drill rig or crane mounted injection system. The curtain is developed by forming a line or row of adjacent grout columns along the containment boundary. A secondary row of columns are installed behind the primary row with sufficient overlap to fill in any gaps between the columns.

Due to the possibility of gaps forming in the grout curtain from shrinkage upon setting of the grout, these barriers may not be as effective in controlling flow/migrations as other types of subsurface barriers. However, this technology can be used to provide a barrier where subsurface features may limit the feasibility of using a slurry wall. Contaminant compatibility is a key factor for implementation of this technology due to the potential to develop perforations in the curtain if contaminants affect grout setting.

Factors affecting the applicability, effectiveness, and cost of this technology are similar to that of slurry walls described above.

- **Sheet Piling**

Sheet piles are constructed of a variety of materials including steel, wood, concrete or geomembranes to form a vertical subsurface barrier to control groundwater flow. Steel sheet piles are most commonly used while HDPE geomembrane panels have been used as an alternative to steel for their chemical resistance properties. Sheet piling forms a relatively impermeable continuous wall. Sheet piling can be installed by assembling wall sections prior to installation or by driving sections of the wall into the ground using drop or vibratory hammers.

The voids in the interlocking sections fill in over time with soil particles or can be installed with a sealing gasket-type material. Subsurface obstructions such as large rocks, foundations, or utilities limit the applicability and effectiveness of this type of barrier. Sheet piling is readily available and costs are dependent upon site conditions and installation requirements.

Based on the site and subsurface characteristics of Area A and evaluation of slurry walls, grout curtains and sheet piling, a grout curtain barrier is retained for further evaluation as a groundwater containment technology and alternative for Area A.

5.6 Bank Stabilization

- **Fabriform®**

Fabriform® is an effective and durable erosion control technology that involves using a monolithic concrete protective structure formed by pumping fine aggregate concrete into woven synthetic fabric forms. A large semi-continuous mat of concrete can be installed without significant use of heavy equipment.

- Rip Rap

Rip rap consists of large rocks or boulders placed on exposed areas of a bank to reduce the potential for soil erosion. The rock size and thickness of the rip rap used is based on site conditions. Typically, a geotextile is placed beneath the rip rap to act as a separation layer.

Based on Area A site conditions including river velocities and potential for undermining semi-rigid erosion control mats (i.e. Fabriform®), and its effective use in Area D remedial systems, rip rap is retained for further evaluation for exposed bank areas in Area A.

5.7 Soil Excavation and Disposal

This technology involves the excavation and removal of contaminated soils (overburden) using conventional earth moving and handling equipment. Excavated soils are either treated onsite and returned to the excavation, disposed of in a constructed on-site unit, or transported to permitted off-site treatment and/or disposal facilities. The anticipated volume and characteristics of the soils affect which alternative is more appropriate. Excavations are backfilled with suitable clean fill or soil which is then compacted and graded to restore the area to the desired surface conditions. Excavation and off-site disposal is applicable to the complete range of contaminant groups.

Factors that may limit the applicability and effectiveness of the process include:

- Generation of fugitive emissions may be a problem during operations;
- The distance from the site to the nearest disposal facility with the required permit(s) will affect cost;
- Depth and composition of the media and presence of debris requiring excavation must be considered;
- Transportation of the soil through populated areas may affect community acceptability; and

- The type of contaminant and its concentration will impact off-site disposal requirements.

Excavation and off-site disposal is a well proven and readily implementable technology. Excavation is the initial component in all ex-situ treatment technologies. Costs for excavation are dependent on the nature of hazardous materials, volume and methods of excavation. This technology can be less cost effective than other alternatives such as capping or in-situ treatment where large volumes of soil are involved requiring treatment or disposal due to transportation, landfill disposal, or incineration costs. The type of contaminants and concentrations impact off-site disposal requirements.

Additional costs may include soil/debris disposal characterization and treatment prior to Subtitle C landfill disposal to meet RCRA Land Disposal Restrictions (LDRs) requirements, if the soils are characterized as RCRA hazardous and specific constituent concentrations exceed the LDR limits. Otherwise, non-hazardous soil and debris could be disposed of in a Subtitle D solid waste landfill.

With respect to Area ABCE, depth of contaminants and historic presence of industrial facilities (e.g., buildings, tank systems, process equipment), paved roadways, parking areas, railroad tracks, massive concrete foundations and subsurface utilities would likely prevent extensive soil excavation for treatment and/or disposal.

However, excavation and removal of soil may be appropriate for limited areas where the constituent concentrations pose an unacceptable risk. In addition, excavation or the generation of contaminated soils for off-site disposal is a component of the installation of any groundwater containment and collection system. Consequently, this technology is retained for soils for these specific applications.

5.8 Soil Treatment

Three soil treatment technologies were retained from the initial screening activities [Task I Corrective Measures Identification Report (Golder, 1999b)] as presented in the CMS work plan which include incineration, bioremediation, and phytoremediation. The applicability of these technologies for Area ABCE soils are discussed below based on information derived from contacts with remedial contractors, similar project applications, and further review of literature sources.

5.8.1 Incineration

High temperatures, 870 to 1,200 °C (1,400 to 2,200 °F), are used to volatilize and combust (in the presence of oxygen) organic constituents (including VOCs, SVOCs and PCBs) in hazardous wastes and soils. Often auxiliary fuels are employed to initiate and sustain combustion. The destruction and removal efficiency (DRE) for properly operated incinerators exceeds the 99.99% requirement for hazardous waste and can be operated to meet the 99.9999% requirement for PCBs and dioxins. Off gases and combustion residuals usually require treatment. There are several incineration system designs commercially available including:

- Rotary Kilns;
- Circulating Bed Combustor (CBC);
- Fluidized Bed; and
- Infrared Combustion

Factors that may limit the applicability and effectiveness of incineration include:

- Specific feed size and materials handling requirements that can impact applicability or cost at specific sites;
- Heavy metals can produce a bottom ash that requires stabilization;
- Volatile heavy metals, including lead, cadmium, mercury, and arsenic, leave the combustion unit with the flue gases and require gas cleaning systems for removal;

- Metals can react with other elements in the feed stream, such as chlorine or sulfur, forming more volatile and toxic compounds than the original species. Such compounds are likely to be short-lived reaction intermediates that can be destroyed in a caustic quench; and
- Sodium and potassium form low melting point ashes that can attack the brick lining and form a sticky particulate that fouls gas ducts.

If an off-site incinerator is used, the potential risk of transporting the hazardous waste through the community must be considered. Additionally, on-site incineration can raise substantial concerns from the local community. The commercial units are large capacity rotary kilns with afterburners and sophisticated air pollution control systems.

Soil/debris treatment costs at off-site incinerators are generally higher than other technologies. Mobile units that can be operated on-site reduces the soil transportation costs. However, large volumes of soil requiring incineration are required for onsite – incineration to be cost effective due to high mobilization and permitting costs.

Based on these considerations and site characteristics, incineration would only be applicable for limited volumes of excavated soil/debris removed for disposal that, due to RCRA Land Disposal Restriction (LDR) organic constituent concentrations, may preclude the direct RCRA landfill disposal. However, based on a review of the Area ABCE soil sample analyses by CWM Chemical Services, L.L.C. Model City facility (CWM), if necessary, specific organic constituents in soil/debris could be treated by off-site chemical oxidation (if necessary) at the CWM Model City facility as a lower cost alternative to incineration. Consequently, this technology is not retained.

5.8.2 Bioremediation

Enhanced bioremediation is a process in which indigenous or inoculated micro-organisms (e.g., fungi, bacteria, and other microbes) degrade (metabolize) organic contaminants found in soil and/or groundwater, converting them to innocuous end products. Nutrients, oxygen, or other amendments may be used to enhance bioremediation and contaminant desorption from subsurface materials. Two typical processes that can be used include:

Aerobic

In the presence of sufficient oxygen (aerobic conditions), and other nutrient elements, microorganisms will ultimately convert many organic contaminants to carbon dioxide, water, and microbial cell mass.

Anaerobic

In the absence of oxygen (anaerobic conditions), the organic contaminants will be ultimately metabolized to methane, limited amounts of carbon dioxide, and trace amounts of hydrogen gas. Under sulfate-reduction conditions, sulfate is converted to sulfide or elemental sulfur, and under nitrate-reduction conditions, dinitrogen gas is ultimately produced.

Enhanced bioremediation of soil typically involves the percolation or injection of groundwater or uncontaminated water mixed with nutrients and saturated with dissolved oxygen. Sometimes acclimated microorganisms (bioaugmentation) and/or another oxygen source such as hydrogen peroxide are also added. An infiltration gallery or spray irrigation is typically used for shallow contaminated soils, and injection wells are used for deeper contaminated soils.

Although successful in-situ bioremediation has been demonstrated in cold weather climates, low temperature slows the remediation process. For sites with low soil temperature, heat blankets may be used to cover the soil surface to increase the soil temperature and the degradation rate. Enhanced bioremediation may be classified as a long-term technology which may take several years for cleanup.

Bioremediation techniques have been successfully used to remediate soils, sludges, and ground water contaminated with petroleum hydrocarbons, solvents, pesticides, wood preservatives, and other organic chemicals. Bioremediation is especially effective for remediating low level residual contamination in conjunction with source removal.

Sometimes contaminants may be degraded to intermediate or final products that may be less, equally, or more hazardous than the original contaminant.

While bioremediation (nor any other remediation technology) cannot degrade inorganic contaminants, bioremediation can be used to change the valence state of inorganics and cause adsorption, immobilization onto soil particulates, precipitation, uptake, accumulation, and concentration of inorganics in micro or macroorganisms. These techniques, however, are still largely experimental.

Factors that may limit the applicability and effectiveness of this process include:

- Cleanup goals may not be attained if the soil matrix prohibits contaminant-microorganism contact;
- The circulation of water-based solutions through the soil may increase contaminant mobility and necessitate treatment of underlying groundwater;
- Preferential colonization by microbes may occur causing clogging of nutrient and water injection wells;
- Preferential flow paths may severely decrease contact between injected fluids and contaminants throughout the contaminated zones. These systems are generally not used for clay, highly layered, or heterogeneous subsurface environments because of oxygen (or other electron acceptor) transfer limitations;
- High concentrations of heavy metals, highly chlorinated organics, long chain hydrocarbons, or inorganic salts are likely to be toxic to microorganisms; and
- Bioremediation slows at low temperatures.

Treatability or feasibility tests are required to determine whether enhanced bioremediation is feasible in a given situation, and to define costs, the remediation time frame and parameters.

In-situ processes generally require longer time periods, however, and there is less certainty about the uniformity of treatment because of the inherent variability in soil characteristics and difficulty in monitoring progress. Remediation times are often years,

depending mainly on the degradation rates of specific contaminants, site characteristics, and climate.

Based on the site characteristics, range of constituents present, limitations discussed above, and discussions with a bioremediation contractor, this technology is not retained for further evaluation.

5.8.3 Phytoremediation

Phytoremediation is a process that uses plants to remove, transfer, stabilize, and destroy contaminants in soil and sediment. Contaminants may be either organic or inorganic. The mechanisms of phytoremediation include enhanced rhizosphere biodegradation, phyto-extraction (also called phyto-accumulation), phyto-degradation, and phyto-stabilization.

Enhanced Rhizosphere Biodegradation

Enhanced rhizosphere biodegradation takes place in the soil immediately surrounding plant roots. Natural substances released by plant roots supply nutrients to microorganisms, which enhances their biological activities. Plant roots also loosen the soil and then die, leaving paths for transport of water and aeration. This process tends to pull water to the surface zone and dry the lower saturated zones.

Phyto-accumulation

Phyto-accumulation is the uptake of contaminants by plant roots and the translocation/accumulation (phytoextraction) of contaminants into plant shoots and leaves.

Phyto-degradation

Phyto-degradation is the metabolism of contaminants within plant tissues. Plants produce enzymes, such as dehalogenase and oxygenase, that help catalyze degradation. Research is reportedly continuing by various organizations determine if both aromatic and chlorinated aliphatic compounds are amenable to phyto-degradation.

Phyto-stabilization

Phyto-stabilization is the phenomenon of production of chemical compounds by plant to immobilize contaminants at the interface of roots and soil.

Phytoremediation may be applicable for the remediation of metals, pesticides, solvents, explosives, crude oil, PAHs, and landfill leachates. Some plant species have the ability to store metals in their roots. They can be transplanted to sites to filter metals from wastewater. As the roots become saturated with metal contaminants, they can be harvested. Hyper-accumulator plants may be able to remove and store significant amount of metallic contaminants.

Currently, research is being performed to determine the ability of specific trees to remove organic contaminants from ground water, translocate and transpiration, and possibly metabolize them either to CO₂ or plant tissue.

There are a number of limitations to phytoremediation in soil.

- The depth of the treatment zone is determined by plants used in phytoremediation. In most cases, it is limited to shallow soils;
- High concentrations of hazardous materials can be toxic to plants;
- It involves the same mass transfer limitations as other biotreatments;
- It may be seasonal, depending on location;
- It can transfer contamination across media, e.g., from soil to air;

- It is not effective for strongly sorbed (e.g., PCBs) and weakly sorbed contaminants;
- The toxicity and bioavailability of biodegradation products is not always known; and
- Products may be mobilized into ground water or bioaccumulated in animals.
- This technology is still generally in the research/demonstration stage.

The cost of using this technology, if effective for soil remediation, is expected to be significantly less than excavation and landfill disposal.

Based on the site characteristics, limitations discussed above, and review/evaluation with a phytoremediation contractor, this technology is not retained for further evaluation.

5.9 Groundwater Collection and Extraction

Extraction Wells

Groundwater extraction or pumping are some of the most commonly used groundwater containment and remediation technologies at contaminated sites. Groundwater extraction includes removal of dissolved contaminants from the subsurface, and containment of contaminated groundwater to prevent migration.

Extraction wells are used to remove groundwater from an aquifer and generally consist of a well casing, well screen, filter pack, seal and pump. The casing and screen stabilizes the borehole, restricts particles from entering the well and allows water to be drawn into the well casing. Various pump designs can be used to pump groundwater to the surface through the casing. The well seal prevents surface water from migrating down the borehole to groundwater.

Extraction wells are most effective where aquifers have high hydraulic conductivities and where hydraulic gradients are steep. The criteria for well design, pumping system, and treatment are dependent on the physical site characteristics and contaminant type. The effectiveness of an extraction well system depends on the location, configuration and

number of wells, well design and pumping rates. Extraction wells can be subject to biofouling, corrosion or build up of scale on the well or pumping components.

A component of any groundwater extraction system is a groundwater monitoring program to verify its effectiveness. Monitoring the remedial system with wells and piezometers allows iterative adjustments to be made to the system in response to changes in subsurface conditions resulting from groundwater extraction.

The final component is determining the termination requirements. Termination requirements are based on the cleanup objectives defined during the corrective action process.

The costs of these systems are dependent upon subsurface materials and available data, well depth, design, and requirements for subsequent groundwater conveyance, storage, treatment, and discharge.

Based on the Area ABCE site characteristics, extraction wells are retained for further evaluation as a groundwater containment and removal technology for Area A and an alternative for Areas BCE.

Interception/Collection Trenches

Groundwater interception/collection trenches are essentially subsurface drains that are gravity collection systems design to intercept groundwater flow to collect and transport the water by gravity flow to removal systems. These trenches or drains form a continuous zone of influence such that groundwater within the target zone flows toward the trench.

These systems are comprised of a permeable gravel fill and/or conduit to direct the flow to a collection sump; a filter fabric to prevent clogging by fine particulates; a suitable impermeable backfill to restore the excavation to grade and prevent surface water

infiltration; and a pumping and piping system for removal and conveyance of the groundwater for subsequent treatment and/or discharge.

Interceptor/collection trenches are used primarily for shallow (i.e. < 40 feet) applications due to the addition costs for excavation, shoring and dewatering at greater depths. The systems are often used in conjunction with barrier walls to control groundwater flow.

The system components must be compatible with soil and groundwater contaminants to prevent clogging/fouling. Costs for construction of these systems are mainly dependent on excavation cost and cost for disposal of excavated soils, if required.

Based on the Area BCE site characteristics, interceptor/collection trenches are retained for further evaluation as a groundwater containment and removal technology and alternative for Areas BCE.

Well Point Recovery/Dewatering

These systems consist of a series of closely spaced wells which are connected to one another by a pipe system which runs along the ground surface between the wells. The wells are installed in the overburden soils and into a shallow aquifer. Groundwater is pumped by suction lift. The usefulness is limited by the height that water can be lifted, which is approximately 15 feet. As this type of system is limited by its maximum lift, and based on the site conditions in area ABCE, this technology is not retained for further evaluation.

5.10 Groundwater Treatment After Removal

The remedial measures implemented by Allied Signal, Inc. for Area D included installation of a slurry wall, groundwater extraction wells, capping and construction of an Area D groundwater treatment system (GWTS) which is currently in operation and located in Area A of the BCC facility. Influent groundwater from the Area D extraction wells is pumped to the GWTS for treatment prior to discharge to the Buffalo River

(Outfall 001). The Area D groundwater discharge criteria and authorization was issued by the NYSDEC on August 7, 1995 (Buffalo Color Site No. 915012). The NYSDEC indicated in this authorization that the discharge criteria are consistent with procedures used under the State Pollutant Discharge Elimination System (SPDES) permit.

The Area D groundwater contaminants treated by the current GWTS include metals (arsenic, cadmium, chromium, copper, iron, lead, mercury), oils and various VOCs and SVOCs.

The current Area D GWTS unit processes for treating the extracted groundwater include:

- Oil/Water Separation;
- Metals Precipitation;
- Coagulation/Flocculation;
- Clarification;
- Multimedia Filtration;
- Activated Carbon Adsorption;
- pH Adjustment;
- Sludge Thickening; and
- Sludge Dewatering.

The groundwater contaminants in Area D being treated through the GWTS are similar to those identified from analysis of groundwater samples collected in Areas A, B, C and E at the BCC facility. Consequently, the applicability and use of the GWTS for potential additional groundwater flows from other remedial systems at the BCC facility has been taken into consideration as part of the Area ABCE CMS.

As a component of the Area "A" groundwater pump test and modeling performed by Parsons Engineering Science, Inc. (Parsons) (Parsons, 1999), Area A groundwater treatability testing was performed. Groundwater from Area A could be considered to represent the general range of constituents and concentrations observed from groundwater samples collected from Areas ABCE.

A groundwater sample was collected prior to the pumping test from monitoring well RFI-24 by Parsons for evaluation. A discussion of the treatability testing is presented in Section 3.1 of the Parsons report. Based on this testing, Parsons indicated that groundwater from Area A could be treated using the existing GWTS unit operations. However, additional treatability studies were recommended by Parsons to evaluate potential treatment problems and to determine the need, if any, for treatment process modifications.

Consequently, groundwater treatment through the Area D GWTS or a similar system is retained for further evaluation for Area A and for Areas BCE.

5.11 Groundwater Discharge

Three options were evaluated for potential discharge of groundwater collected and removed using the technologies describe above:

- **Discharge of Treated Groundwater to Buffalo River**

Under this option, extracted groundwater treated through the Area D GWTS would be discharged to the Buffalo River in accordance with the current NYSDEC approval for discharge of the Area D treated groundwater. A modification of the current discharge approval would be required to include the discharge of any treated groundwater derived from Area ABCE. This discharge option is retained for further evaluation.

- **Discharge of Groundwater to Buffalo Sewer Authority (BSA)**

Under this option, untreated groundwater or groundwater treated through the Area D GWTS or similar system would be discharged to the BSA for treatment in accordance with a modification of the current BSA discharge permit issued to BCC (Permit No. 99-05-BU021 effective June 1, 1999). BCC's current discharge limits are based on an average flow of 250,000 gallons/day for sampling point SP003 (Area A), 123,000 gallons/day for sampling point SP004 and categorical discharge limits for the organic chemical industry.

This discharge option is retained as an alternative to the discharge of treated groundwater to the Buffalo River as described above.

- Discharge of Groundwater to Deep Well

This option would involve the discharge of treated groundwater under RCRA section 3020(b) through a new on site deep injection well into a suitable geologic formation. An Underground Injection Control (UIC) permit would be required to be obtained from the NYSDEC which is expected to involve likely extensive supplemental investigations and permitting. In addition, based on a review of records relating to the former Deep Well operated in Area C, the anticipated flow rates and characteristics of groundwater to be injected appear to be limiting factors for this option.

Based upon further evaluation and in consideration of the other available options, this alternative for discharge of groundwater is not retained.

6. EVALUATION OF CORRECTIVE MEASURES ALTERNATIVES

6.1 Introduction

This section presents the evaluation of corrective measures alternatives. A discussion of groundwater modeling performed during the CMS is first provided. This information is then followed by a description of corrective measures evaluation criteria, discussion of potential corrective measures alternatives, and finally the proposed corrective measures alternative.

Numerical and analytical groundwater flow modeling for Area A and Area BCE, respectively, was conducted as part of the evaluation of remedial alternatives for shallow aquifer groundwater at BCC. Additionally, constituent migration analysis for several specific compounds within selected portions of Area BCE was performed using an analytical solution to a one-dimensional advection-dispersion equation. Specifically, the purpose of the flow and constituent modeling for Area BCE was to investigate current conditions and several hypothetical remedial scenarios to assess what measures beyond existing conditions may be required for this portion of the site.

6.2 Groundwater Flow Modeling of Remedial Alternatives for Area A

6.2.1 General

The computer code MODFLOW^{win32}, based on the widely used United States Geologic Survey computer code MODFLOW and developed by Environmental Simulations, Inc. (1996), was used to complete the modeling exercise for Area A. Consistent with the remedial objective of groundwater containment for Area A, the goal of the groundwater flow model was to evaluate optimum extraction well configurations and pumping rates in order to prevent further impacts to the Buffalo River.

MODFLOW^{win32} is a three-dimensional numerical, finite-difference groundwater flow model that provides solutions for transient and steady state hydraulic head distributions. In addition, flow due to external stress, such as flow to wells, areal recharge,

evapotranspiration and surface water bodies, can also be simulated. Both pre- and post-processing of data was completed using Groundwater Vistas Software (Environmental Simulations, 1996). Particle tracking was developed using the computer code MODPATH (Pollack, 1989). With this code, it is possible to generate three-dimensional path lines of flowing groundwater based on steady state pumping simulations developed from MODFLOW. One of the main advantages of MODPATH is the ability to evaluate capture zones of pumping wells under different scenarios.

The numerical groundwater flow modeling completed assumes that the aquifer is a non-leaky unconfined aquifer and that groundwater flow occurs under steady-state conditions. The base of the aquifer was considered to be the top of the Glaciolacustrine clay layer, as defined in numerous boreholes completed at the site and presented on Figures 6, 7 and 8 of the document entitled "Final Report on RCRA Facility Investigation, Buffalo Color Corporation, Buffalo, New York (Revision 1)" (Revised RFI Report [Golder Associates, 1998a]).

6.2.2 Previous Groundwater Modeling

Previous groundwater modeling was completed for Area A, and portions of the adjacent PVS property by Parsons (Parsons, 1999). The Parsons model was comprised of a single layer, and utilized a uniform hydraulic conductivity value (e.g., 35 ft/day). The model was calibrated to the August 1998 groundwater contours presented within the RFI (Golder, 1998a). Model calibration indicated that the absolute residual mean of simulated versus observed range in head ratio was 18%. Model verification was carried out by attempting to simulate the results of recovery period data of a pumping test completed by Parsons in May 1999. However, due to variations in the pumping rate during the pumping period, and significant fluctuations in the river elevation during both pumping and recovery periods, the model verification was limited in success. Predictive simulations were carried out to evaluate a shallow aquifer groundwater extraction system. The results of these simulations indicated that a system of four wells each pumping at a

rate of 6 gallons per minute (gpm) would be adequate in preventing groundwater migration to the Buffalo River.

6.2.3 Groundwater Flow Model Set-up

Appendix B contains figures showing the set-up of the groundwater flow model for Area A. These figures show the distribution of the input parameters in the modeling grid area (Figures B-1 to B-10). A brief summary of the Area A model set-up is presented in the following paragraphs, the model calibration is presented in Section 6.2.4, and modeling results are presented in Section 6.2.5.

Finite Difference Grid and Boundary Conditions

The MODFLOW^{win32} model uses a cell-centered grid. For the Area A model, a finite difference grid of 100 rows and 125 columns with an equal grid spacing of 10 feet (1000 feet x 1250 feet) was selected for the groundwater flow simulation (Figures B-1, B-2 and B-3). The groundwater flow model was set up using three layers. Layer 1 represents the Fill, Layer 2 represents both the Upper Till to the west of the alluvium/upper till transition, as shown on Figure 7 of the report titled "Addendum to Final Report on RCRA Facility Investigation Buffalo Color Corporation, Buffalo, New York" (RFI Addendum [Golder Associates, 1998b]), and the alluvium to the east of the alluvium/upper till transition. Layer 3 represents the Glaciolacustrine clay to the west of the alluvium/upper till transition, and the alluvium to the east of the transition zone. Dividing the model in this manner allowed the simulation of partially penetrating observation well screens.

Constant head cells were assigned to the western model boundary in Layers 1, 2 and 3, as well as in the eastern part of the modeling grid to simulate the Buffalo River. The hydraulic head values assigned to these cells were based on the August 1998 groundwater and river elevation presented on Figure 7 of the RFI Addendum.

Base of the Aquifer

The base of the unconfined aquifer is considered to be the top of the Glaciolacustrine clay layer. In the model, the base of layer 3 to the east of the alluvium/upper till transition area was defined by the Glaciolacustrine clay/alluvium interface. To the west of this transition area, the bottom of Layer 3 was arbitrarily set to include five feet of the Glaciolacustrine clay. The base of Layer 2 was defined by the Glaciolacustrine clay/till interface to the west of the alluvium/upper till transition area and to the east the base of Layer 2 was selected to ensure that the monitoring wells screened within the alluvium in this area could be treated as fully penetrating. The base of Layer 1 was defined by the fill/upper till interface to the west of the alluvium/upper till transition area, and by the fill/alluvium interface to the east of the alluvium/upper till transition area. The bottom elevation zonation for Layers 1, 2 and 3 are shown on Figures B-4, B-5, and B-6, respectively.

Hydraulic Conductivity

The zones of hydraulic conductivity in the Area A model were based on the results of slug tests completed as part of the RFI (Golder, 1997) and the results of the groundwater pumping test completed by Parsons (Parsons, 1999). Based on the results of these hydrogeologic tests, the following hydraulic conductivities were initially assigned to the model:

- Fill (3.4 ft/day);
- Upper Till (2.8×10^{-2} ft/day); and
- Glaciolacustrine clay (9.9×10^{-6} ft/day).

The alluvium was assigned three hydraulic conductivity zonations. These zonations were interpreted based upon the depositional history of the river, and the results of slug testing carried out in this area. These corresponded to an upstream area (i.e., in the vicinity of piezometers RFI-34, RFI-38, RFI-44, RFI-45 and RFI-46), a central area (i.e., in the vicinity of piezometers, RFI-22, RFI-24, and RFI-26, and observation wells OW-1 and

OW-2) and a downstream area (i.e., in the vicinity of piezometer RFI-25). These three areas were initially assigned hydraulic conductivity values corresponding to the geometric mean hydraulic conductivity value for the piezometers and wells within each area, as follows:

- Upstream area (3.2 ft/day)
- Central area (36.4 ft/day)
- Downstream area (59.3 ft/day)

The value assigned to the upstream area was increased to 20.0 feet/day during calibration, as discussed in Section 6.2.4 below. Hydraulic conductivity zonation for Layer 1, 2 and 3 are presented on Figures B-7, B-8 and B-9, respectively.

Precipitation Recharge

The net precipitation recharge assigned to the model ranged from 0 to 15 inches/year. Areas occupied by buildings were assigned a recharge rate of 0 inches/year, non-paved grassy areas were assigned recharge rates of 10 inches/year and non-paved gravel areas were assigned recharge rates of 15 inches/year. Precipitation recharge zonation is shown on Figure B-10.

6.2.4 Groundwater Flow Model Calibration

The goal of the model calibration was to obtain values for simulated hydraulic heads and gradients that are similar to the observed data. The August 19-20, 1998 groundwater elevations were used to calibrate the model (Table B-1). During model calibration, it was noted that the hydraulic conductivity of the alluvium had the most impact on the simulated head solution. It is worth noting that the results of the slug tests and pumping tests completed in the alluvium indicate a range of almost two orders of magnitude for the hydraulic conductivity of this unit (i.e., 0.77 ft/day at RFI-46 to 59.3 ft/day at RFI-25). As discussed above, the hydraulic conductivity for the upstream area was changed during calibration from 3.2 ft/day to 20 ft/day. This increase can be justified since the results of

the pumping test completed by Parsons indicated the hydraulic conductivity of RFI-24 was 23 ft/day, compared to the slug test result of 9.8 ft/day in the same well.

Table B-2 presents the results of the statistical summary for the model calibration. As shown, there is good correlation between the measured and simulated heads, with a ratio of absolute residual mean to head range of 3% (ratios of less than 10% are considered appropriate). The largest residual (i.e. 0.70 ft.) was noted at well PS-14. This well is screened across the fill/alluvium interface, and is located to the west of the alluvium/upper till transition area, consequently this discrepancy was not considered significant on the model's ability to simulate site hydraulic conditions. Figure B-11 presents simulated August 1998 hydraulic head contours.

The model calibration was not verified directly against the results of the pumping test for several reasons. Firstly the pumping period data were significantly affected by variations in pumping rate. Secondly, due to the influence of fluctuations in river elevation on both the pumping period and recovery period, corrections in the time-drawdown data appear to have been difficult to achieve (Parsons, 1999).

6.2.5 Groundwater Flow Model Results

Following model calibration, particle tracking simulations were completed to optimize both the number, and location of extraction wells which would effectively prevent groundwater migration to the Buffalo River. Particles were started within Layer 1, upgradient of the facility, and in Layers 1, 2 and 3 immediately downgradient of the alluvium/upper till transition area, and allowed to move within the simulated flow field created by a series of extraction wells adjacent to the river.

Figure B-12 presents the simulated hydraulic head contours for a system of five extraction wells pumping at a combined rate of 16 gallons per minute (gpm). Individual well pumping rates are presented in Table B-3. A conceptual layout for this scenario is presented on Figure B-13. This scenario appears to be effective in preventing

groundwater migration to the river, however a large proportion (i.e., 68%) of the total volume of water pumped originates in the river. As shown on Figure B-12, it is noted that particles emanating from the southeastern portion of Area B would be captured by the components of the Area A containment system located near South Park Ave.

With consideration for the total volume of water that would require treatment, a hydraulic barrier was considered which would reduce the volume of water being pumped from the river. Figure B-14 presents the simulated hydraulic head contours for a system of four extraction wells pumping at a combined rate of 8 gpm. Individual well pumping rates are presented in Table B-4. In this scenario, the hydraulic conductivity of the barrier was considered to be 1×10^{-4} cm/sec, which is representative of a leaky grout curtain. A conceptual layout for an Area A groundwater containment system that incorporates a grout barrier is presented on Figure B-15. Further reduction in pumping rates was achieved using a lower hydraulic conductivity for the barrier (e.g., 1×10^{-7} cm/sec) such as that potentially achieved by a slurry wall, however existing site conditions preclude the construction of this type of barrier.

6.3 Groundwater Modeling of Remedial Alternatives for Areas BCE

6.3.1 General

The objective of the groundwater modeling for Area BCE was to evaluate the existing groundwater flow conditions with regard to groundwater flux and particle trajectories and to evaluate several remedial system configurations that provide capture of groundwater along the downgradient perimeter of Area BCE. As stated previously, the specific purpose of the evaluation of several hypothetical remedial scenarios was to assess what additional measures beyond existing conditions may be required for this portion of the site. Additionally, to further assist in selection of remedial alternatives for Area BCE, an evaluation was conducted of the potential for subsurface migration of several chemical constituents found within groundwater of the area (see Section 6.3.5 for discussion).

The groundwater flow model applied for Area BCE is a two-dimensional analytical flow model titled WinFlow, Version 1.07, developed by Environmental Simulations, Inc (1995). The steady-state (equilibrium) version of the program was utilized for the simulations. The steady-state module simulates groundwater flow in a horizontal plane using analytical functions developed by Strack (Environmental Simulations, Inc., 1996). The steady-state module simulates the effects of wells, uniform recharge, circular recharge/discharge areas, and line sources or sinks as well as uniform regional hydraulic gradient. The model depicts the flow field using streamlines, particle traces, and contours of hydraulic head.

The general approach for groundwater flow modeling for Area BCE was to develop the model on the basis that heads are known at the Buffalo River and alluvium/till interface and for portions of the Area BCE sewers and BSA sewer and then model these features as a series of line sinks. Model set-up parameters were established based upon existing data generated during the RFI and previous investigations. These parameters included aquifer thickness and a mean hydraulic conductivity representative of the Area BCE shallow aquifer. Once these parameters were set, the model was calibrated to groundwater conditions for Area BCE as measured in August 1998 as part of the RFI. This step involved varying model elements [e.g. recharge areas and sinks (e.g. sewers and alluvium)] in order to reproduce groundwater flow conditions as they existed in August 1998. The August 1998 groundwater elevations were used for the model calibration since the water table configuration for this period is consistent with previous potentiometric maps prepared for the RFI and also represents the most complete data set for shallow aquifer water levels.

Once existing conditions were modeled, three remedial systems designed to provide groundwater capture along the downgradient perimeter of Area BCE were evaluated. The model was used to generate particle capture simulations so that geometries of the remedial systems could be optimized. The model was then used to quantify the relative discharge rate of groundwater to each remedial system.

6.3.2 Groundwater Flow Model Set-up

Aquifer Top and Bottom Elevations

Top and bottom elevations input into the model for the shallow aquifer of Area BCE are as follows:

Aquifer Top Elevation = 585.0 (ft MSL); and
Aquifer Bottom Elevation = 572.8 (ft MSL).

The aquifer top was chosen as an approximate ground surface elevation representative for the general site. It is noted that this elevation does not directly affect model calculations because all groundwater elevations are calculated lower by the model and subsequently the model employs equations for unconfined flow. The elevation for the aquifer bottom is equivalent to the average top of the glaciolacustrine clay unit in Area BCE. These elevations were derived from well logs of monitoring wells installed as part of the RFI and previous investigations within Area BCE. The model assumes that these surfaces are horizontal (i.e. holds the elevation values constant), whereas the actual surfaces vary across the area. However, the variations in the elevation of the top of the glaciolacustrine clay unit are not significantly large across Area BCE.

Hydraulic Conductivity

The hydraulic conductivity utilized in the Area BCE model was based on the results of 13 slug tests completed as part of the RFI within Area BCE shallow monitoring wells. Table C-1 presents the results of these slug tests and the geometric mean hydraulic conductivity for the tests. The geometric mean hydraulic conductivity value of 2.76×10^{-6} cm/sec (7.82×10^{-3} ft/day) was input to the model to represent the hydraulic conductivity for the shallow aquifer of Area BCE.

6.3.3 Groundwater Flow Model Calibration

The goal of the model calibration was to obtain values for simulated hydraulic heads and gradients that are similar to the observed data. The August 1998 groundwater elevations were used to calibrate the model (Table C-2). August 1998 conditions were simulated by adding model elements as required to approximate groundwater elevations and flow conditions as measured in the field on August 19-20, 1998. Appendix C-1 presents the results of the model calibration to August 1998 conditions.

Model elements required to simulate August 1998 conditions included ten groundwater recharge areas, a constant-head reference point for the model, and a series of elements termed "line sinks" to simulate the alluvium/tills interface and portions of BCC and BSA sewers. The model element locations are identified within Appendix C-1. Groundwater recharge is added to the model as circular areas of recharge to the aquifer, termed "ponds" in the model, which have a set rate of infiltration per unit area.

The majority of Area BCE is covered by modeled recharge areas, which simulates all sources of aquifer recharge such as precipitation recharge, lateral recharge from upgradient sources, and any anthropogenic sources such as leaking water supply systems or stormwater drains. Infiltration rates for the ponds were varied to produce the best fit model calibration, and range from $0.000002 \text{ ft}^3/\text{day}/\text{ft}^2$ to $0.000055 \text{ ft}^3/\text{day}/\text{ft}^2$ (0.0088 in/year to 0.24 in/year). Total recharge area fluxes ranged from $2.22 \text{ ft}^3/\text{day}$ to $0.206 \text{ ft}^3/\text{day}$ for the ten ponds.

The local hydrologic base level for the site is known from the RFI to be the Buffalo River. The groundwater elevations within alluvial deposits located between Area BCE and the Buffalo River roughly parallel the river level as indicated by the flat hydraulic gradient within the alluvium of the PVS property, as shown on the August 1998 shallow aquifer potentiometric map (Golder, 1998a). Thus the model included a series of line sinks along the alluvium/till interface to simulate the groundwater elevation within the alluvium and the seepage face of the alluvium/till transition. Additionally, a series of line

sinks was positioned along the opposite river bank to simulate the far river shore and to facilitate establishment of a horizontal head for the river (i.e. no flow boundary). The PVS riverbank was not used as the location of the line sinks as gradients are known to be generally flat between the alluvium/till interface and the river and given the model limitations which only allows simulations of flow through one aquifer media. The line sinks are head-controlled, thus a head to be maintained is input into the model and the model computes the flux necessary to maintain that head per unit length. The elevation of all line sinks simulating the river/alluvium was set at 574.0 ft MSL which is the average groundwater elevation at the alluvium/till interface in August 1998.

Line sinks were used to simulate the hydrogeologic effects of BCC and BSA sewer lines in Areas BCE in a similar fashion as they were used to simulate the influence of the river/alluvium. The line sinks were established as head-controlled, and the heads were set from one to five feet above the level of the line sinks simulating the river/alluvium as appropriate to best match field-measured conditions.

Winflow's steady state model requires the use of a reference head, which is a spot on the model where the head is specified and is unchanging; all other elevations in the model are calculated relative to this known elevation. For the existing conditions model, the reference head chosen was the location of monitoring well RFI-20 in the northern corner of Area C (as far as possible from the effects of the model elements influencing groundwater elevation) and the head was set at the elevation (582.0 ft) measured in the field for that well in August 1998.

Calibration Evaluation

In order to judge the accuracy of the existing conditions model, both the overall pattern of groundwater elevation distribution and groundwater elevations at specific points, called targets, are compared between the model and August 1998 field-measured groundwater elevations. Figure C-1 presents the modeled potentiometric surface for August 1998. The overall distribution and pattern of groundwater elevations produced by the model shows a

good correlation to the manually contoured map of the shallow aquifer potentiometric surface for August 1998 (Golder, 1998a). In addition, the average difference between simulated and measured groundwater elevations at individual well locations is 0.58 feet (Appendix C-1). This indicates the central tendency of the modeled groundwater elevations reasonably matched that of the field measured elevations. The ratio of the absolute residual mean to hydraulic head range for the model is approximately 10%, which as described for Area A modeling, indicates a reasonably good correlation exists between the measured and simulated hydraulic heads.

6.3.4 Groundwater Flow Model Results

Existing Conditions

The modeled shallow aquifer potentiometric surface for August 1998 is presented as Figure C-1. To determine the simulated fate of groundwater particles within Area BCE, particles were released throughout the Area BCE model. Particle pathways are equivalent to streamlines of groundwater flow. Simulated particle pathways for Area BCE under existing conditions (e.g. August 1998) are shown on Figure C-2. The influence of BCC and BSA sewer segments on capture of groundwater as well as discharge of groundwater to the alluvium/till interface is shown on Figure C-2. As shown on Figure C-2, particles released within Area BCE are captured by either BCC or BSA sewers, with the exception of particles released within the southern portion of Area B and the southeastern corner of Area E. Particles released from the southern portion of Area B and the southeastern corner of Area E are simulated as discharging to the modeled alluvium/till interface.

The following presents a water balance evaluation for the current conditions model for Area BCE:

Inflow (gal/day)		Outflow (gal/day)	
Recharge Element*	38.3	Sewers/Backfill	21.7
		<u>Alluvium</u>	<u>13.1</u>
		Total	34.8
Inflow/Outflow % difference	10.1		

Note* This element represents all inflow types (e.g. leaking pipes, lateral inflow from upgradient groundwater, and surface infiltration)

Inflow and outflow fluxes for the water balance of Area BCE were quantified by totaling the model calculated flux for individual elements. The calculated flux for each model element is presented in Appendix C-1. The percent difference between inflows and outflows is interpreted to be equivalent to the components of recharge that migrate beyond the model domain to the north and west.

The recharge rate indicated for the Area BCE model is reasonable considering a site area that is primarily comprised of paved or impervious surfaces overlying low permeability soils (e.g. tills). The steady-state module simulates groundwater flow in a horizontal plane using analytical functions developed by Strack (Environmental Simulations, Inc., 1996). Similarly, the rate of influx into the sewer systems within the model domain is well within reason considering the existing capacities of the various sewer segments.

As indicated by the water balance, 62-percent of the modeled outflow flux from Area BCE is discharge to the sewers within the Area BCE model domain. Consequently, based upon the model calculated fluxes, segments of the BCC sewers and BSA sewer system represent significant existing capture mechanisms for groundwater discharging from Area BCE. It is notable that the BSA incorporates into their anticipated treatment volume a fraction of total inflows derived from leakage into their sewers from non-point sources such as described herein.

To allow a comprehensive evaluation of remedial alternatives for Area BCE, using the calibrated existing conditions model as a base flow field, three remedial system scenarios providing groundwater capture along the downgradient perimeter of Area BCE were modeled. Specific details regarding the components and relative advantages/disadvantages of these potential remedial scenarios are discussed in Section 6.5. As previously noted, the radius of groundwater capture provided by the Area A groundwater extraction system will extend to the southern part of Area B. Consequently, this capture was considered in development of the models for each of the scenarios by limiting their extent along Lee St. The following presents the results of this modeling effort.

Extraction Wells

This remedial scenario includes a series of groundwater extraction wells positioned to intercept groundwater along the BCC property line at Lee Street and Prenatt Street. Due to the low hydraulic conductivity of soils within this portion of the site which reduces the effective radius of capture for a well, to achieve groundwater containment along these perimeters would require the installation of roughly 60 wells spaced approximately 30 feet apart. The wells are modeled as fully penetrating the shallow aquifer and extending into the top of the glaciolacustrine clay unit. A conceptual layout of such an extraction system is presented on Figure C-3, while Figure C-4 presents the modeled flow field and particle capture provided by such a system. As presented within Appendix C-2, which provides the model run output for this scenario, the model predicted total discharge rate from the conceptual extraction system would be approximately 32 gallons/day. A discharge summary that presents the relative contribution of wells located along both Lee St. and Prenatt St. is shown on Figure C-4. As indicated on Figure C-4, a conservative factor of safety of 3 is applied to the modeled total discharge and results in a revised total discharge estimate of approximately 95 gallons/day. This factor of safety is applied to account for inflow to the wells beyond the models capability of simulation, including utility bedding drainage, surface infiltration and general aquifer heterogeneities which may be encountered within the capture zone of the system.

Collection Trenches

This remedial scenario includes two groundwater collection trenches positioned to intercept groundwater along the BCC property line at Lee Street and Prenatt Street. The trenches are modeled as fully penetrating the shallow aquifer with their base keyed into the top of the glaciolacustrine clay unit. A conceptual layout of the trench collection system is presented on Figure C-5, while Figure C-6 presents the modeled flow field and particle capture provided by such a system. As detailed within Appendix C-3, which provides the model run output for this scenario, the model predicted total discharge rate from the conceptual extraction system would be approximately 51 gallons/day. A discharge summary that presents the relative contribution of the trench components for both Lee St. and Prenatt St. segments is shown on Figure C-6. For the same reasons as described for the extraction well scenario, as indicated on Figure C-6, a conservative factor of safety of 3 is applied to the modeled total discharge and results in a revised total discharge estimate of approximately 150 gallons/day.

Combination of Extraction Wells and Collection Trench

This remedial scenario includes a series of extraction wells positioned along Lee St. operating in conjunction with a groundwater collection trench positioned along Prenatt St. The wells and trench are modeled as described previously, with both components fully penetrating the shallow aquifer. A conceptual layout of this scenario is presented on Figure C-7, while Figure C-8 presents the modeled flow field and particle capture provided by such a system. As detailed within Appendix C-4, which presents the model run output for this scenario, the model predicted total discharge rate from the conceptual system would be approximately 46 gallons/day. The relative discharge contribution of components for both Lee St. and Prenatt St. is shown on Figure C-8. Applying a conservative factor of safety of 3 to the modeled discharge results in a revised total discharge estimate of approximately 140 gallons/day.

6.3.5 Constituent Migration Analysis

Analysis Approach

To assist in evaluation of remedial alternatives for Area BCE, the potential for migration in groundwater of several site-specific constituents was evaluated using one-dimensional contaminant transport modeling techniques. An associated objective was to investigate a mechanism that would support the findings of the RFI that show no detections of organic constituents in downgradient locations immediately beyond the BCE boundary. As described within this section, the constituent migration modeling was performed using very conservative input parameters and assumptions including no biologic degradation of constituents.

The site specific compounds selected for migration analysis included aniline, chlorobenzene, and chloroform. These compounds were selected to be representative constituents of groundwater within specific areas located along the Lee St. and Prenatt St. perimeter of Area BCE. Additionally, these compounds were selected based upon their levels of concentration within shallow aquifer groundwater and their physical/chemical characteristics.

Three areas located along the perimeter of Area BCE were selected for application of the constituent transport modeling. Each of these areas was chosen based upon the presence in groundwater of one of the organic compounds designated for transport evaluation. The areas and compound found within groundwater of the particular area are as follows:

- Southeast perimeter of Area B - Aniline;
- Tank Farm area located in the southwest portion of Area E - Chlorobenzene; and
- Former Lagoon/BSA breach area in the southeast portion of Area E - Chloroform.

Model input parameters, conservative where appropriate, were developed for each of the three cases. These parameters were then entered into an Excel® spreadsheet for which an algorithm had been developed for solution of the one-dimensional transport model.

Method of Analysis

The analytical model selected for this evaluation is the steady-state one-dimensional advection-dispersion equation for groundwater flow and solute transport. This model is described in a number of technical references including those prepared by de Marsily (1986) and Fetter (1988). The equation and required input parameters are presented on the analysis worksheets contained within Appendix C-5. The following paragraphs describe the development of hydrogeologic, aquifer media, and constituent specific parameters utilized for this evaluation. Specific parameters utilized in the modeling of each case are summarized on the calculation worksheets provided in Appendix C-5.

Several hydrogeologic parameters were required as inputs to the model. The hydraulic gradient in the direction of flow for each area of evaluation was calculated using the shallow aquifer potentiometric map for August 1998 as presented within the RFI report (Golder, 1998a). The effective porosity was conservatively (e.g. a lower porosity increases flow velocities) established as 0.10 for each case. The hydraulic conductivity utilized for each case was 0.00782 ft/day which is the geometric mean of the hydraulic conductivities measured in the RFI wells of Area BCE. These parameters are utilized by the model to calculate the average linear velocity of groundwater.

The dispersion coefficient, D , is estimated from the expression $D=aU$, where a is the longitudinal dispersivity, approximated as one-tenth of the plume length, and U is the groundwater velocity. The longitudinal dispersivity input in each case was established as 10 feet, considering an assumed 100 foot plume length.

Due to the absorptive characteristics of a particular compound, that compound will travel at (no retardation) or slower (retarded) than the average velocity of groundwater. The

measure of this lag between the center of mass of a constituent plume moving from a point source while undergoing adsorption is the retardation factor. This factor is a non-dimensional parameter defined as the reciprocal of the relative velocity, and is calculated using compound specific adsorption isotherm data (denoted as K_d , the distribution coefficient) and media characteristics. The equation for calculation of the retardation factor as well as calculated retardation factors for the constituents evaluated are presented on the calculation sheets provided within Appendix C-5. The bulk density of the aquifer media was determined directly from geotechnical data developed for clay soils in the Western New York area having similar geologic origin and characteristics as those found within Area BCE of the BCC site. As an example of the effects of the retardation factor on migration of an organic constituent, a retardation factor of 1.0 indicates that the compound will travel at the same velocity as the groundwater, whereas a retardation factor of 5.5 means that the compound of interest is traveling 5.5 times slower than the groundwater. For the site-specific volatile and semi-volatile organic constituents evaluated for Area BCE, retardation factors are calculated as 2.4 for aniline, 4.3 for chloroform, and 35 for chlorobenzene. The relatively wide range of retardation factors represented for these three constituents encompasses a significant portion of the range of retardation factors which would be calculated for other organic constituents found within Area BCE groundwater. Additionally, it is noted that the compounds aniline and chloroform are classified as very highly mobile, while chlorobenzene is classified as moderately mobile. For semi-volatile organic compounds, retardation factors are generally much higher due to the greater affinity of these compounds to organic matter in the aquifer media.

The distribution coefficient for an organic compound in a specific soil is estimated by multiplying the soil-water partition coefficient, K_{oc} , by the percent organic carbon within the soil. Soil-water partition coefficients for organic compounds are readily available from a number of technical sources. The organic carbon content representative of the glacial till and utilized in the analysis of each case was a conservative 0.5 percent (Fetter, 1988).

Initial concentrations of constituents utilized for the evaluation of each specific case were obtained from analytic data developed during the RFI. The initial concentrations are as follows:

- Aniline - 35 ug/l at monitoring well RFI-28;
- Chlorobenzene - 10000 ug/l at monitoring well RFI-32; and
- Chloroform - 1100 ug/l from monitoring wells within the former lagoons area.

The concentrations presented above represent the highest values determined during the RFI for the particular constituent at the identified monitoring well(s). The approach to this transport modeling evaluation assumes a mass of each constituent located in the general vicinity of the particular well identified above.

Simulation times for the model runs of each case were conservatively taken as the probable longest time before present that each of the individual constituents could have been released within a particular area designated for evaluation. These times were provided by BCC site personnel familiar with the operational history of the facility. Simulation times utilized in evaluation of each case were as follows:

- Aniline - 85 years;
- Chlorobenzene - 50 years; and
- Chloroform - 35 years.

Results of Constituent Migration Analysis

The solution of the model for each case evaluated is presented on the worksheets contained within Appendix C-5. The solution of the model is provided as a graph of concentration of a given constituent versus distance from the origin. The intersection of the slope of the curve with the x-axis indicates the model predicted maximum distance of travel for the solute front within the simulation period run for the model. As shown on the graphs presented within Appendix C-5, the simulated distance of constituent transport for each case is as follows:

- Worksheet C-5.1: Southeast perimeter of Area B – constituent aniline. Simulated transport distance for an 85 year time period is approximately 120 feet. Assuming the origin of contamination is near monitoring well RFI-28, the solute front would only extend just beyond Lee St.;
- Worksheet C-5.2: Tank Farm area located in the southwest portion of Area E – constituent chlorobenzene. Simulated transport distance for a 50 year time period is approximately 20 feet. Assuming the origin of contamination is near monitoring well RFI-32, the solute front would only extend to the northern side of Prenatt St.; and
- Worksheet C-5.3: Former Lagoon/BSA breach area in the southeast portion of Area E – constituent chloroform. Simulated transport distance for a 35 year time period is approximately 45 feet. Assuming the origin of contamination is near wells R-13 and R-03 (near the BSA breach), the solute front would only extend to a distance roughly equivalent to the BSA sewer located beneath Prenatt St. in this area.

It is notable, that in addition to the use of conservative input parameters, the steady-state one-dimensional solute transport equation utilized in this evaluation is inherently conservative and represents an extreme worst case scenario in which the total mass of a constituent in groundwater is continuously increasing (e.g. continuous source). In actuality, the likely sources of the constituents evaluated have been limited historic releases of these compounds within Area BCE, and not a continuous localized source as assumed by the model. The current “source” of the constituents modeled is most likely a localized area of impacted groundwater, not a continuous localized source.

As indicated on the worksheets, the steady-state one-dimensional solute transport equation utilized in this evaluation includes a reaction term for exponential contaminant decay through a first order reaction rate for the sum of natural chemical and biological processes. As a further conservative measure, this component of the model was left out in the evaluation of each case. However, it is noted that several constituents evaluated have quantified factors describing their rates of decay within groundwater (e.g. decay coefficients).

Conclusions

Based upon the results of the constituent migration analysis using the one-dimensional steady-state transport model with conservative input data and assumptions, there is limited potential for the constituents evaluated to migrate significantly beyond the BCC property in Area BCE. Attenuation by the physical characteristics of the shallow aquifer soils appears to be a significant mechanism limiting the migration of these constituents, as well as other groundwater constituents, from Area BCE to locations beyond the BCC property. The results of groundwater monitoring performed as part of the RFI for wells positioned immediately downgradient of the BCC property and Area BCE have not indicated the presence of these constituents. Consequently, groundwater monitoring performed during the RFI supports natural attenuation, in conjunction with interception of groundwater by existing sewer systems, as a mechanism controlling and limiting migration of constituents of concern from Area BCE.

6.4 Corrective Measures Evaluation Criteria

The criteria used to evaluate each corrective measure alternative included:

1. Technical

Evaluation of each corrective measure alternative based on performance, reliability, implementability, and safety.
2. Environmental

Facility conditions and pathways of contamination actually addressed by each alternative and evaluation of the short and long-term beneficial and adverse effects of the response alternative.
3. Human Health

The extent to which each alternative mitigates short and long-term potential exposure to any residual contamination and protects human health both during and after implementation of the corrective measure.

4. Institutional

Assessment of relevant institutional needs for each alternative regarding Federal, State, and local requirements and permitting on the design, operation, and timing of each alternative.

5. Reduction of Toxicity, Mobility, or Volume

Evaluate the degree to which each of the alternatives will reduce the toxicity, mobility, or volume of the contaminants and/or impacted media.

6. Cost

This criterion identifies estimated costs associated with each alternative. This evaluation presents the estimated total costs including direct and indirect capital, operational and maintenance costs. These estimated costs were obtained from site data including estimates for the Area D remedial activities, costing manuals (e.g. R.S. Means), preliminary estimates from contractors/vendors, and similar project experience.

The cost estimates also include engineering fees and contingencies for potential unexpected cost increases during final design and implementation of the alternatives. An appropriate cost contingency was provided based on the anticipated variability and/or uncertainty associated with each cost element. A construction contingency of 30 % was used for specific cost elements due to the expected variability in subsurface conditions and presence of subsurface features such as utilities and extensive building foundations. The present worth cost, in 1999 dollars (based on a projected 30-year post closure period and 5 % interest rate) is estimated for each alternative.

6.5 Corrective Measure Alternatives

6.5.1 Alternative 1 – Area A Groundwater Extraction System, Institutional Controls, Groundwater Monitoring, Repair Sheet Piling Breach (Area E), Area A Bank Erosion Control

Description

The primary components of Alternative 1 are:

- Area A Groundwater Extraction System

As previously described within Section 6.2, five (5) groundwater extraction wells (nominal 6 inch diameter) would be screened in the alluvium to an average depth of

approximately 30 -35 feet bgs. and installed along the southeastern perimeter of Area A at an approximate distance of 100 feet from the Buffalo River. The five extraction wells would be equipped with submersible electric pumps and associated pumping level controls. The modeled total pumping rate is estimated at 16 gpm. However, for alternative evaluations, the total pumping rate has been increased by a safety factor of two (approximately 30 gpm) as a conservative measure to address subsurface conditions which can not be anticipated within the model simulations. The extraction wells would be set in subsurface vaults and connected by a subsurface double contained forcemain for transfer of the groundwater to either two existing BCC Area A tanks (VT-Tanks; 40,000 gallons each) directly to the existing BCC BSA Outfall 003 for discharge to the BSA sewer and treatment plant or for treatment through the Area D GWTS (or similar system). A conceptual layout of this scenario is provided on Figure B-13, while Figure D-1 provides conceptual design details for such a system.

Five (5) piezometers would also be installed in proximity to the extraction wells. In combination with the existing site wells, these new piezometers would be used to monitor water level elevations and performance of the extraction system. Groundwater elevations would be recorded frequently (e.g., weekly/monthly) at system start up and on a quarterly basis after the system has stabilized.

- Institutional Controls

These measures include the following current site controls:

- Access is restricted to BCC employees, their subcontractors, and authorized visitors;
- A chain-link fence with locking gates surrounds the site, except for cross streets and railroad track areas;
- A 24-hour uniformed guard security service;
- Routine maintenance of the existing facilities including maintenance of the existing soil/vegetative covers for the former Lagoons 1, 2 and 3 in Area E and concrete, asphalt pavement, and gravel cover over the facility soils;
- Health and safety rules for employees, visitors and contractors working on site;
- Employee industrial hygiene monitoring program;
- Specific safety procedures and use of personnel protective equipment while at the facility; and

- Post closure monitoring and maintenance for the former lagoons area in Area E.

BCC would also develop an excavation management plan to control subsurface activities that will further define procedures for limiting exposure to soil and groundwater contaminants, air monitoring requirements, dust control measures and required personal protective equipment.

BCC, through their legal counsel, would also execute restrictions to the property deed to restrict the BCC property to industrial/commercial uses so long as residual soil or groundwater contaminant concentrations require this restriction. This would also include an updated property survey.

- Groundwater Monitoring

Groundwater monitoring would be performed for the shallow and confined aquifers in Area ABCE. This proposed monitoring program would incorporate select BCC wells from the current Post Closure Monitoring program (former Lagoons 1,2, 3 area) and select RFI wells. The groundwater monitoring network would consist of the following monitoring wells, parameters and frequency. These well locations are shown on Figure D-2.

Shallow Aquifer

Shallow aquifer wells would consist of twenty-one (21) wells; RFI-PZ-17, RFI-PZ-18, RFI-PZ-19, RFI-17, RFI-18, RFI-20, RFI-22, RFI-24, RFI-25, RFI-27, RFI-28, RFI-29, RFI-30, RFI-32, RFI-33, RFI-34, RFI-35, RFI-36, RFI-42, RFI-45, and RFI-51.

Monitoring for VOCs and SVOCs would be performed on a semi-annual basis and monitoring for metals and inorganics would be performed on an annual basis. The actual parameters would be consistent with the current post closure monitoring parameters.

Confined Aquifer

Confined aquifer wells would consist of six (6) wells; R-01, R-04, RFI-16, RFI-19D, RFI-21D, and RFI-23D. Monitoring for site specific VOCs and SVOCs would be performed on an annual basis and monitoring for metals and inorganics would be performed on a biennial basis. The actual parameters would be consistent with the current post closure monitoring parameters.

- **Repair Sheet Piling Breach (Area E)**

Within the study area, the BSA sewer is bound by sheet piling consisting of wood planking and steel piling. In the area where BCC Outfall 011 crosses the BSA sewer line, a 5-ft to 10-ft section of the sheet piling has been reportedly removed. This component would involve the repair of this section of the sheet piling to further limit groundwater flow from Area E beyond the minimal seepage characteristics of existing soils. The repair would serve to redistribute groundwater seepage to a uniform distribution within soils located adjacent to the sheet piling in this area. This repair would be achieved by the following general method, as shown on Figure D-3:

- Excavation of the overburden to below the bottom of BCC Outfall 011 and beyond the limits of the breach. Note, the breach repair would apply to both the north and south sections of sheet piling breached by the outfall;
 - Installation of appropriate formwork against the sheet pile;
 - Placement of a low permeability concrete grout mixture and curing of the grout to close the breach; and
 - Backfilling of soil to grade.
- **Area A Bank Erosion Control**

This component involves placement of rip rap along the approximate 190 foot section of exposed Area A bank adjacent to the Buffalo River to prevent soil and potential contaminants from eroding from the bank. Some surface preparation such as brush removal, grading, and geotextile installation prior to placement of the rip rap will be required. A conceptual cross-section for this measure is provided on Figure D-4. In addition, a routine precision survey, as previously performed by BCC, will be performed on a semi-annual basis to monitor potential deflections of the retaining walls and bank in this area.

Alternative 1A - Installation of Area A Groundwater Barrier

The components of Alternative 1A are the same components of Alternative 1 above with the inclusion of an approximately 760 foot long grout barrier in Area A along the southeastern perimeter between the Buffalo River and the proposed Area A groundwater extraction well system. This grout barrier would be installed to reduce the volume of river water extracted by the Area A groundwater extraction system. The conceptual layout for an Area A groundwater extraction system incorporating a grout barrier is

provided on Figure B-15, while schematics of the conceptual grout barrier design are presented on Figure D-5.

The primary benefit of this barrier would be a reduction in the volume and associated cost for treatment and/or disposal of the extracted groundwater. Based on groundwater modeling conducted by Golder as described in Section 6.2.5, a barrier with a permeability of approximately 1×10^{-4} cm/sec could reduce the groundwater pumping rate and volume by potentially 60 percent. This barrier would be installed from ground surface to the base of the alluvium and keyed into the glaciolacustrine clay unit using a jet grouting or equivalent technique. The actual installation of this barrier (if needed), would likely be phased in after the initial start-up and operation of the Area A groundwater extraction system. This would allow for observation of actual groundwater pumping and flow rates to be evaluated with respect to the long term cost effectiveness of the use of a grout barrier.

Groundwater Discharge Options

The estimated flow rate of groundwater extracted from Area A is projected to be in the range of up to 30 gallons per minute (without installation of a barrier wall) or approximately 43,200 gallons per day. The options for the discharge of extracted groundwater for these alternatives include:

- **Discharge to Area D Groundwater Treatment System (GWTS)**

A description of the Area D GWTS was provided in Section 5.10 and a schematic of the system is included in Appendix D. The reported current maximum design capacity of the GWTS (located in Area A of the BCC site) is a nominal 20 gpm. Based on information provided by CSK Technical Inc., (CSK) (the GWTS operator under contract to Allied Signal, Inc.), and information provided by Allied Signal Inc., currently Area D groundwater is treated generally at a pumping rate of 20 gpm during an 8-12 hour period, 5 days per week or an average continuous rate of 3 gpm.

Section 5 of the Parsons report (Parsons, 1999) indicates that the current average pumping of the Area D GWTS rate is 4 gpm and that the plant was designed for a nominal 20 gpm throughput which could be increased to 30 gpm with some minor modifications. These modification are anticipated to include larger pump impellers.

Based on the operations and maintenance (O&M) costs for the treatment of groundwater through the Area D GWTS, the O&M costs for groundwater from Area A is estimated by Allied Signal, Inc. to be approximately \$0.03/gallon. In addition, Allied Signal, Inc. is also evaluating the installation of an air stripping system to remove VOCs from the groundwater to reduce activated carbon consumption and related costs.

Based on information provided by Allied Signal, Inc., any significant groundwater flows in excess of a total flow rate of 30 gpm at this time would require a major expansion or essentially a duplicate groundwater treatment system at a reported cost of approximately \$500,000. As presented in Appendix F, the present worth cost for this expanded system for a presumed 30-year post closure period is \$9,560,682. As stated above, the estimated flow rate of groundwater from an Area A groundwater extraction system is in a range of 20 to 30 gpm. Consequently, the maximum total flow rate of the GWTS and its equalization tank T-2 volume (2,000 gallons), would not likely provide sufficient storage and excess processing capacity to account for periods of system downtime for situations including normal maintenance, equipment malfunctions, or replacement. In these situations, groundwater pumping from Area D and the proposed Area A groundwater extraction system would generally be required to cease for some period of time until the system was put back online.

BCC has indicated that two existing (40,000 gallon each) tanks (VT Tanks) in Area A near building 54 could be used, if needed, for equalization/storage of groundwater extracted from Area A.

- **Discharge to Buffalo Sewer Authority**

A review of the current BCC Buffalo Sewer Authority (BSA) discharge permit limitations and average concentrations of groundwater constituents detected in samples collected from Area ABCE monitoring wells was performed. Estimated groundwater constituent concentrations and loadings were also prepared. The BSA was contacted by BCC regarding these data and the estimated potential groundwater discharge rates. The BSA has indicated to BCC that groundwater from Areas ABCE may be discharged directly to the BSA. Letters from BCC to the BSA regarding this approach and estimated groundwater constituent concentrations and loadings from Area A are presented in Appendix E. Based on their initial review of these data, the BSA did not view the groundwater constituents or any loadings from Areas BCE to be significant based on the projected limited loadings. As noted in Section 6.3.4, the BSA has indicated to BCC that they incorporate into their anticipated treatment volume a fraction of total inflows derived from leakage into their sewers from non-point sources such as groundwater infiltration from Areas BCE.

The NYSDEC Water Division would need to review and approve this proposed approach as presented herein. A modification of the current BCC BSA discharge permit and discharge limits for discharge of groundwater to the BSA would be required. Discharge of groundwater would be subject to a BSA discharge fee. BCC

has indicated that current fee for discharge of process waters from the facility to the BSA is \$0.77 per 1,000 gallons plus surcharges for any exceedances of BOD, phosphate and total suspended solids limits. The potential groundwater discharge point would be the existing BCC Outfall 003 located in Area A (see Appendix B and Figure B-13).

As presented in Appendix F, the estimated present worth cost for this approach for a presumed 30-year post closure period is \$415,079.

Evaluation of Alternative 1 and 1A

- **Technical**

This alternative involves the use of proven technologies to provide hydraulic containment using extraction wells to prevent future discharge of hazardous constituent in shallow groundwater from Area A to the Buffalo River. Initial treatability studies performed by Parsons indicate that Area A extracted groundwater could be treated through the existing Area D GWTS. However, additional treatability studies will be required.

Additional treatment processes such as air stripping may be required to reduce activated carbon consumption based on operational experience for Area D groundwater by Allied Signal, Inc. Some groundwater contaminants requiring treatment in a system such as the Area D GWTS are not conventional given the uniqueness of the BCC historic chemical operations. In addition, based on the groundwater modeling performed and estimated groundwater flow rates (no barrier assumed) which conservatively include a safety factor, there is the possibility that the Area D GWTS does not have sufficient capacity to process groundwater from both Area D and Area A or excess capacity to handling downtime situations. Consequently, an additional treatment system could be required.

Given the anticipated approval by the BSA, direct discharge of extracted groundwater from Area A to the BSA treatment plant would be the preferable option based on cost, reliability, safety, availability of existing BCC facilities, and ease of implementation.

Installation of a grout barrier would use proven technology as a potential cost saving measure to reduce the flow rate and volume of extracted groundwater from Area A given the influence of the Buffalo River on projected pumping rates. However, construction of such a barrier in Area A, while possible, may involve some installation difficulties due to the presence of known subsurface structures related to historic building foundations within Area A. It would appear that this option would only be considered if it is necessary to treat groundwater through the Area D GWTS (or similar system) to address potential capacity issues and reduce long term O&M costs.

Construction of rip rap along the limited section of Area A bank and repair of the breach in the BSA sewer line sheet piling in Area E would be readily implemented using conventional construction techniques.

The existing and proposed institutional controls and expanded groundwater monitoring program are also readily implemented. Sampling and analytical results would be incorporated in to the existing groundwater monitoring reports submitted by BCC to the NYSDEC and USEPA as required by the BCC Post Closure permit.

This alternative is estimated to require approximately one year for final design and one year/construction season to implement. The Area A groundwater extraction system would operate for a presumed period of 30 years. Operation and maintenance requirements would include well and pump maintenance, replacement, labor, and utilities. Institutional controls and the groundwater monitoring program would also be implemented during this period.

- **Environmental**

This alternative is protective of the environment through preventing the migration of contaminated groundwater to the Buffalo River from Area A and potential erosion of a limited area of soil along the river bank.

Installation of a groundwater extraction system on the downgradient perimeter of Area A would provide hydraulic containment of shallow groundwater beneath Area A and adjacent areas to the east including the southeast corners of Area B. This system would prevent the further discharge of hazardous constituents in Area A shallow groundwater to the Buffalo River, thus eliminating future impacts and potential risks.

Constituent migration analyses and downgradient groundwater sample analyses in conjunction with interception of shallow groundwater by on site sewer systems suggest that there are existing conditions/mechanisms controlling and limiting the migration of constituents of concern from Area BCE.

The direct contact soil exposure pathway was generally recognized as being blocked (i.e. by existing site conditions (surface capping such as concrete or asphalt) or managed by administrative controls (i.e. access restrictions, health and safety procedures). In addition, exposed soil along the Area A bank would be covered using rip rap to provide containment and prevent soil erosion. Routine surveying will provide a mechanism for monitoring the retaining walls in Area A.

This alternative would pose no short term risks to the community during construction of the Area A groundwater extraction system or during placement of rip rap. Safety hazards to workers associated with construction activities would be mitigated by the requisite training and health and safety plans required for working on RCRA facilities.

For this remedy to be effective for the presumed duration of 30 years, routine monitoring and maintenance of the Area A groundwater extraction system and long term groundwater monitoring and institutional controls will be required.

- **Human Health**

In light of the proposed corrective measures of hydraulic containment of shallow groundwater in Area A, the risk from discharge to the Buffalo River will be controlled. Potential human and ecological receptors and exposure pathways were identified to determine the level of risk potentially present from the identified contaminants. As presented in the RA, based on the chemical screening and pathways analysis, it was concluded that there are likely no unacceptable health risks to on- and off-site human and environmental receptors from soil-borne contaminants for Area ABCE.

A number of substances were identified as being of potential concern in shallow groundwater in Area BCE. Identification of these substances was based on a conservative screening approach, involving comparison with concentrations to corresponding TAGM 3028 GALs and TOGS 1.1.1 criteria. Potential pathways for on-site and off-site receptors to be exposed to substances in groundwater were evaluated. The only plausible potential exposure pathway identified in the CPM was the discharge of several groundwater constituents to the Buffalo River. However, even with the use of very conservative assumptions, no BCC-derived chemicals from Areas B, C and E were identified as reaching the Buffalo River.

Nevertheless, risk calculations were performed as part of the RA to determine if a potential risk existed by incidental ingestion of Buffalo River water using the maximum concentrations observed in Areas B, C and E. One metal, arsenic, was identified as having a potential risk with a NCR of 5.03×10^{-5} . However as this calculation ignored dilution and sorption processes, it does not represent a realistic estimate. In any event, the calculated NCR is within the range of ILCRs generally considered to be acceptable by the U.S. EPA ($10^{-6} - 10^{-4}$). It was concluded that there are likely no unacceptable health risks to on- and off-site human and environmental receptors from groundwater-borne contaminants from Area BCE.

The RA assumes that the site will continue its operation as a chemical manufacturing facility. Any significant change in the facility's future use for industrial or commercial purposes will necessitate a review of the site and RA.

- **Institutional**

Institutional actions for this alternative would require modification of the existing BCC BSA discharge permit as described above and routine monitoring and reporting to ensure that discharge limitations are met. Groundwater monitoring and reporting would be performed in accordance with a modified groundwater monitoring plan in accordance with the provisions of the BCC Post Closure Permit. A permit

modification by the NYSDEC would also be required as specified in Module III E.13 (a) of the BCC Post Closure permit. Compliance with a site specific health and safety plan under 29CFR 1910.120, RCRA and Occupational Health and Safety Act (OSHA) regulations are required during implementation of this alternative. The construction of facilities associated with the groundwater extraction system, transfer piping and storage tanks prior to discharge to the BSA sewer is presumed to be exempt from RCRA permitting under the wastewater treatment unit provision (Section 402 or 307(b) of the Clean Water Act) of 6NYCRR 373-1.1(d)(1)(xii).

Contact with the United States Army Corp of Engineers will be required to identify any specific permit requirements for installation of the rip rap along the Area A river bank.

A current site property survey and additional conditions on the property deed restricting groundwater use and limiting the property use to industrial/commercial purposes will be required.

As discussed in Section 7, a NYSDEC approved Corrective Measures Implementation (CMI) Plan will need to be developed for this or any alternative prior to initiating construction activities.

- **Reduction of Toxicity, Mobility, or Volume**

The installation of a shallow groundwater extraction system in Area A and placement of rip rap on the section of Area A river bank would virtually eliminate off-site contaminant migration from Area A. As discussed above, off site migration of contaminants in shallow groundwater from Area BCE is limited by existing conditions and continued groundwater monitoring would be performed.

Area A groundwater constituents and toxicity would be reduced through treatment via the BSA treatment plant. If warranted as described above, the extracted groundwater volume from Area A could be substantially reduced by approximately 60 % under Alternative 1A through the installation of a grout barrier located between the Buffalo River and proposed extraction wells.

This alternative does not provide for any additional containment for soils in Area ABCE.

- **Cost**

The estimated present value cost (including capital and O&M costs) for Alternative 1 is \$1,889,602 assuming groundwater extracted from Area A is discharged to the BSA. The estimated present value cost for Alternative 1A is \$3,384,275. The detailed cost estimates for these alternatives are presented in Appendix F.

As presented above and in Appendix F, the 30-year present worth cost of Area A groundwater discharge to the BSA is significantly less than treatment through an expanded/duplicate Area D type GWTS.

6.5.2 Alternative 2 - Area A Groundwater Extraction System, Area BCE Groundwater Extraction System, Institutional Controls, Groundwater Monitoring, Repair Sheet Piling Breach (Area E), Area A Bank Erosion Control

Description

The primary components of Alternative 2 include the components described for Alternatives 1 or 1A with the addition of groundwater collection and extraction systems located along the perimeter of Areas BCE at Lee and Prenatt Streets. The options under this alternative include:

- **Alternative 2A – Area BCE Extraction Wells**

As previously described within Section 6.3.4, sixty (60) groundwater extraction wells (nominal 4 inch diameter casings installed in 36 inch diameter gravel filled boreholes) would be screened in the shallow aquifer to the top of glaciolacustrine clay unit. The large diameter borehole for each extraction well effectively increases the radius of capture for a well, consequently reducing the number of wells required. Considering the large diameter of the boreholes, installation of the wells would likely be achieved through the use of a deep foundation installation rig equipped with continuous flight augers as opposed to a conventional drilling rig used for well installations. The wells would be located along Lee St, Prenatt St., and a portion of Orlando St. Each extraction well would be equipped with a controllerless submersible pneumatic pump (e.g. no level control required) powered by a centrally located air compressor. As indicated on Figure C-4, the projected total pumping rate is estimated approximately 95 gallons/day. The extraction wells would be equipped with flush mount wellhead vaults and connected by a subsurface gravity drain for transfer of the groundwater to two collection sumps and lift stations. The Lee Street collection sump would transfer groundwater captured along Lee Street through a double contained forcemain to a gravity drain along Prenatt Street. A centralized collection sump within Area E would transfer the total collected groundwater through a double contained forcemain to the existing BCC 500,000 gallon tank TKR1 located in Area E. Groundwater collected in tank TKR1 would be routinely transferred by tank truck for treatment through the Area D GWTS or discharged directly to the existing BCC BSA Outfall 002 in Area E to the BSA sewer and treatment plant. A conceptual layout of this scenario is provided on Figure C-3, while Figure D-6 provides conceptual details for such a system.

Five (5) piezometers would also be installed along the system alignment. In combination with the existing site monitoring wells and piezometers, these new piezometers would be used to monitor water level elevations and performance of the extraction system. Groundwater elevations would be recorded frequently (e.g., weekly/monthly) at system start up and on a quarterly basis after the system has stabilized.

- **Alternative 2B – Area BCE Collection Trenches**

As previously described within Section 6.3.4, an enhanced permeability (gravel-filled) groundwater collection trench (nominally 2.5 feet wide) keyed to a depth of one foot into the glaciolacustrine clay unit, would be installed. The collection trench would consist of two sections. One section would be installed in Area B along Lee Street (approximately 500 feet long) and one section installed in Area E along Prenatt and Orlando Streets (approximately 1385 feet long).

A sump located at Lee St. would transfer collected groundwater through a double contained forcemain to a reinfiltration point located within the trench backfill of the Prenatt St. trench segment. A sump located within Area E near Prenatt Street would transfer the collected groundwater through a double contained forcemain to the existing BCC 500,000 gallon tank TKR1. Groundwater collected in tank TKR1 would be routinely transferred by tank truck for treatment through the Area D GWTS or discharged directly to the existing BCC BSA Outfall 002 located in Area E. As indicated on Figure C-6, the projected total pumping rate is estimated at approximately 150 gallons/day. A conceptual layout of this scenario is provided on Figure C-5, while Figure D-7 provides conceptual details for such a system.

Two (2) piezometers would be installed within the trench. In combination with the existing site monitoring wells, piezometers, and trench sumps these new piezometers would be used to monitor water level elevations and performance of the extraction system. Groundwater elevations in existing wells/piezometers, trench sumps, and new piezometers would be recorded frequently (e.g., weekly/monthly) at system start up and on a quarterly basis after the system has stabilized.

- **Alternative 2C - Extraction Wells in Area B and Collection Trench in Area C/E**

This alternative would be a combination of groundwater extraction wells installed in Area B along Lee Street and a groundwater collection trench installed along Prenatt and Orlando Streets. The purpose of evaluation of this combined alternative would be the reduction of soils requiring disposal, as well as limiting conflicts/issues related to utilities and construction along Lee St. Thirteen (13) groundwater extraction wells as previously described under Alternative 2A would be screened in the shallow aquifer to the top of glaciolacustrine clay unit. Each extraction well would be connected by a subsurface gravity drain for transfer of groundwater to a collection sump and lift station located at Lee St.. The lift station would transfer groundwater through a double contained forcemain to a reinfiltration point located within the backfill of the

Prenatt Street trench. The trench along Prenatt and Orlando Streets would be constructed as previously described under Alternative 2B. A centralized collection sump within Area E located near Prenatt Street would transfer the collected groundwater through a double contained forcemain to the existing BCC 500,000 gallon tank TKR1 in Area E. As indicated on Figure C-8, the projected total pumping rate is estimated at approximately 140 gallons/day. Groundwater collected in tank TKR1 would be routinely transferred by tank truck for treatment through the Area D GWTS or discharged directly to the existing BCC BSA Outfall 002 in Area E to the BSA sewer and treatment plant. A conceptual layout of this scenario is provided on Figure C-7.

Two (2) piezometers would also be installed along the Lee Street extraction system alignment and one piezometer would be installed within the Prenatt/Orlando St. trench. In combination with the existing site wells/piezometers, the new piezometers and trench sump would be used to monitor water level elevations and performance of the extraction system. Groundwater elevations would be recorded frequently (e.g., weekly/monthly) at system start up and on a quarterly basis after the system has stabilized.

Soil and Debris Disposal Options

- **Off Site Disposal Of Excavated Soils At RCRA Treatment, Storage And Disposal Facility**

This option is comprised of off-site disposal of soils and debris at a permitted RCRA treatment, storage and disposal facility (TSDF) generated from excavation and drilling activities associated with the proposed CMS alternatives. Initial contact and review of the Area ABCE soil sample analyses by CWM Chemical Services, LLC Model City facility provided disposal options and costs for soils and debris from Area ABCE. For the purposes of conservatively estimating potential disposal costs, the higher costs for direct landfill disposal of soils and debris as RCRA hazardous wastes were used. Off-site disposal of soils and debris as non-hazardous wastes may be a lower cost option based on actual testing of these materials for the RCRA characteristics.

- **On Site Disposal of Excavated Soils in RCRA Corrective Action Management Unit (CAMU)**

This option is comprised of on-site disposal of soils generated from excavation and drilling activities associated with the proposed CMS alternatives. Considering the projected volume of soil and debris generated that would require management, this option would only be proposed as part of the evaluation of Alternatives 2A, 2B, 2C as well as Alternatives 4A, 4B and 4C, which involve groundwater collection systems for Areas BCE. As a potential cost effective option to off-site disposal, soils generated from these activities could be disposed of in an on-site RCRA designated

Corrective Action Management Unit (CAMU) located in the former lagoons area of Area E.

A CAMU is generally defined as an “area within a facility that is used for managing remediation wastes for implementing corrective action or cleanups at a facility”. The provisions for this type of unit was retained in the final USEPA “Hazardous Waste Identification Rule for Contaminated Media” under 40 CFR 264.552 (November 30, 1998). The CAMU provisions provide for:

- The use of these units within the contiguous property under control of the owner/operator where the remediation waste originated;
- Remediation waste placed into a CAMU does not need to meet LDR treatment standards;
- CAMUs can be used to consolidate remediation wastes on site; and
- Groundwater monitoring, closure and post closure requirements are needed and must address capping of remediation waste that are to remain in place.

The conceptual design of the CAMU would be as follows:

An area having dimensions of approximately 150x150 feet would be designated as the CAMU and would be located within the footprint of the former lagoons in Area E as the former lagoons area is currently subject to RCRA post closure care requirements. After surface preparation, a geosynthetic drainage layer comprised of a geonet with geotextile attached on top and bottom would be installed. The drainage layer would transmit seepage to a collection pipe network which would subsequently drain directly to a groundwater collection system sump in Area E. Soil would be placed in 6 to 8 inch lifts above the drainage layer using conventional earth moving equipment. Debris such as concrete foundations, large rubble etc. would be sent for off-site disposal. After placement, the soil would be fine graded to suitable slopes to promote runoff. A structural geotextile would be placed on the final graded surface and a 3 inch thick asphalt based cover system would be installed over the soils. The cover system would be keyed into the existing clay closure cover of the former lagoons area. A conceptual layout and conceptual details of this scenario are provided on Figure D-8.

Groundwater monitoring, institutional controls and post closure care would be performed as described in Alternative 1 with additional cover system maintenance that would include annual inspections and resurfacing of the cover on an as warranted basis.

Evaluation of Alternatives 2A, 2B and 2C

- **Technical**

These alternatives include all of the components of Alternative 1 and would also include active hydraulic containment systems using extraction wells, collection

trenches, or a combination of wells and a trench as described above to further limit the potential for future migration of hazardous constituents in shallow groundwater from the perimeter of Areas B, C, and E. The construction of these additional shallow groundwater containment and collection systems would also use proven technologies, pumping, and groundwater transfer systems. For this alternative, existing storage tank systems in Area E would be upgraded and used for temporary storage of groundwater, (if required) prior to discharge to the BSA system or alternatively to the Area D GWTS or similar system.

However, the volume of extracted groundwater estimated to be captured and collected using any of these alternative systems is very low given the low hydraulic conductivity and saturated thickness of the shallow aquifer soils in these areas. The estimated daily flow rates of groundwater collected from these systems would be in the range of only 95 to 150 gallons per day or approximately 35,000 to 55,000 gallons per year.

The construction practices for installation of a trench along the Lee street property line would need to address stability issues which may arise from the close proximity of Lee Street. Similarly, issues would arise in the vicinity of the Lee and Prenatt St. intersection, where railcar activity would likely be disrupted. Additionally, considering the depth of the target horizon (e.g. glaciolacustrine clay) along some portions of Lee and Prenatt streets, the depth of excavation limits of conventional trenching technologies may be approached. Utilities concerns/conflicts will be more prevalent than Alternative 1/1A and the detailed design would require addressing these issues.

Alternatives 2A, 2B or 2C are estimated to require approximately one year for final design and one to two years/construction seasons to implement. Inclusion of any of these additional groundwater containment systems would likely take longer to implement compared to the time required to implement Alternative 1. In addition, due to the significant volume and cost associated with transportation and off site disposal of soil and debris associated with these alternatives, construction of an on site soil disposal CAMU requires consideration. The construction of a CAMU would likely lengthen the time to implement this alternative.

Any additional groundwater extraction system would also operate for a presumed period of 30 years. Operation and maintenance requirements would include additional well and pump maintenance, replacement, labor, and utilities. Institutional controls and the groundwater monitoring program implemented during this period would be the same as Alternative 1.

- **Environmental**

These alternatives would provide an additional level of engineering controls to prevent the potential migration of contaminated groundwater from Areas B, C, and E.

However, constituent migration analyses and downgradient groundwater sample analyses in conjunction with flow modeling demonstrating interception of shallow groundwater by on site sewer systems suggest that there are existing conditions/mechanisms controlling and limiting the migration of constituents of concern from Area BCE. In addition, the breach in the BSA sewer line sheet piling in Area E would be repaired under Alternative 1/1A further limiting groundwater flow from this area.

No significant short or long term benefits beyond Alternative 1/1A would be provided based on the very low flux of groundwater through Areas B, C, and E, existing attenuation of contaminants, and existing groundwater containment conditions achieved by seepage into the sewers.

Safety hazards to workers associated with construction activities would be mitigated by the requisite training and health and safety plans required for working on RCRA facilities. However, the specific considerations noted above would need to be addressed in developing appropriate health and safety procedures.

As in the case of Alternative 1/1A, for this remedy to be effective for the presumed duration of 30 years, institutional controls and routine monitoring and maintenance of any Area B, C, and E groundwater extraction system and a CAMU (if constructed) will be required.

Consequently, given these conditions and the results of the RA, no significant level of additional environmental protection would appear to be provided by an additional groundwater containment system in Areas B, C and E.

- **Human Health**

It was concluded by the RA that there are likely no unacceptable health risks to on- and off-site human and environmental receptors from groundwater-borne contaminants from Area BCE given the current site conditions and in consideration of the proposed construction of the Area A groundwater extraction system and institutional controls identified in Alternative 1.

This alternative would pose more short term risks to the community during construction of an Area B, C, and E groundwater containment system compared to Alternative 1. The construction of any of these additional groundwater containment systems would involve safety issues that would need to be addressed related to subsurface utilities, railroad structures, rail crossings, and existing operating areas along the perimeter of Areas B, C, and E. Additionally, pedestrian and traffic considerations would also be a consideration along Lee Street between South Park Avenue and Prenatt Street.

Consequently, given the results of the RA, no significant level of additional human health protection would appear to be provided by an additional groundwater containment system in Areas B, C and E under this alternative.

- **Institutional**

The institutional requirements for Alternatives 2A, 2B, and 2 C would be similar to that required for Alternative 1/1A. However, additional RCRA permitting activities through the NYSDEC and USEPA would be required if a soil disposal CAMU was to be designed and constructed. Coordination with and approval from the various local utilities, railroad and the City of Buffalo would also be required for any work along Lee and Prenatt streets.

- **Reduction of Toxicity, Mobility, or Volume**

The reduction in toxicity, mobility or volume for these alternatives would be similar to Alternative 1. The installation of an additional shallow groundwater containment system in Areas B, C and E would provide additional engineering controls to minimize the potential for off-site contaminant migration from these Areas. As discussed above however, off site migration of contaminants in shallow groundwater from Area B, C, and E is already being restricted by the existing site conditions. The repair of the BSA sheet piling breach in Area E will also further limit groundwater flow and the potential for migration of contaminants from this area. Therefore, no significant reduction in contaminant mobility would be anticipated.

While constituents present in groundwater collected by an Area BCE containment system would be treated either by discharge to the BSA or the Area D GWTS, the estimated short and long term volume and associated contaminant mass reduction expected by implementation of these systems is not significant.

- **Cost**

The estimated present value costs (including capital and O&M costs) for Alternatives 2A, 2B and 2 C are \$2,764,656, \$2,810,504, and \$2,854,157, respectively, assuming off-site soil disposal. Construction of an on site soil disposal CAMU could result in potential savings of approximately \$266,448 or \$183,436 for Alternatives 2B and 2C, respectively. The costs of Alternatives 2A, 2B, and 2 C are greater than the cost of Alternative 1 by approximately 46 to 51%.

The detailed cost estimates for these alternatives are presented in Appendix F.

6.5.3 Alternative 3 - Area A Groundwater Extraction System, Institutional Controls, Groundwater Monitoring, Repair Sheet Piling Breach (Area E), Area A Bank Erosion Control, Soil Capping

Description

The primary components of Alternative 3 include the components described for Alternatives 1 or 1A and also capping of unpaved soils in Areas A, C, and E to reduce infiltration, potential soil runoff, and further limit potential exposure to constituents in surficial (0-2 ft. bgs.) soils. Capping of unpaved soils would be achieved by the installation of asphalt paving. The selected areas identified for capping using asphalt paving as a cover material are identified in Figure D-9. The asphalt cap would consist of the following components (top to bottom):

- One inch wear surface;
- Two inch binder layer; and
- Two inches of crushed stone.

The conceptual asphalt paving design is shown on Figure D-10.

Evaluation of Alternative 3

- **Technical**

This alternative includes all of the components of Alternative 1 or 1A and would also include soil capping using an asphalt cover system in unpaved areas of Areas A, C and E. Soil capping using an asphalt barrier would be performed to reduce infiltration primarily in Area A. No significant reduction in infiltration/recharge would be expected for Areas C or E as many areas of the facility are already paved or covered. This alternative also provides an additional barrier over surficial (0-2 ft. bgs.) unpaved soils to minimize the potential for soil runoff and exposure to soil constituents by facility workers.

This alternative is estimated to require approximately one year for final design and one year/construction season to implement. Installation of the asphalt cover could be performed concurrently with the installation of the elements of Alternative 1. The construction of the asphalt cover is readily implemented using simple paving techniques.

The asphalt cover system would also operate for a presumed period of 30 years. Operation and maintenance requirements would include routine repair and/or replacement of the 1-inch top wearing surface in specific areas during this period.

- **Environmental**

This alternative would provide an additional engineering control to limit surface water infiltration and recharge to shallow groundwater. A long term benefit would be reduction of leaching of impacted soils in the unsaturated zone, consequently potentially decreasing the time for contaminant mass removal within groundwater of Area A.

However, given the results of the RA, no significant level of additional environmental protection would appear to be provided by additional soil cover compared to Alternative 1. This alternative would not pose any more short term risks to the community or safety hazards to workers during construction compared to Alternative 1.

As in the case of Alternative 1, 2A, 2B and 2C, for this remedy to be effective for the presumed duration of 30 years, routine monitoring and maintenance of the asphalt cover associated with Alternative 3 would be required particularly in any high traffic areas.

- **Human Health**

It was concluded by the RA that there are likely no unacceptable health risks to on- and off-site human and environmental receptors from soil-borne contaminants derived from Area ABCE given the current site conditions and in consideration of continued industrial use in the future and institutional controls described in Alternative 1.

Consequently, given these conditions and the results of the RA, no significant reduction in risk would appear to be provided by additional asphalt cover under this alternative. However, asphalt capping would provide an engineering control to further reduce the potential for soil runoff and worker exposure to soil contaminants in Areas A, C, and E.

- **Institutional**

The institutional requirements for Alternative 3 would be equivalent to that required for Alternative 1.

- **Reduction of Toxicity, Mobility, or Volume**

The reduction in toxicity, mobility or volume for these alternatives would be similar to Alternative 1. Cover systems do not lessen toxicity, mobility, or volume of hazardous wastes or contaminated media, but they do mitigate infiltration and

potential exposure to soil contaminants. Additionally, a soil cover system can prevent, or reduce, the migration of contaminants in the unsaturated soils or groundwater.

- **Cost**

The estimated present value costs for Alternative 3 is \$2,700,051 assuming off-site soil disposal. The cost of Alternative 3 is greater than Alternative 1 by approximately 43% and is in the same cost range of Alternatives 2A, 2B, and 2C. The estimated cost of Alternative 3A (grout barrier in Area A) would be \$4,194,724.

The detailed cost estimate for this alternative is presented in Appendix F.

6.5.4 Alternative 4 - Area A Groundwater Extraction System, Area BCE Groundwater Extraction System, Institutional Controls, Groundwater Monitoring, Repair Sheet Piling Breach (Area E), Area A Bank Erosion Control, Soil Capping

Description

The primary components of Alternative 4 include the components described for Alternatives 2A, 2B or 2C and also capping of unpaved soils in Areas A, C, and E to reduce infiltration, potential soil runoff, and further limit potential exposure to constituents in surficial (0-2 ft. bgs.) soils. The selected areas and materials identified for capping using asphalt paving as a cover material are the same as identified for Alternative 3 (Figure D-10).

Evaluation of Alternative 4

- **Technical**

This alternative includes all of the components of Alternatives 2A, 2B or 2C and also includes soil capping using an asphalt cover system in unpaved areas of Areas A, C and E as described for Alternative 3. As discussed in Alternative 3, soil capping using an asphalt barrier would be performed to reduce infiltration primarily in Area A as no significant reduction in infiltration/recharge would be expected for Areas C or E considering many areas of the facility are already paved or covered. This alternative also provides an additional barrier over surficial (0-2 ft. bgs.) soils to minimize the potential for soil runoff and exposure to soil constituents by facility workers.

As the modeled estimated volume of extracted groundwater from the hypothetical Area BCE extraction systems (Alternatives 2A, 2B and 2C) is very low (i.e., 95 to

150 gallons /day), no significant reduction in volume would be likely as a result of soil capping in these areas.

This alternative is estimated to require approximately one year for final design and one to two years/construction seasons to implement. The construction period would be longer than Alternative 1 or Alternative 3 and similar to Alternatives 2A, 2B and 2C.

Operation and maintenance requirements are the same as that for Alternatives 2A, 2B, 2C and Alternative 3.

Environmental

As in the case of Alternative 3, given the results of the RA, no significant level of additional environmental protection would appear to be provided by additional soil cover. This alternative would provide an additional engineering control to limit surface water infiltration and recharge to shallow groundwater. This alternative would not pose any more short term risks to the community or safety hazards compared to Alternative 2A, 2B, or 2C.

- **Human Health**

Given the results of the RA, as discussed under Alternative 3, no significant reduction in risk would appear to be provided by additional asphalt cover under this alternative. However, asphalt capping would provide an engineering control to further reduce the potential for soil runoff and worker exposure to soil contaminants in Areas A, C, and E.

- **Institutional**

The institutional requirements for Alternative 4 would be the same as that required for Alternative 2A, 2B or 2C.

- **Reduction of Toxicity, Mobility, or Volume**

The reduction in toxicity, mobility or volume for this alternative would be similar to Alternative 2A, 2B or 2C and Alternative 3.

- **Cost**

The estimated present value costs (including capital and O&M costs) for Alternatives 4A, 4B and 4C are \$3,575,105, \$3,620,953, and \$3,664,606, respectively, assuming off-site soil disposal. Construction of an on site soil disposal CAMU could result in potential savings of approximately \$226,448 (Alternative 4B) or \$183,436 (Alternative 4C). The cost of Alternatives 4A and 4C are greater than the cost of Alternatives 1/1A, 2A, 2B, 2C and 3.

The detailed cost estimate for this alternative is presented in Appendix F.

A summary of the cost estimates for the above corrective measures alternatives is also provided in Appendix F.

6.6 Proposed Corrective Measures Alternative

Based on the results of the site specific risk assessment, groundwater modeling evaluations, and the detailed analyses of the corrective measures alternatives, Alternative 1 is proposed for Area ABCE at the BCC facility. The components of Alternative 1 include:

- Area A Groundwater Extraction System;
- Institutional Controls;
- Groundwater Monitoring;
- Repair Sheet Piling Breach (Area E); and
- Area A Bank Erosion Control.

These proposed corrective measures would include off site disposal of a limited volume of soils and debris generated as a result of the installation of the Area A groundwater extraction system. Groundwater from the Area A extraction system would be discharged directly to the BSA sewer and treatment plant upon final approval by the BSA and modification of the current BCC BSA discharge permit.

This proposed alternative is protective of human health and the environment, satisfies the remedial objectives, is cost effective, and can be readily implemented using proven technologies.

7. SCHEDULE FOR CORRECTIVE MEASURES IMPLEMENTATION

In order to implement the proposed corrective measures, a Corrective Measure Implementation (CMI) program will be developed. The CMI will consist of the following elements:

- Corrective Measure Design; and
- Corrective Measure Construction.

The purpose of the CMI program would be to develop a detailed design of the proposed corrective measures including specifications and drawings for construction, development of an engineering cost estimate, and subsequently, execution and construction of the proposed corrective measures.

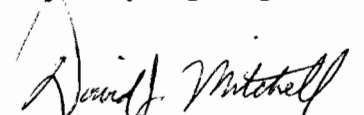
A CMI program for the proposed corrective measures would be initiated upon NYSDEC and USEPA approval of this CMS. In addition, initiation of a permit modification by the NYSDEC would be required as specified in Module III E.13 (a) of the BCC Post Closure permit.

If an approval of this CMS was issued by the NYSDEC and USEPA to BCC in early 2000, a final design for the proposed corrective measures could be completed by December 31, 2000 with construction activities initiated in 2001. A detailed schedule of construction for the proposed corrective measures will be provided as part of the final CMI design.

GOLDER ASSOCIATES INC.



David C. Wehn
Project Hydrogeologist



David J. Mitchell, P.G., P.E.
Senior Geological Engineer



Brian C. Senefelder, CHMM
Associate/Project Director

REFERENCES

- Adrian, D. and Merckel, C.N., 1989, "Update on the Status of the Biota of the Buffalo River, Buffalo, New York". State University College at Buffalo, Aquatic Biology Program.
- Empire Soils Investigations, Inc., 1990, "Hydrogeologic Investigation, Buffalo Color Corporation, Buffalo, New York".
- Engineering Science, Inc., 1989, "Phase II Investigation Site No. 915004, Allied Chemical Industrial Chemical Division, City of Buffalo".
- Fetter, C.W., 1998, "Applied Hydrogeology, 2nd Edition", Page 68.
- Golder Associates, 1997, "Final Report on RCRA Facility Investigation, Buffalo Color Corporation".
- Golder Associates, 1998a, "Final Report on RCRA Facility Investigation, Buffalo Color Corporation, Buffalo, New York (Revision 1)".
- Golder Associates, 1998b, "Addendum to Final Report on RCRA Facility Investigation Buffalo Color Corporation, Buffalo, New York".
- Golder, 1999a, "Work Plan for Area ABCE, Corrective Measures Study, Buffalo Color Corporation, Buffalo, New York".
- Golder, 1999b, "Corrective Measures Identification Report, Buffalo Color Corporation, Buffalo, New York".
- Makarewicz, J.C., et al., 1982, "Biological Survey, Buffalo River and Outer Harbor of Buffalo, New York", Volumes 1 and 2, The Research Foundation of the State of New York, State University of New York at Brockport, New York.
- Malcolm-Pirnie, Inc., 1989, "Remedial Investigation Report at the Buffalo Color Corporation Area D, Engineering Report, Buffalo, New York".
- New York State Department of Environmental Conservation, January 1994, "Revised Technical and Administrative Guidance Memorandum, Determination of Soil Clean-up Objectives and Clean-up Levels (HWR-94-4046).
- Parsons Engineering Science, Inc., 1999, "Buffalo Color Area "A" Pumping Test and Groundwater Modeling".
- Remcor, Inc., 1995, Project No. 94149, "Draft RCRA Facility Investigation Report, Allied Signal Inc., Buffalo Research Laboratory".

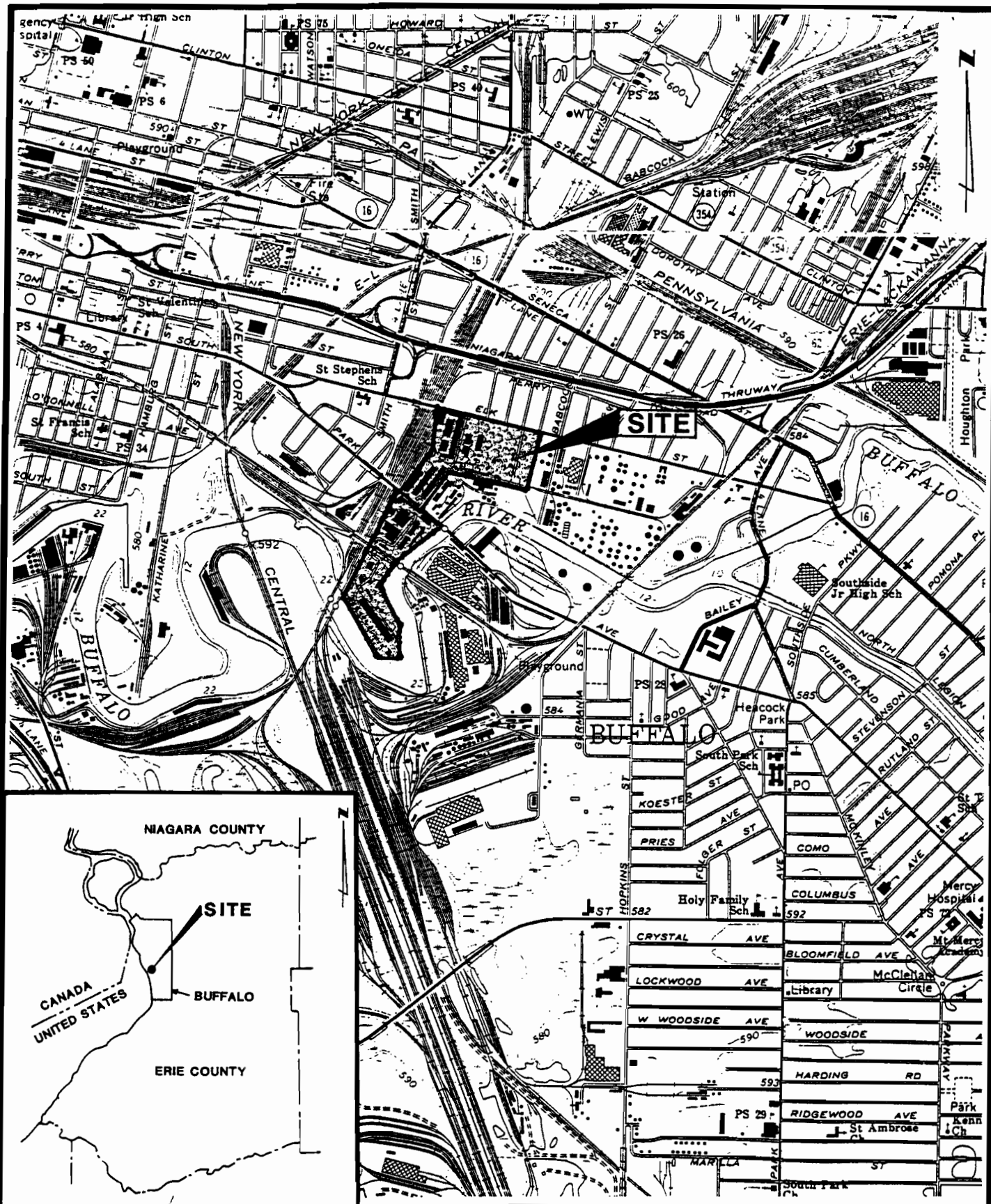
Thomsen Associates, 1987, "Groundwater Quality Evaluation Report, Buffalo Color Corporation".

USEPA "Hazardous Waste Identification Rule for Contaminated Media" 40 CFR 264.552 (November 30, 1998).

Wehran-New York, 1991, "Area D Feasibility Study".

Figures

GOLDER ASSOCIATES INC.



**Golder
Associates**

Buffalo, New York

CLIENT/PROJECT

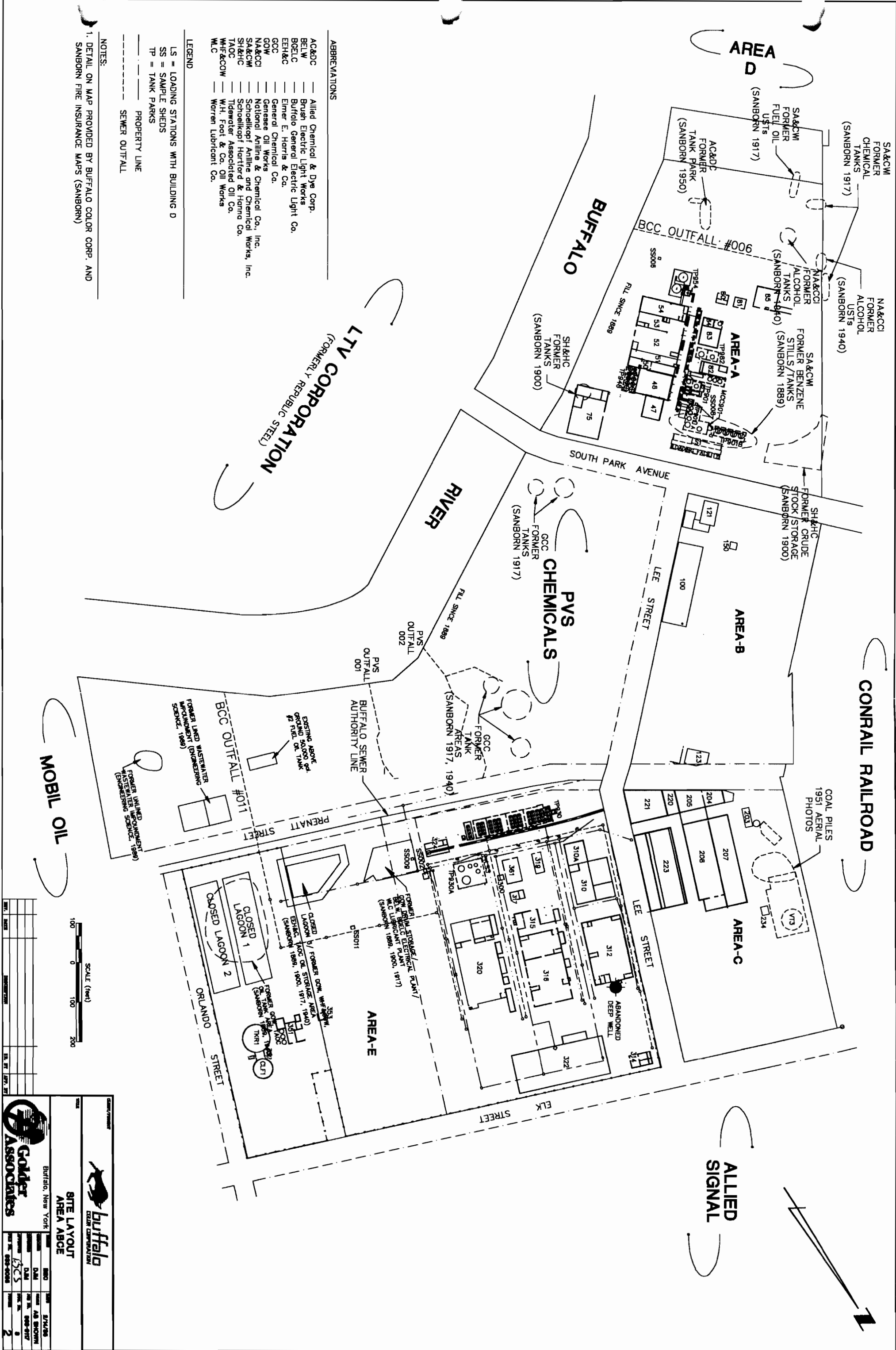


buffalo
COLOR CORPORATION

TITLE

SITE LOCATION MAP

DRAWN	BEC	DATE	2/7/95	JOB NO.	963-9117
CHECKED	CPP	SCALE	N.T.S.	DWG No./REV. No.	6
REVIEWED	CPP	FILE NO.	933-9058	FIGURE NO.	1



LEGEND

LS = LOADING STATIONS WITH BUILDING D

SS = SAMPLE SHEDS

TP = TANK PARKS

----- PROPERTY LINE

----- SEWER OUTFALL

ABBREVIATIONS

AC&DC — Allied Chemical & Dye Corp.

BELC — Brush Electric Light Works

BE&LC — Buffalo General Electric Light Co.

EEH&C — Elmer E. Harris & Co.

GCC — General Chemical Co.

GOV — Genesee Oil Works

NA&CCI — National Aniline & Chemical Co., Inc.

SA&CW — Schoellkopf Aniline and Chemical Works, Inc.

SH&HC — Schoellkopf Hartford & Hanna Co.

TAOC — Tidewater Associated Oil Co.

WH&COW — W.H. Foot & Co. Oil Works

WLC — Warren Lubricant Co.

NOTES:

1. DETAIL ON MAP PROVIDED BY BUFFALO COLOR CORP. AND SANBORN FIRE INSURANCE MAPS (SANBORN)

buffalo
COLOR CORPORATION

SITE LAYOUT
AREA ABCE

Buffalo, New York

Goldier Associates

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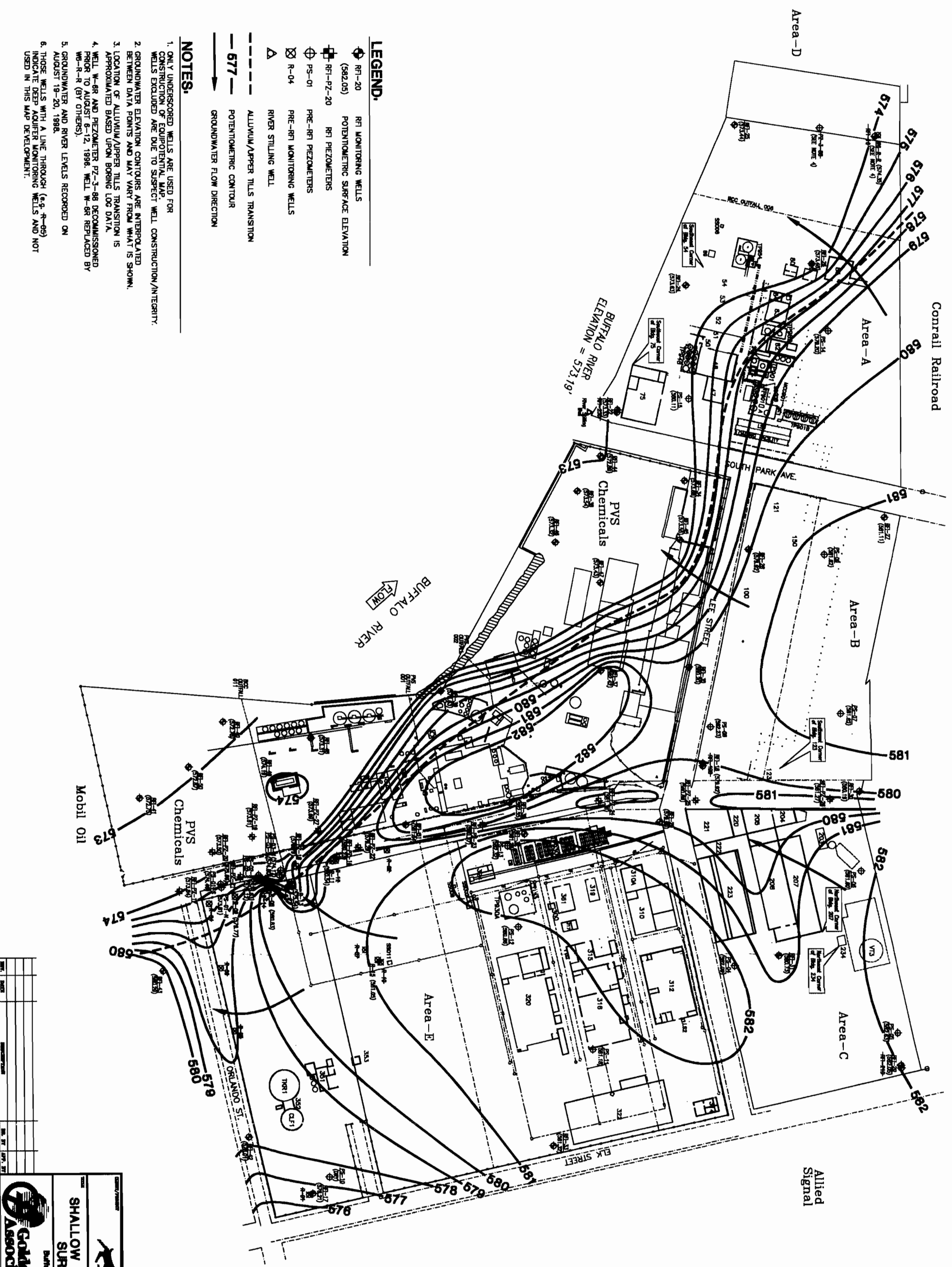
SHALLOW AQUIFER POTENTIOMETRIC SURFACE AUGUST 1998

Buffalo, New York

 Golder Associates

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- LEGEND.**
- RFI-20 RFI MONITORING WELLS
 - (582.05) POTENTIOMETRIC SURFACE ELEVATION
 - RFI-PZ-20 RFI PIEZOMETERS
 - PS-01 PRE-RFI PIEZOMETERS
 - R-04 PRE-RFI MONITORING WELLS
 - △ RIVER STILLING WELL
 - ALLUVIUM/UPPER TILLS TRANSTION
 - - - - - POTENTIOMETRIC CONTOUR
 - GROUNDWATER FLOW DIRECTION
- NOTES.**
1. ONLY UNDERSCORED WELLS ARE USED FOR CONSTRUCTION OF EQUIPOTENTIAL MAP. WELLS EXCLUDED ARE DUE TO SUSPECT WELL CONSTRUCTION/INTEGRITY.
 2. GROUNDWATER ELEVATION CONTOURS ARE INTERPOLATED BETWEEN DATA POINTS AND MAY VARY FROM WHAT IS SHOWN.
 3. LOCATION OF ALLUVIUM/UPPER TILLS TRANSTION IS APPROXIMATED BASED UPON BORING LOG DATA.
 4. WELL W-88 AND PIEZOMETER PZ-3-88 DECOMMISSIONED PRIOR TO AUGUST 6-12, 1998. WELL W-88 REPLACED BY W8-R-R (BY OTHERS).
 5. GROUNDWATER AND RIVER LEVELS RECORDED ON AUGUST 18-20, 1998.
 6. THOSE WELLS WITH A LINE THROUGH (e.g. R-69) INDICATE DEEP AQUIFER MONITORING WELLS AND NOT USED IN THIS MAP DEVELOPMENT.

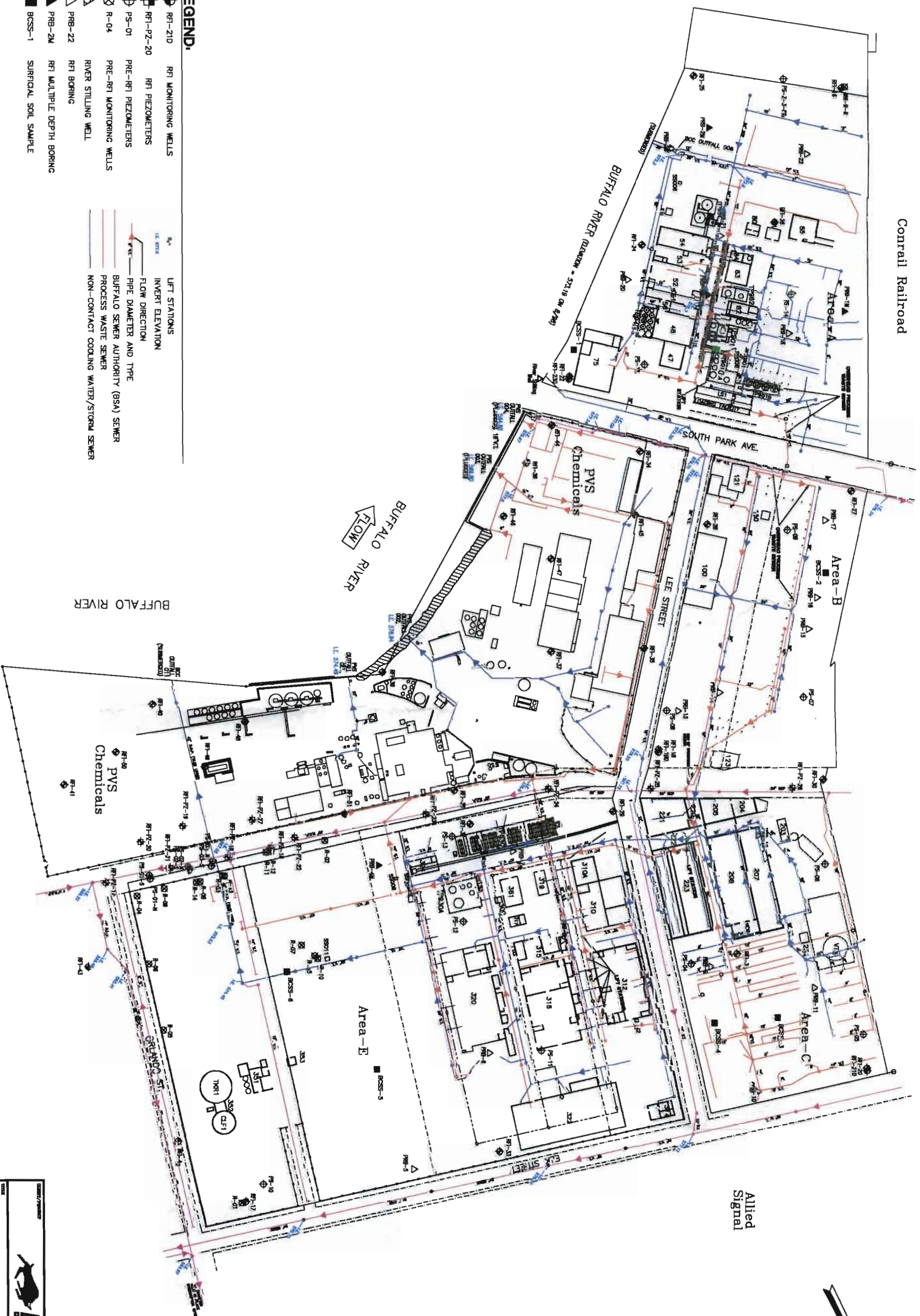


Conrail Railroad

Area-D

- LEGEND.**
- RFI-21D RFI MONITORING WELLS
 - RFI-PZ-20 RFI PIEZOMETERS
 - PS-01 PRE-RFI PIEZOMETERS
 - R-04 PRE-RFI MONITORING WELLS
 - PRB-22 RIVER STILLING WELL
 - PRB-2M RFI BORING
 - PRB-2M RFI MULTIPLE DEPTH BORING
 - BCSS-1 SURFICAL SOL SAMPLE

- LIFT STATIONS
- INVERT ELEVATION
- FLOW DIRECTION
- PIPE DIAMETER AND TYPE
- BUFFALO SEWER AUTHORITY (BSA) SEWER
- PROCESS WASTE SEWER
- NON-CONTACT COOLING WATER/STORM SEWER



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SOLUTIONS

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RF116C2F	(mg/kg)
Aniline	4.4
Benzo(a) Anthracene	13
Benzo(b) Fluoranthene	18
Chrysene	9.5
Chromium	572
Copper	553
Iron	137,000
Selenium	30.6
(2-4 ft. bgs.)	

RF126C5F	(mg/kg)
Aniline	17
Chromium	164
(4-6 ft.bgs.)	

PR81M	(mg/kg)
Aniline	2.9
Selenium	12.7
(0-2 ft.bgs.)	

RF125C2F	(mg/kg)
Benzo(a) Anthracene	17
Benzo(b) Fluoranthene	16
Benzo(k) Fluoranthene	10
Chrysene	16
Arsenic	191
Iron	496,000
Selenium	109
(2-4 ft. bgs.)	

PR82M	(mg/kg)
Selenium	7.15
(0-2 ft. bgs.)	

PR823S2F	(mg/kg)
1,2,4 Trichlorobenzene	110
(0-2 ft. bgs.)	

PR83M	(mg/kg)
Chlorobenzene	15-37
Aniline	8.5
Cadmium	14.5
Selenium	10.8
(0-8 ft.bgs.)	

RF124C5F	(mg/kg)
Benzo(a) Anthracene	270
Benzo(a) Pyrene	200
Benzo(b) Fluoranthene	260
Benzo(k) Fluoranthene	84
Indeno(1,2,3-CD)Pyrene	100
Carbazole	120
Chrysene	230
Dibenzofuran	130
Cyanide	4.9
(6-8 ft. bgs.)	

RF122CW7	(mg/kg)
Aniline	1.4
Chromium	248
Copper	853
Selenium	9.1
Cyanide	5.1
(14-16 ft. bgs.)	

BCSS-1	(mg/kg)
Cadmium	30
Chromium	501
Iron	346,000
Manganese	2,350
Nickel	301
Selenium	24.4

RF128	(mg/kg)
Benzo(b) Fluoranthene	9
(0-2 ft. bgs.)	

RF119D	(mg/kg)
Aniline	1,100
(6-8 ft. bgs.)	
RF119DCAF	(mg/kg)
Nitrobenzene	3.6
(10-12 ft. bgs.)	

PR87S2F	(mg/kg)
Chlorobenzene	18
(0-2 ft. bgs.)	

PR84M	(mg/kg)
Selenium	20.2
(0-4 ft. bgs.)	

RF1P21BC2F	(mg/kg)
Chromium	457
Selenium	24.6
Cyanide	2.9
(0-2 ft. bgs.)	

BCSS-6	(mg/kg)
Aniline	0.48

RF120C2F	(mg/kg)
Cyanide	32.7
(2-4 ft. bgs.)	

RF121DS8F	(mg/kg)
Chlorobenzene	45
(2-4 ft. bgs.)	

RF131SWT	(mg/kg)
1,2,4 Trichlorobenzene	190
(6-8 ft. bgs.)	
RF131C2F	(mg/kg)
Chlorobenzene	20
Arsenic	434
Cyanide	1.35
(2-4 ft. bgs.)	

BCSS-4	(mg/kg)
Aniline	3.1
Benzo(b)Flouanthene	9.3
Cadmium	31
Chromium	591
Iron	343,000
Manganese	2,770
Mercury	18
Nickel	338
Selenium	31.5

Allied
Signal

LEGEND

	% PROPERTY AREA
PAVED/STRUCTURE OR EXISTING BUILDING	56%
GRAVEL SURFACE	14%
SLAB FOUNDATION/LAGOON CLOSURE CAP	3%
TOTAL OF PROPERTY AREA	73%
GRASSED AREA	27%

NOTES

1. CONCENTRATIONS IN mg/kg
2. EXCEEDANCES ABOVE NYSDEC TAGM 4046 SOIL CLEANUP OBJECTIVES. 1/94

- RFI-21 RFI MONITORING WELLS/PIEZOMETERS
- PS-01 PRE-RFI PIEZOMETERS
- R-04 PRE-RFI MONITORING WELLS
- PRB-20 RFI BORING
- PRB-1M RFI MULTIPLE DEPTH BORING
- ▲ RIVER STILLING WELL
- SURFACE SOIL SAMPLE

Mobil Oil

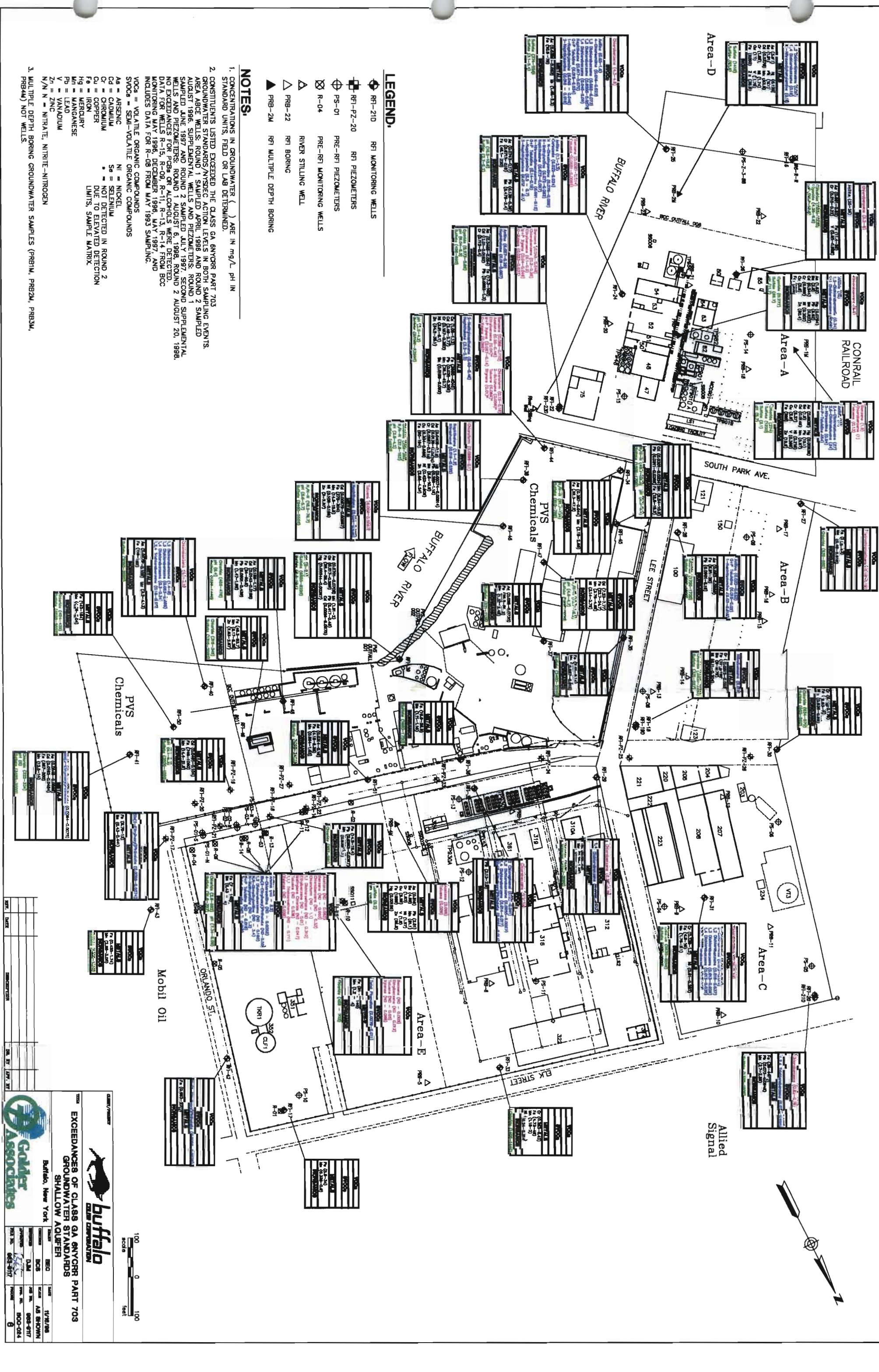


Buffalo, New York

buffalo
COLOR CORPORATION

EXCEEDANCES IN SOIL
AREA ABCE

CLIENT/PROJECT	DRAWN	DATE	JOB NO.
Goldier Associates	BEC	6/30/99	993-9206
CHECKED	SCALE	DMG. NO.	FIGURE NO.
BCS	AS SHOWN	BCC-027	5
REVIEWED	FILE NO.		
afw	993-9206		



LEGEND.

- RFI-21D RFI MONITORING WELLS
- RFI-PZ-20 RFI PIEZOMETERS
- PS-01 PRE-RFI PIEZOMETERS
- R-04 PRE-RFI MONITORING WELLS
- RFI-22 RFI MONITORING WELLS
- PRB-2M RFI MULTIPLE DEPTH BORING

NOTES.

1. CONCENTRATIONS IN GROUNDWATER () ARE IN mg/L, pH IN STANDARD UNITS, FIELD OR LAB DETERMINED.
2. CONSTITUENTS LISTED EXCEEDED THE CLASS GA 6NYCRR PART 703 GROUNDWATER STANDARDS/NYSDEC ACTION LEVELS IN BOTH SAMPLING EVENTS. AREA ABCE WELLS: ROUND 1 SAMPLED APRIL 1998 AND ROUND 2 SAMPLED AUGUST 1998. SUPPLEMENTAL WELLS AND PIEZOMETERS: ROUND 1 SAMPLED JUNE 1987 AND ROUND 2 SAMPLED JULY 1987. SECOND SUPPLEMENTAL WELLS AND PIEZOMETERS: ROUND 1 AUGUST 6, 1998, ROUND 2 AUGUST 20, 1998. NO EXCEEDANCES FOR PCBs OR ALCOHOLS WERE DETECTED. DATA FOR WELLS R-15, R-08, R-11, R-13, R-14 FROM BCC MONITORING MAY 1996, DECEMBER 1996, MAY 1997, AND INCLUDES DATA FOR R-08 FROM MAY 1993 SAMPLING.
3. MULTIPLE DEPTH BORING GROUNDWATER SAMPLES (PRB1M, PRB2M, PRB3M, PRB4M) NOT WELLS.

EXCEEDANCES OF CLASS GA 6NYCRR PART 703 GROUNDWATER STANDARDS SHALLOW AQUIFER

Buffalo, New York

DATE	11/18/98
BY	AS BROWN
REVISED	08/28/97
REVISION	08/28/97
REVISION	08/28/97

Appendices

GOLDER ASSOCIATES INC.

APPENDIX A

RISK ASSESSMENT
CORRECTIVE MEASURES STUDY
BUFFALO COLOR CORPORATION
AREA ABCE
BUFFALO, NEW YORK

EXECUTIVE SUMMARY

A site specific risk assessment was performed for the Buffalo Color Corporation, Area ABCE, a dyestuff manufacturing facility. Soil contaminants were assessed to evaluate the potential risk to human (site workers and neighboring residents) and ecological receptors through direct and indirect soil contact. The shallow groundwater was also assessed to determine the impact to humans and ecological receptors through direct ingestion of groundwater or discharge to the Buffalo River and the potential risk to recreational users of the river and fish. The effects on the Buffalo River from the impacted shallow groundwater in Area A were not included in this examination since hydraulic containment has been proposed as a corrective measure in this area. The risk assessment concluded that no unacceptable risk exists with respect to the on site soils and shallow groundwater, even if potentially discharging to the Buffalo River.

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1.0 INTRODUCTION

1.1 Scope of Work and Objectives for the Site Specific Risk Assessment

This document presents the site-specific risk assessment (RA) for Buffalo Color Corporation (BCC), Buffalo, New York as outlined in the Work Plan for Area ABCE, Corrective Measures Study (CMS), (Golder, 1998). Previous environmental investigations, for the RCRA Facility Investigation (RFI) for BCC (Golder, 1998), encountered contaminants at specific locations on this site where soil and groundwater concentrations of these contaminants exceeded the criteria detailed in New York State Department of Environmental Conservation (NYSDEC) Technical and Guidance Memorandum (TAGM) and exceeded the criteria in Technical and Operational Guidance Series (TOGS).

As presented in the RFI and CMS Work Plan, the primary issue of concern was the shallow groundwater quality at the perimeter of Area ABCE. Accordingly, this RA examines the consequences of potential soil contaminants within Areas A, B, C and E and groundwater contaminants within Areas B, C and E that could theoretically pose a risk to human and ecological health. The effects on the Buffalo River from the impacted shallow groundwater in Area A were not included in this examination since hydraulic containment has been proposed as a corrective measure in this area. Potential human and ecological receptors and exposure pathways have been identified to determine the level of risk potentially present from the identified contaminants.

This RA was carried out to support the CMS and to characterize the potential risk resulting from contaminants in Area ABCE. The methods used in this RA are consistent with U.S. EPA Risk Assessment Guidance for Superfund (RAGs) (U.S. EPA, 1989) including the updated methodology outlined in the U.S. EPA's Soil Screening Guidance (SSG) (U.S. EPA, 1996a and 1996b). Golder Associates Ltd. was retained to perform this site specific risk assessment and GlobalTox International Consultants Inc. were retained to critically assess the report.

This RA assumes that the site will continue its operation as a chemical manufacturing facility. Any potential risks identified also assume this continuing use. Any significant change in the facility's future compared with its current industrial purpose will necessitate a review of the site and RA. Also, any change in the facility's future use should prompt contact with Golder Associates to confirm that the results of this RA are applicable.

1.2 Background

The BCC site is located at 100 Lee Street, Buffalo, New York, as shown in Figure 1. The investigation area (Areas ABCE) encompasses approximately 42 acres. Only Area A is adjacent to the Buffalo River. These areas have been in continuous operation for over 100 years, manufacturing dyestuffs and various organic chemicals. Inclusive of the site operations were the construction of three surface water impoundments or lagoons (Lagoons 1, 2 and 3) located in Area E which have been subsequently closed. The closure of the lagoons was approved by the NYSDEC. A more detailed description of the site's history and operation can be obtained in the RFI report (Golder, 1998).

1.3 Identification of a Potential Risk

There are three prerequisites for a potential risk to exist as listed below:

- A chemical must exist above concentrations that can cause an adverse effect;
- A receptor must be present; and
- An exposure pathway must be complete from the source to the receptor for contact with the contaminant to occur.

These three components must all be present for a potential risk to exist (Figure 2). However, the presence of all three components co-existing does not pre-suppose that a risk is present, only that the potential for a risk is present.

The RA can be used to distinguish which environmental conditions warrant further investigation and those that do not because one or more risk components are missing or because of an existing management controls for mitigating potential risk. The following section presents the RA for Area ABCE.

1.4 Report Format

The process used for this RA follows the U.S. EPA RA process, (U.S. EPA, 1989) which has four stages (See Figure 3):

1. Hazard Identification/Problem Formulation
2. Exposure Assessment
3. Toxicity Assessment
4. Risk Characterization

These four steps drive the RA process and evaluate the possibility of adverse effects on human or ecological health following exposure from a contaminant. A brief description of the stages of the RA is presented below:

- *Hazard Identification / Problem Formulation*

Chemicals of potential concern are identified through a screening process which compares site-specific analytical data to health-based or risk-based criteria. Potential receptors (i.e. people, plants, animals) and pathways of exposure (i.e. mechanisms and media through which substances of concern can reach receptors) are screened using information about site-specific land use. The three risk components are then synthesized into a conceptual pathways model (CPM) that describes complete exposure pathways from sources (chemicals) to receptors through contact pathways.

- *Exposure Assessment*

Physiological parameters, such as body weight and breathing rate, for people that may be exposed to different environmental media (e.g. air, water, soil) are identified from

standard exposure factor guidance and integrated with the frequency, duration and magnitude of the potential exposures from plausible exposure scenarios. The result is a quantitative estimate of the dose received by the receptors (i.e. people) under consideration.

- *Toxicity Assessment (Dose-Response Assessment)*

For this RA, the dose-response assessment made extensive use of available sources of chemical-specific toxicity reference values. Reference doses (R_fD) for non-carcinogens and cancer potency or slope factors (SF) were identified from agency sources and the literature (HEAST, 1997; IRIS, 1999; U.S. EPA, 1999a,b).

- *Risk Characterization*

The estimated exposures were compared to their respective reference toxicity values to obtain a quantitative estimate of the risk for carcinogenic substances or Hazard Quotient (HQ) for non-carcinogens. The magnitude of the numerical cancer risk (NCR) for carcinogens and the hazard quotients (HQ) for non-carcinogens are then discussed in the context of potential health risks. The risk characterization component also identifies and discusses the significance of areas of uncertainty and these uncertainties were treated within the RA.

2.0 HAZARD ASSESSMENT/PROBLEM FORMULATION

2.1 Soil Chemical Screening

Chemical screening was used to identify substances that could potentially pose a risk to human health. To this end, a stepwise approach was used to assess likely chemicals and locations that are of potential concern. Figure 4 presents the approach used for screening soil chemistry results. Analytical results for soil samples from the RFI were screened to identify compounds of potential concern by comparison to the following criteria (in order of comparison):

- NYSDEC TAGM 4046 Determination of Soil Clean-Up Objectives and Clean-Up Levels (Step 1A)
- NYSDEC TAGM 3028 Contained-In Criteria for Environmental Media: Soil Action Levels (SALs) (Step 1B)
- Industrial/Commercial Risk-Based Levels (RBLs) (Step 1C)

Soil concentrations were then compared to local background concentrations in the Buffalo area as defined in a previous study (NYSDOH, 1996) (Step 2). The term “no further action” refers to the concept that the current measure(s) or criteria that are in place are sufficient to maintain a “no risk” condition (i.e. continuation of monitoring and/or maintenance of ground cover with asphalt or concrete to block potential exposure to receptors). Any compounds that were present at a concentration in excess of the screening criteria were retained in the development of a soil CPM.

Soil quality data used in the RA were obtained from analytical data assembled in Appendix H: RFI Laboratory Reports – Soil Samples of the RFI (Golder, 1998). For the areas under investigation, 33 soil sampling locations were identified. The full suite of chemicals tested in the confirmatory soil analysis of the RFI (Golder, 1998) were considered in this RA.

For ease of discussion, the compounds considered in this assessment were organized into four main categories:

- volatile organic compounds (VOCs)
- semi-volatile organic compounds (SVOCs)
- inorganics and
- polychlorinated biphenyls (PCBs).

Soil samples were recovered from ground surface to depths ranging up to 40 ft below ground surface (bgs). For the purposes of this assessment, all soils samples were conservatively assessed as though they had been collected from the upper 2 ft of overburden. U.S. EPA (1990) guidance considers the upper 2 ft of overburden to be “surface soils” for the direct soil contact pathway. Even though the soil sample may be at depth (greater than 2 ft.) if it can be eliminated by the RA, assuming it is at surface, it will provide a definite exclusion of risk.

In some samples, some parameters had analytical detection limits that were not sufficiently low to compare to the TAGM criteria, due to sample matrix effects. When a compound was measured as a “not detected” value, it was considered that the compound was not present at a concentration above the analytical detection limit. Hence, if a detection limit for a substance was higher than a regulatory TAGM value or risk-based value, the substance was retained for further screening, since it could not be assumed that the compound was not present at concentrations greater than the TAGM or risk-based value. In these cases, substances were conservatively retained and assumed to be present at concentrations equal to their reported detection limits and carried through the screening process. If the detection limit was less than the corresponding TAGM criterion, the substance was not considered further in the assessment.

2.1.1 Soil Concentrations Compared to TAGM 4046 Criteria

(Step 1A of Figure 4).

For the first step of screening analytical results for the soil samples were compared to TAGM 4046 guidance clean-up levels. These values are proposed by the NYSDEC as guidance levels to which a contaminated site should be remediated since restoration to pre-contamination conditions may not be feasible. These are NYSDEC guidance levels determined from the most stringent of the following:

- cancer risk;
- reference dose for noncarcinogens;
- water quality levels or maximum contaminant levels; or
- background or method detection limits.

Buffalo area background concentrations that are applicable to the TAGM 4046 criteria were obtained from the NYSDOH Seneca-Babcock study (NYSDOH, 1996). The default TAGM 4046 criteria use a total organic carbon (TOC) value of 1%. However, as suggested in the TAGM 4046, the RFI for BCC incorporated a site specific soil TOC value of 5.3%. As such, the adjusted TAGM 4046 values listed in the tables of the RFI were used as the criteria. If no TAGM 4046 criteria were available for comparison, the compound was retained for further assessment for the following steps of the RA.

Table 1 summarizes the VOC, SVOC, inorganic and PCB analytical results. It provides the maximum concentration detected, the TAGM 4046 criteria (if available), the number of samples found to exceed the TAGM 4046 criteria and the number of constituents above the respective analytical detection limits. The following discusses the compounds exceeding the TAGM 4046 values.

Volatile Organic Compounds (VOCs)

All VOCs considered in Area ABCE had TAGM 4046 values. The following describes the VOCs exceeding TAGM 4046 values and retained for further examination:

VOCs Exceeding TAGM 4046 (4 constituents):

- acetone, benzene, chlorobenzene, methylene chloride

VOCs Exceeding TAGM 4046, Not Exceeding Analytical Detection Limits (3 constituents):

- acetone, benzene, methylene chloride

Only chlorobenzene was confirmed to exceed the respective TAGM 4046 level; the other compounds listed above had analytical detection limits above the corresponding criteria. Regardless, all 4 VOCs above the TAGM 4046 criteria were retained for further screening.

Semi-Volatile Organic Compounds (SVOCs)

The following list describes SVOCs and TAGM 4046 values:

SVOCs Without TAGM 4046 Criteria (5 constituents):

- carbazole, N,N-diethylaniline, 1-naphthylamine, N-nitrosodiphenylamine, p-toluidine

SVOCs Exceeding TAGM 4046 Criteria: (10 constituents)

- aniline, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, chrysene, dibenzofuran, naphthalene, nitrobenzene

SVOCs Exceeding TAGM 4046, Not Exceeding Analytical Detection Limits (3 constituents):

- aniline, chrysene, nitrobenzene

As the analytical detection limits of the aniline, chrysene and nitrobenzene were lower than the respective TAGM 4046 criteria, these chemicals could not be excluded from the RA at this point. These SVOCs, along with the others listed above, were retained for further screening because the exact concentrations are not known.

Inorganics

Of the 19 inorganic parameters that were analyzed, the following results were obtained:

Inorganics Without TAGM 4046 Criteria (2 constituents):

- antimony, silver

Inorganics Exceeding TAGM 4046 Criteria: (15 constituents)

- aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, vanadium, zinc

All of these inorganics were retained for further screening. The two other inorganics which were detected, chromium (VI) and cyanide, must be evaluated on a site-specific basis, as specified in the TAGM 4046 criteria. These two constituents were also retained for further analysis.

Polychlorinated Biphenyls (PCBs)

Aroclor 1254 was the only PCB detected at Area ABCE. None of the samples from the 33 soil sample locations had concentrations above the TAGM 4046 values.

2.1.2 Soil Concentrations Compared to TAGM 3028 Soil Action Levels

(Step 1B of Figure 4)

TAGM 3028 table of Soil/Sediment “Contained-In” Criteria: Soil Action Levels (SALs) (NYSDEC, 1997) are based on U.S. EPA’s Soil Screening Guidance (U.S.EPA, 1996a, b). These levels correspond to soil concentrations that are protective of human health for the direct contact pathway and are based on an incremental lifetime carcinogenic risk

(ILCR) of no more than one-in-a-million (10^{-6}) or a non-carcinogenic hazard quotient (HQ) of 1.0 for the most sensitive effect of a substance, in a residential exposure scenario. If no TAGM 3028 SAL was available for a substance, it was retained for further assessment in subsequent steps of the screening process for soil. The chemical parameters that remained after screening with the TAGM 4046 criteria were compared to the TAGM 3028 SALs.

For lead, a value of 400 mg/kg was used for residential criteria. This value was derived by the U.S. EPA using its Integrated Exposure Uptake Biokinetic (IEUBK) Model for lead in children (U.S. EPA, 1994) and is consistent with the value for lead in the Agency's Soil Screening Guidance (U.S. EPA, 1996a and 1996b). NYSDEC has incorporated this value into its 1997 TAGM 3028 Soil/Sediment Action Levels. No value for lead exists for industrial/commercial (I/C) land use, therefore, the residential value was used in chemical screening.

Thirty-three soil locations in Area ABCE were sampled. Table 2 summarizes the VOC, SVOC and inorganic exceedences and it provides the maximum concentration detected, the TAGM 3028 SAL (if available), the number of samples found to exceed the TAGM 3028 SALs and the number of samples above the respective analytical detection limits. The following discusses the compounds exceeding the TAGM 3028 SALs.

Volatile Organic Compounds (VOCs)

Of the 4 VOCs retained from the previous screening, none were above the TAGM 3028 SALs. Therefore, all VOCs were excluded from further consideration in this RA.

Semi-Volatile Organic Compounds (SVOCs)

The following lists describe the remaining SVOC concentrations in relation to the TAGM 3028 SALs.

SVOCs Without TAGM 3028 SALs (4 constituents):

- dibenzofuran, N,N-diethylaniline, 1-naphthylamine, p-toluidine

SVOCs Exceeding TAGM 3028 SALs (7 constituents):

- benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, carbazole, chrysene,

SVOCs Exceeding TAGM 3028 SALs, Not Exceeding Analytical Detection Limits (4 constituents):

- benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene

Three SVOCs were positively identified as having concentrations in excess of the TAGM 3028 SALs (benzo(k)fluoranthene, carbazole and chrysene). The remaining SVOCs did not have analytical detection limits below TAGM 3028 criteria and were conservatively retained for further screening.

Inorganics

Of the 33 soil samples analyzed, the following inorganics were retained in the RA following comparison with TAGM 3028 SALs.

Inorganics Without TAGM 3028 SALs (5 constituents):

- aluminum, chromium, cobalt, copper, iron

Inorganics Exceeding TAGM 3028 SALs (3 constituents):

- antimony, arsenic, lead

Antimony was the only metal that was not confirmed to be present above the analytical detection limits.

2.1.3 Soil Concentrations Compared to Industrial/Commercial (I/C) Risk-Based Direct Contact Values

(Step 2C of Figure 4).

I/C values were derived for direct soil contact using procedures documented in U.S. EPA's Soil Screening Guidance (U.S. EPA, 1996a, b). The target ILCR in this guidance was one-in-a-million (10^{-6}) and the target non-carcinogenic HQ was 1.0, both of which are consistent with target values used by the NYSDEC in its derivation of the TAGM 3028 SALs (see above). For substances that can cause cancer and non-cancer effects, the I/C risk-based level used in screening was the lower (i.e. more protective) of the cancer and non-cancer based values. The equation used to calculate the non-carcinogenic risk is as follows:

$$\text{Industrial RBL (mg / kg)} = \frac{THQ \times BW \times AT_{nc} \times 365d / y}{\frac{1}{RfD} \times 10^{-6} \text{ kg / mg} \times EF \times ED \times IR}$$

and for carcinogenic risk:

$$\text{Industrial RBL (mg / kg)} = \frac{TR \times BW \times AT_c \times 365d / y}{SF \times 10^{-6} \text{ kg / mg} \times EF \times ED \times IR}$$

Where:

<i>Parameter</i>	<i>Description</i>	<i>Default Value</i>	<i>Reference</i>
THQ	Target Hazard Quotient (unitless)	1.0	U.S. EPA, 1996a
TR	Target Risk (unitless)	10^{-6}	U.S. EPA, 1996a
BW	Industrial Receptor Body Weight (kg)	70	U.S. EPA, 1996a
AT _{nc}	Averaging Time for Non-Carcinogens (years)	25	U.S. EPA, 1996a
AT _c	Averaging Time for Carcinogens (years)	70	U.S. EPA, 1996a

<i>Parameter</i>	<i>Description</i>	<i>Default Value</i>	<i>Reference</i>
365	Conversion factor for day per year	365	-
R _f D	Toxicity Reference Dose (mg/kg/d) (Oral Exposure)	Chemical Specific	IRIS, 1999; HEAST, 1997; U.S. EPA , 1999a, U.S. EPA , 1999b
SF	Toxicity Cancer Slope Factor for Oral Exposure	Chemical Specific	IRIS, 1999; HEAST, 1997; U.S. EPA , 1999a, U.S. EPA , 1999b
10 ⁻⁶	Conversion factor for kg per mg	10 ⁻⁶	-
EF	Exposure Frequency (d/y)	250	U.S. EPA, 1996a
ED	Exposure Duration (years)	25	U.S. EPA, 1996a
IR	Incidental Ingestion Rate of Soil for Industrial Workers (mg/d)	50	U.S. EPA, 1996a

The most recent toxicity data for Reference Doses (R_fDs – used for evaluating non-cancer risks) and Slope Factors (SFs – used for evaluating cancer risks) were obtained from the following sources (in sequence of choice):

1. U.S. EPA 's Integrated Risk Information System (IRIS, 1999)
2. U.S. EPA 's Health Effects Assessment Summary Tables (HEAST, 1997)
3. U.S. EPA Region 3 and Region 9 Toxicity Summaries for either risk-based concentrations or preliminary remediation goals, respectively (U.S. EPA , 1999a, b).

For lead, a value of 400 mg/kg was used for I/C screening. This value was derived by the U.S. EPA using its Integrated Exposure Uptake Biokinetic (IEUBK) Model for lead in children (U.S. EPA , 1994; U.S. EPA , 1998b) and is consistent with the value for lead in the Agency's Soil Screening Guidance (U.S. EPA, 1996a and 1996b). NYSDEC has

incorporated this value into its 1997 TAGM 3028 Soil/Sediment Action Levels. No value for lead exists for I/C land use therefore, this residential value was used in order to be conservative.

Table 3 summarizes the SVOCs and inorganic exceedences (note that all VOC parameters and PCBs were eliminated from further consideration based on previous screening steps, discussed above). It indicates the number of soil samples analyzed for each chemical parameter, the maximum concentration detected, the I/C RBL criteria (if available), the number of samples found to exceed the criteria and the number of samples with analytical detection limits greater than the criteria. The following discusses the compounds compared to calculated I/C RBL criteria.

Semi-Volatile Compounds (SVOCs)

The SVOCs remaining from the TAGM 3028 SAL screening were compared to I/C values.

SVOCs Without I/C RBLs (3 constituents):

- N,N-diethylaniline, 1-naphthylamine, p-toluidine

SVOCs Exceeding I/C RBLs (5 constituents):

- benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene

All of the SVOCs exceeding the I/C RBL criteria have analytical detection limits exceeding the criteria. Because these SVOC detection limits were in excess of the criteria, they were retained for further assessment.

Inorganics

All inorganics analyzed had corresponding I/C RBL criteria. Only two metals, arsenic and lead, were present in analyzed soil samples at concentrations greater than the I/C RBL criteria. Both were retained for further screening in this RA.

2.1.4 Local Background Conditions

(Step 2 of Figure 4)

Background soil conditions have been previously evaluated for the local Buffalo area (NYSDOH, 1996). NYSDOH (1996) reported that the soil concentrations did not differ significantly from neighboring communities, used as a control and not affected by industrial operations. The soil concentrations are compared to a reported mean value for local background conditions, where one exists. Otherwise, the concentrations are compared to the maximum range of reported values (sometimes only a single point). If the concentration was below the local background concentration, the compound was removed from further consideration in the RA.

Table 4 summarizes the SVOCs and inorganics exceeding the background concentrations as provided in the NYSDOH Seneca-Babcock study (NYSDOH, 1996). It provides an indication of the soil analytes considered, the maximum concentration detected, the background soil concentrations used as a comparison (if available), and the number of samples found to exceed the background concentrations.

Using the background concentrations as criteria, none of the SVOCs retained from prior screening steps could be eliminated from the RA. However, the metals of concern, arsenic and lead, appeared to be elevated within the background study area. The majority of detected soil arsenic concentrations in Area ABCE fall within the background residential soil concentration ranges. Using the mean of the arsenic background concentration of 19 mg/kg, 14 of the 33 RFI soil samples exceed this value. When compared to the maximum arsenic background concentration of 97 mg/kg, only 2 RFI soil samples (RFI25C2F at 191 mg/kg and RFI31C2F at 434 mg/kg) exceed this value.

Sample location RFI25C2F is currently located under a gravel surface and should not pose a high potential risk, as discussed further in section 2.1.5 Chemical Screening Using Institutional Controls. Both of these samples were taken at depths between 2 to 4 ft bgs. Even though this RA has assumed all soils are present at surface for screening purposes, these samples are isolated from direct contact, as defined in U.S. EPA Soil Screening Guidance documents (U.S. EPA, 1996a, b). However, no sample was taken in the upper 2 ft of soil at these locations to confirm that arsenic is not accessible. A surface sample directly to the north of RFI31C2F did not identify arsenic at a concentration in excess of the Buffalo area local background range. Due to the localized and infrequent nature of the arsenic distribution in Area ABCE and because identified concentrations are largely consistent with published background values, the fact that RFI25C2F is located beneath an institutional control (gravel surface) and a surface sample in the vicinity of RFI31C2F did not produce arsenic concentrations above the Buffalo area background range, arsenic was removed from further consideration in the RA.

Lead was also elevated within the reported NYSDOH Buffalo background study area. Using a mean background lead concentration of 728 mg/kg, only 2 of the 33 RFI soil samples from Area ABCE were above this value. These two samples, RFI22CWT at a concentrations of 1080 mg/kg and PRM4MC2F at 1370 mg/kg, are well below the maximum background concentration of 2520 mg/kg. Lead concentrations are recognized as being high compared to U.S. EPA response action ranges (400-5000) ppm, but recommends simple measure to reduce exposure, particularly to children. This is discussed further in Section 2.4 Pathway Screening. PRB4MC2F was collected at 2 ft bgs and is located under a gravel surface. RFI22CWT was collected between 14 to 16 ft bgs and a surface sample (BCSS-1) directly to the south did not have a lead concentration above the local background range. As lead appears to be consistent with reported local background values, and not unique to Area ABCE, and because no surface expression of lead was found, lead was removed from further consideration in the RA.

2.1.5 Chemical Screening Using Institutional Controls

The SVOCs retained following all prior screening steps were then evaluated as to their location relative to the BCC investigation area. Institutional controls at BCC, such as paved ground surfaces, existing buildings, gravel surfaces, slab foundations and lagoon closure caps, serve to interrupt or block contact with surficial soils. Therefore, if constituents of concern were from sample locations where an existing institutional control exists, it can be reasonably eliminated from the RA. In addition, soil samples that are deeper than two ft are considered subsurface soils (U.S. EPA, 1990) and negate direct contact. Even though this RA has assumed all soil samples to be available for direct contact for the purposes of risk screening, samples that are identified below 2ft are, in reality, not accessible unless excavated. These samples are also removed from further consideration in the RA. Figure 5 defines the areas with institutional controls and Table 5 lists the SVOCs remaining after this comparison.

Though consideration of institutional controls leads to a reduction in the number of locations within the BCC site at which SVOC concentrations are of concern, no SVOCs are eliminated from the RA by this screening step. As a result, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, N,N-diethylaniline, p-toluidine, and 1-naphthylamine were retained for further consideration.

2.2 Groundwater Chemical Screening

The groundwater data used in this RA were obtained from two sources. These data were obtained from Appendix I RFI Laboratory Reports - Groundwater Samples of the RFI (Golder, 1998) and the lagoon area monitoring data (which is also summarized in the RFI) were obtained from the BCC Groundwater Monitoring Reports (BCC, 1993, 1996 and 1997). For ease of discussion in the RA, the compounds are separated into 5 categories:

- volatile organic compounds (VOCs);

- semi-volatile organic compounds (SVOCs);
- inorganics;
- polychlorinated biphenyls (PCBs); and
- alcohols.

The site specific lagoons area groundwater monitoring chemical data set was consistent with the RFI suite of chemicals. In light of the proposed corrective measures of hydraulic containment of shallow groundwater in Area A, groundwater from this area was not considered in this RA. Based on the available data, it is considered that this set of site specific confirmatory analyses provides a representative description of the groundwater contaminants in Area B, C and E. Some of the chemicals analyzed in samples from the lagoon area were consistently below analytical detection limits. Also, the majority of these chemicals do not have NYSDEC criteria and toxicity information is non-existent. Consequently, these chemicals were not assessed further in the RA.

Specific analytes were quantified in 71 to 77 samples. The reason for this range is due to the fact that not all the same chemicals were analyzed in each set of historic lagoon area monitoring samples. As a result, the total number of samples was variable from location to location.

The groundwater monitoring data indicates a high number of non-detected constituents. To aid in the screening process, the groundwater concentrations of detected constituents in areas B, C and E were compared to concentrations of constituents detected in background or perimeter monitoring wells. The wells considered as background wells were RFI-20, RFI-33 and RFI-43. The data from each of these wells were compiled, for each sample date. The minimum concentrations of each constituent detected was then extracted from this compilation to provide a composite background concentration with which to compare the RFI and lagoon area groundwater sample analyses. This composite serves only to eliminate constituents that are considered local background. Generally, for organic constituents, the minimum concentration of each of the organic analytes was the

lowest analytical detection limit of the perimeter wells. Inorganic constituents, for the most part, had measurable concentrations.

Constituents above these background levels were then compared to two sets of criteria as developed by the NYSDEC:

- Class GA Groundwater (Source of Drinking Water) from the Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Division of Water Technical and Operational Guidance Series (TOGS) (1.1.1), NYSDEC, Revised June 1998; and
- Groundwater Action Levels (GALs), NYSDEC Technical and Administrative Guidance Memorandum No. 3028 - Contained-In Criteria for Environmental Media (August 26, 1997).

Substances with analytical detection limits above the values in these guidance documents were conservatively retained for further assessment. The rationale for this decision, as explained in the soil screening process, is that the actual concentration of the substances cannot be determined with these detection limits and may indeed be above the values given in the guidance documents.

Figure 6 summarizes the risk screening process for groundwater in Areas B, C and E.

2.2.1 Groundwater Concentrations Compared to Background Concentrations

The concentrations of groundwater constituents at BCC investigation areas B, C and E were compared to the concentrations assembled for the background composite well (as discussed above). Table 6 summarizes the comparison and provides an indication of the maximum concentration detected, the background concentration used for comparison, the number of samples exceeding the background concentrations and the number of samples not detected above analytical detection limits.

Volatile Organic Compounds (VOCs)

The VOC concentrations compared to the composite background concentrations are listed below.

VOCs Exceeding Background Concentrations (14 constituents):

- acetone, benzene, chlorobenzene, chloroform, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, methylene chloride, tetrachloroethene, toluene, 1,1,1-trichloroethane, m+p-xylene, o-xylene

VOCS Exceeding Background, Not Exceeding Analytical Detection Limits (13 constituents):

- acetone, benzene, chlorobenzene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, methylene chloride, tetrachloroethene, toluene, 1,1,1-trichloroethane, m+p-xylene, o-xylene

Semi-Volatile Organic Compounds (SVOCs)

The SVOC concentrations compared to the composite background concentrations are listed below.

SVOCs Exceeding Background Concentrations (17 constituents):

- acenaphthene, aniline, anthracene, butylbenzyl phthalate, 2-chlorophenol, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, diethyl phthalate, bis(2-ethylhexyl)phthalate, fluoranthene, naphthalene, 1-naphthylamine, nitrobenzene, pyrene, o+p-toluidine, 1,2,4-trichlorobenzene

SVOCs Exceeding Background, Not Exceeding Analytical Detection Limits (4 constituents):

- butylbenzyl phthalate, fluoranthene, nitrobenzene, pyrene,

Inorganics

The inorganics compared to the composite background concentrations are presented below. The background concentrations for inorganic analytes were not always below analytical detection limits, as was the case with VOCs and SVOCs.

Inorganics Exceeding Background Concentrations (23 constituents):

- aluminum, antimony, arsenic, barium, chloride, chromium, chromium (VI), cobalt, copper, cyanide-total, iron, lead, manganese, mercury, nickel, NO₃-N, NO₃/NO₂-N, NO₂-N, phosphorus, selenium, sulfide, vanadium, zinc

Inorganics Exceeding Background, Not Exceeding Analytical Detection Limits (13 constituents)

- antimony, barium, chromium, chromium (VI), copper, cyanide-total, nickel, NO₃-N, NO₃/NO₂-N, NO₂-N, selenium, vanadium, zinc

Polychlorinated Biphenyls (PCBs)

The 7 PCB Aroclor concentrations compared to the composite background concentrations are listed below.

PCBs Above Background (number of analytes = 7):

- Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, Aroclor 1260

None of these Aroclors were actually detected and may not be present at the site. However, analytical detection limits were not sufficiently low to determine whether true levels exceeded background. Therefore, they have been retained for further evaluation in the RA.

Alcohols

None of the groundwater sample alcohol (n-butanol, methanol, 2-propanol, ethanol) concentrations were above the analytical detection limits from the compounds in the composite background well.

2.2.2 Groundwater Concentrations Compared to TOGS GA Criteria.

Table 7 summarizes the VOCs, SVOCs, inorganics and PCB groundwater samples exceeding the TOGS GA criteria, as well as the maximum concentrations detected, the corresponding criteria, the number of samples exceeding the criteria, and the number of constituents detected above the analytical detection limits.

Volatile Organic Compounds (VOCs)

All of the analyzed VOCs had corresponding TOGS GA criteria. Several VOCs exceeded these criteria and are listed below.

VOCs Above TOGS GA Criteria (14 constituents):

- acetone, benzene, chlorobenzene, chloroform, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, methylene chloride, tetrachloroethene, toluene, 1,1,1-trichloroethane, m+p-xylene, o-xylene

VOCs Exceeding TOGS GA Criteria, Not Exceeding Analytical Detection Limits (12 constituents):

- benzene, chlorobenzene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, methylene chloride, tetrachloroethene, toluene, 1,1,1-trichloroethane, m+p-xylene, o-xylene

To be conservative, the VOCs having sample analytical detection limits above the TOGS GA values were retained for further evaluation in the RA.

Semi-Volatile Organic Compounds (SVOCs)

Two SVOCs did not have associated TOGS GA criteria and several other SVOCs exceeded TOGS GA criteria. These findings are summarized below:

SVOCs Without TOGS GA Criteria (2 constituents):

- 2-chlorophenol, 1-naphthylamine

SVOCs Above TOGS GA Criteria (15 constituents):

- acenaphthene, aniline, anthracene, butylbenzyl phthalate, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, diethylphthalate, bis(2-ethylhexyl)phthalate, fluoranthene, naphthalene, nitrobenzene, pyrene, o+p-toluidine, 1,2,4-trichlorobenzene

All of the above SVOCs had analytical detection limits above the TOGS GA criteria concentration. They were conservatively retained for further assessment.

Inorganics

The following presents a comparison of inorganic constituents groundwater sample concentrations with TOGS GA criteria:

Inorganics Without TOGS GA Criteria (3 constituents):

- cobalt, phosphorus, vanadium

Inorganics Exceeding TOGS GA Criteria (15 constituents):

- aluminum, antimony, arsenic, barium, chloride, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, sulfide, zinc

Inorganics Exceeding TOGS GA Criteria, Not Exceeding Analytical Detection Limits (6 constituents):

- aluminum, antimony, chromium, lead, nickel, sulfide

Polychlorinated Biphenyls (PCBs)

All PCB analytes (Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254 and Aroclor 1260) detection limits exceeded the TOGS GA criteria. Therefore, all PCB analytes were retained for further assessment.

2.2.3 Groundwater Concentrations Compared to TAGM 3028 Groundwater Action Levels (GALs).

TAGM 3028 GALs are based, in part, on New York State standards and guidelines, and on U.S. EPA's Maximum Contaminant Levels. These GALs correspond to concentrations that are protective of human health from the groundwater ingestion pathway. Values tabulated in TAGM 3028 were used in this assessment since they represent a conservative (i.e. protective) approach to the assessment of potentially impacted groundwater. If no TAGM value was available for a chemical, it was retained for further assessment in subsequent steps of the screening process for substances in groundwater.

A range of 71 to 77 groundwater samples were collected from monitoring wells within the BCC investigation areas B, C and E. Analytes quantified in these samples were compared to TAGM 3028 GAL criteria, as listed below. Table 8 summarizes the parameter exceedences and provides the maximum concentration detected for each constituent, the corresponding criteria, the number of samples exceeding the criteria, and the number of constituents detected above the analytical detection limits.

Volatile Organic Compounds (VOCs)

All VOC analytes had associated TAGM 3028 GAL criteria. The following exceeded these criteria:

VOCs Exceeding TAGM 3028 GAL Criteria (14 constituents):

- acetone, benzene, chlorobenzene, chloroform, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, methylene chloride, tetrachloroethene, toluene, 1,1,1-trichloroethane, m+p-xylene, o-xylene

VOCs Exceeding TAGM 3028 GAL Criteria, Not Exceeding Analytical Detection Limits (12 constituents):

- benzene, chlorobenzene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, methylene chloride, tetrachloroethene, toluene, 1,1,1-trichloroethane, m+p-xylene, o-xylene

Therefore, only two VOCs (acetone and chloroform) can be confirmed as being above the TAGM 3028 GAL criteria. The remaining VOCs had concentrations below the analytical detection limits, but these detection limits are above the TAGM 3028 GAL criteria. Therefore, they were conservatively retained for further assessment.

Semi-Volatile Organic Compounds (SVOCs)

One SVOC did not have an associated TAGM 3028 GAL. For 16 other SVOCs, groundwater sample concentrations were consistently at non-detectable levels, but the analytical detection limits were not sufficiently low to exclude them from further consideration in the RA. The 17 substances retained for further examination were:

SVOCs Without TAGM 3028 GAL Criteria (1 constituents):

- 2-chlorophenol

SVOCs Exceeding TAGM 3028 GAL Criteria (16 constituents):

- acenaphthene, aniline, anthracene, butylbenzyl phthalate, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, diethylphthalate, bis(2-ethylhexyl)phthalate, fluoranthene, naphthalene, 1-naphthylamine, nitrobenzene, pyrene, o+p-toluidine, 1,2,4-trichlorobenzene

SVOCs Exceeding TAGM 3028 GAL Criteria, Not Exceeding Analytical Detection Limits (16 constituents):

- acenaphthene, aniline, anthracene, butylbenzyl phthalate, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, diethylphthalate, bis(2-ethylhexyl)phthalate,

fluoranthene, naphthalene, 1-naphthylamine, nitrobenzene, pyrene, o+p-toluidine,
1,2,4-trichlorobenzene

Inorganics

Comparisons of groundwater sample inorganic concentrations to the TAGM 3028 GALs are presented below.

Inorganics Without TAGM 3028 GAL Criteria (7 constituents):

- aluminum, chloride, cobalt, NO₃-N, NO₃/NO₂-N, NO₂-N, phosphorus

Inorganics Exceeding TAGM 3028 GAL Criteria (14 constituents):

- antimony, arsenic, barium, chromium, copper, cyanide-total, iron, lead, manganese, nickel, selenium, sulfide, vanadium, zinc

Inorganics Exceeding TAGM 3028 GAL Criteria, Not Exceeding Analytical Detection Limits (5 constituents):

- antimony, chromium, lead, nickel, sulfide

Even though 5 inorganics were below analytical detection limits, the detection limits exceeded TAGM 3028 GALs. Therefore, these and the other listed inorganics, were retained for further assessment.

Polychlorinated Biphenyls (PCBs)

None of the analyzed PCB mixtures (Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, Aroclor 1260) had associated TAGM 3028 GALs. As a result, these PCBs were retained for further assessment.

2.3 Summary of Contaminants Retained from Soil and Groundwater Screening

The complete soil screening process (consistent with Figure 4) and the constituents retained for further assessment are summarized in Table 9. The list is summarized as follows:

Soil:

SVOCs (8 constituents): benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, N,N-diethylaniline, 1-naphthylamine, and p-toluidine.

Table 10 summarizes the soils screening process, as described in Figure 6. Compounds examined in groundwater which were retained using comparison to the TOGS 1.1.1 GA criteria and the TAGM 3028 GALs are listed below. As these criteria were used simultaneously and were not used as a tiered approach, the list is a composite of both screening reviews:

Groundwater:

VOCs (14 constituents): acetone, benzene, chlorobenzene, chloroform, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, methylene chloride, tetrachloroethene, toluene, 1,1,1-trichloroethane, m+p-xylene, and o-xylene.

SVOCs (17 constituents): acenaphthene, aniline, anthracene, butylbenzyl phthalate, 2-chlorophenol, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, diethylphthalate, bis(2-ethylhexyl)phthalate, fluoranthene, naphthalene, 1-naphthylamine, nitrobenzene, pyrene, o+p-toluidine, and 1,2,4-trichlorobenzene.

Inorganics (22 constituents): aluminum, antimony, arsenic, barium, chloride, chromium, cobalt, copper, cyanide-total, iron, lead, manganese, mercury, nickel, NO₃-N, NO₃/NO₂-N, NO₂-N, phosphorus-total, selenium, sulfide, vanadium, and zinc.

PCBs (7 constituents): Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, and Aroclor 1260.

2.4 Pathway Screening

Since organic and inorganic chemicals of concern (COC) have been identified by this RA for Area ABCE, possible pathways of exposure were considered and evaluated. The following list addresses potential exposure pathways that were considered with regard to chemical constituents found in soil and groundwater at the BCC investigation site.

- *Direct exposure to surface soil by incidental ingestion and dermal contact.*

Paved areas and buildings cover the majority of the site, limiting accessibility to surface soils (Figure 4). Approximately 27% of the site area may have accessible soils covered by grass. Direct exposure to soils on site will therefore be limited. A comprehensive soil management plan, conceived in this CMS, will incorporate existing site soil management protocols to ensure direct exposure to site soils is reduced to excavation activities on site. Any handling or exposure to soil contaminants would be controlled by BCC's soil plan. Some surface areas of the site have been identified as areas, which may present potential exposure to chemical substances in the soil. This assessment has conservatively assumed that all concentrations detected at depth were consistent with surface soil concentrations in locations where no surface soil chemistry was available. Nevertheless, it is generally recognized that the majority of substances were detected at depths greater than 2 ft below ground surface which, in effect, provided protection from direct contact exposures. Furthermore, site use is consistent with I/C use where most workers are employed indoors and therefore, outdoor exposure to soil is limited. The site maintains a perimeter fence, 24 hour security guard service and site access is limited to authorized BCC personnel. This pathway is considered blocked or managed, with a low potential risk and is not considered further for the continued use of this property. In the event future site conditions are altered, then the conditions will have to be examined in the context of this RA.

- *Exposure to dust from wind erosion of surface soils.*

Surface soils at the BCC investigation site are covered with pavement, gravel, buildings, former lagoon areas cap and/or grass (Figure 5) therefore, dust generation is minimal and does not pose a potential risk. In addition, this assessment has conservatively assumed that all concentrations detected at depth were consistent with surface soil concentrations in locations where no surface soil chemistry was available. Nevertheless, it is generally recognized that the majority of substances were detected at depths greater than 2 ft below ground surface, which, in effect, provides protection from exposures, related to dust generation from wind erosion. This pathway is not considered further as a consequence of current site condition.

- *Exposure to soil from overland flow.*

Again, as most surface soils are covered and additionally as the site has a generally flat topography locally influencing surface water velocities, erosion of soil by overland flow is considered negligible. Moreover, the BCC site maintains a permitted system of storm sewers and catch basins designed to capture and monitor runoff. In addition, this assessment has conservatively assumed that all concentrations detected at depth were consistent with surface soil concentrations in locations where no surface soil chemistry was available. Nevertheless, it is generally recognized that substances were detected at depths greater than 2 ft below ground surface which, in effect, provides protection from exposures to soil resulting from overland flow. This pathway is considered managed or blocked as a consequence of current site conditions.

- *Direct exposure to subsurface soil by ingestion and dermal contact.*

Any potential exposure to materials in the subsurface soil is effectively blocked by surface cover. A comprehensive soil management plan, conceived in this CMS, will incorporate existing site soil management protocols to ensure direct exposure to site soils is reduced to excavation activities on site. Any handling or exposure to soil

contaminants would be controlled by BCC's soil plan. This pathway is considered blocked or managed as a consequence of current site conditions.

- *Volatilization of VOCs From Soils*

Potential migration, if any, of organic vapors, such as VOCs, from soil into indoor air are managed by BCC's industrial hygiene monitoring program. The site has had an indoor air-monitoring program in effect since 1978 for a range of organics, inorganics and particulates. Monitoring records were reviewed to assess the potential impact, if any, on potential migration of soil vapours into indoor air. For illustrative purposes, two VOCs (benzene and 1,2-dichlorobenzene) and one SVOC (aniline) have been considered as indicators of potential indoor air concerns. These three compounds have been identified in soil and groundwater in areas of the BCC site.

Chemical	Monitoring Period	OSHA TWA ¹	Result
Benzene	1997	32 mg/m ³	No exceedences noted. Highest value recorded was <0.2mg/m ³ .
1,2-Dichlorobenzene	1979-1997	300 mg/m ³	No exceedences noted. Highest value recorded was 219.8 mg/m ³ in March 1978. Most values were <5 mg/m ³ .
Aniline	1979-1997	19 mg/m ³	Only one (1) exceedence was noted. 19.2 mg/m ³ in March 1981. Most values were <0.5 mg/m ³ .

1. OSHA TWA – Occupational Safety and Health Administration Time Weighted Average values from 29CFR1910.1000 Tables Z-1 and Z-2.

Based on these observations, volatilization of organics from soil into indoor air has not been an issue at BCC and it is assumed not to be an issue in the future. The industrial hygiene program (adequate ventilation system) in effect adequately manages this potential pathway by managing the indoor air quality. Moreover, the highest concentration of organic contaminants in soil and groundwater are SVOCs, which are not likely to contribute appreciably to the soil to indoor air pathway. This pathway was not considered further since it was considered managed or blocked, as a consequence of current site conditions and use.

- *Leaching of Compounds from Soil to Groundwater.*

Soil contaminants at the BCC site have the potential to leach into groundwater migrating through the affected areas. The leaching is evidenced by the elevated groundwater concentrations of COCs present at BCC. Potential risk from this pathway is addressed by consideration of the groundwater pathway, presented below with respect to transport of groundwater contaminants.

- *Direct groundwater exposure through ingestion.*

According to the RFI report (Golder, 1998), there are no known drinking water wells within the cities of Buffalo, Lackawanna or within four miles of the towns of West Seneca or Cheektowaga. Potable water is supplied to the site from the local municipal system. Based on available data, only one groundwater extraction well is present within 4 miles of BCC. An oil refinery nearby reportedly uses an extraction system for groundwater control that discharges to the Buffalo Sewer Authority (BSA). Groundwater extraction wells in Area D are used for remedial measures at the facility and the groundwater is treated prior to discharge to the Buffalo River. A shallow aquifer, groundwater extraction system is also proposed for Area A as part of this CMS. Direct groundwater exposure through ingestion is not considered a viable potential pathway and is not considered further in this assessment.

- *Volatilization of VOCs from Groundwater.*

Potential volatilization of contaminants from groundwater into indoor air is unlikely to be an issue for the BCC site. As discussed previously, vapor migration issues, if any, are effectively managed by BCC's industrial hygiene and monitoring programs. This pathway is not likely to be an issue under these conditions and is not considered further in this RA.

- *Groundwater Migration*

A potential exists for the migration of shallow groundwater and the transport of dissolved COCs into the nearby Buffalo River. Figure 8 illustrates the shallow aquifer potentiometric surface for August 1998. Contours within Area B indicate that groundwater is moving in a southeast direction towards the Buffalo River, where it discharges. Groundwater migration in Areas C and E is predominantly controlled by the east-west BSA sewer line. Potentiometric contours indicate a southerly migration of groundwater which is intercepted by this BSA line. This groundwater sink is not a potential pathway, as intercepted groundwater would be discharged to the BSA line and then to the BSA treatment plant. However, the RFI (Golder, 1998) identified a potential breach in sheet-piling of this BSA sewer line in the southeast corner of Area E, bounded by the PVS Chemicals, Inc. (PVS) site. Contours in this area show a confluence of groundwater flow towards the PVS site and then toward the Buffalo River, where it may discharge. Therefore, shallow groundwater migration from BCC investigation Areas BCE must be further examined as a potential pathway. A more in-depth discussion is provided in Section 4.0 Exposure Assessment, which follows.

The confined aquifer is not used as a potable water source nor does it discharge to the Buffalo River. This pathway is not considered further in this RA.

2.5 Receptor Screening

Chemicals of concern (COCs) and potential pathways were identified in soils and shallow groundwater in the investigation areas of BCC. To complete the screening of all the risk components (see Figure 2), the presence of potential receptors was examined to determine if a potential for risk is present.

A receptor is essentially a site user. For example, BCC personnel, site visitors, and plants and animals that may also be present on-site or nearby are considered receptors. Human and ecological receptors are considered separately. Their assumed proximity and

frequency of contact within the areas of concern are also considered. As such, receptors may exist on- or off-site and may have permanent or occasional use of the site.

Human Receptors

The following human receptors are considered potential receptors for COCs from BCC:

- *On-site human receptors* (includes workers and visitors). For this RA, BCC personnel are considered to be the maximum reasonable exposed receptors, owing to the frequency and duration of their time on site. NYSDEC soil and groundwater criteria as well as previous pathway screening have addressed their exposure. Visitors and/or trespassers were considered to have much lower frequencies and duration of exposures and therefore were not considered further.
- *Area residents*: Since BCC remains inaccessible (i.e. site access is restricted to BCC authorized personnel) and BCC maintains a 24 hour security guard presence and a fenced perimeter, it is unlikely that area residents will come into direct contact with soil or groundwater from the site. A potential secondary exposure pathway is dust. However, this pathway was excluded from further consideration in pathway screening as existing surface cover minimizes dust generation potential. As discussed previously, groundwater and river water is not used in the area for drinking water. Therefore, area residents were not considered further in the RA.
- *Recreational Users of Buffalo River*
As referenced in the RFI (Golder, 1998) the Buffalo River was considered to be a poor habitat for fish and invertebrates and, as such, would not provide a suitable base for recreational fishing. However, the RFI reference states that an increasing number of fish species are reclaiming this habitat and the potential for future recreational use of this fishery is increasing. Therefore, these receptors (i.e. human consumers of river fish) have been considered in this RA.

Also, dermal contact and incidental ingestion of river water may occur in occasional swimmers. However, given the industrial nature of the local area, and difficulty in accessing the river in the vicinity of BCC, swimming within the river near this site would occur, at most, occasionally. However, an exposure analysis on the ingestion of Buffalo River water was performed and is detailed in Section 4.0 Exposure Assessment.

Ecological Receptors

With regards to ecological receptors, a range of ecological receptors, including plants and animals have been considered in the context of whether any are likely to be valued ecological receptors (VECs). VECs would include:

- economically valued plants or animals,
- aesthetically valued species (e.g. endangered species), and
- species vital to the integrity of the local ecosystem.

Given the location of the site and its active industrial use, it is unlikely that VECs will make use of the site. As referenced in the RFI (Golder, 1999), an ecological assessment, habitat survey and wetland delineation was performed in Area D. In addition, an inquiry by Golder to NYSDEC reported that no known species of special management concern or endangered status were present in Area ABCE. Common ecological receptors such as squirrels and birds can be expected to make occasional use of the property. Given the lack of significant vegetation and food sources within BCC and its industrial nature, it is unlikely that the site would provide a suitable habitat for these receptors. The potential exposure of these species to contaminated soils and groundwater is considered to be low. These receptors were not considered further.

As mentioned in the RFI (Golder, 1998), the river is host to a number of fish species. A potential pathway from discharging groundwater to the Buffalo River exists so these

aquatic receptors were included in the CPM to determine if a potential unacceptable risk exists.

2.6 Conceptual Pathways Model (CPM)

The COCs, potential pathway of exposures and potential receptors are summarized in Figure 7, the CPM. No complete source-pathway-receptor linkages were identified for soil. For groundwater, the only potential source-pathway-receptor linkages relate to migration of shallow groundwater to the Buffalo River, including direct discharge from the shallow aquifer and BCC-011 sewer outfall. As a result of this potential risk scenario, potential receptors include recreational users of the river and fish and other biota in the river, within the vicinity of the BCC area.

3.0 TOXICITY ASSESSMENT

The most recent toxicity data for Reference Doses (R_f Ds – used for evaluating non-cancer risks) and Slope Factors (SFs – used for evaluating cancer risks) were obtained from the following sources (in order of preference):

1. U.S. EPA 's Integrated Risk Information System (IRIS, 1999);
2. U.S. EPA 's Health Effects Assessment Summary Tables (HEAST, 1997); and
3. U.S. EPA Region 3 and Region 9 Toxicity Summaries for either risk-based concentrations or preliminary remediation goals, respectively (U.S. EPA , 1999a, b).

The R_f Ds and SFs used in this RA are tabulated in Table 11. Reference values for evaluation of potential impacts to fish and other aquatic biota were obtained from the NYSDEC Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 (NYSDEC, 1998).

4.0 EXPOSURE ASSESSMENT

Because a potential pathway of migration of shallow groundwater to the Buffalo River was identified, an exposure assessment was carried out to determine if the pathway poses a significant risk.

4.1 Shallow Groundwater Migration to Buffalo River.

Since a potential pathway exists for groundwater from the shallow aquifer to discharge into the Buffalo River, it was necessary to quantify the potential risk by calculating loadings to the river and determine if a significant risk to the receptors exists.

Area A is excluded from this RA because of the proposed corrective measure of hydraulic containment. Area B provides a potential pathway to the Buffalo River through the adjacent PVS property. Area E is blocked mainly by the BSA line but a breach in sheet piling in the south-east corner represents a potential viable pathway to the Buffalo River via the adjacent PVS property. The shallow groundwater potentiometric surface in Figure 8 indicates that shallow groundwater from Area C is blocked from directly entering the Buffalo River by water table mounding under the PVS site and by the BSA line. Any potential migration to the river should occur via transport through Areas B and E. As such, two combined areas were considered in determining the concentrations of constituents after discharging to the Buffalo River. The first evaluation areas considered constituent concentrations from investigation Areas B and C and the second evaluation area considered constituent concentrations from investigation Areas C and E.

4.1.1 Assumptions

The following assumptions were used in the discharged concentration calculations. Conservative assumptions were made where possible to determine the maximum concentrations found in the Buffalo River as a result of the discharge by contaminants at BCC.

- *Use of upper tills only to determine concentrations discharged to the Buffalo River.* It was assumed that the contaminants from the upper tills discharged directly to the Buffalo River. The geometric mean of hydraulic conductivity in the upper tills is (2.8×10^{-6} cm/s) as calculated from relevant RFI wells (Golder, 1998). This assumption ignores the alluvium located between the tills and the river. This assumption is conservative and simplifies the hydrogeological model.
- *Low flow rate of the Buffalo River used in calculations.* An approximate value of $1.42 \text{ m}^3/\text{s}$ (50 cfs) was used for the flow in the Buffalo River. This number is based on the lowest geometric daily mean from 45 years of data (Atkinson *et al.*, 1993), and represents a conservative approach to this exposure assessment.
- *Use maximum concentration of each compound in each area.* By assuming that the maximum concentration in an area will be discharged directly to the river from the upper tills, ignoring dilution through dispersion or loss of mass by retardation and degradation, a conservative estimate of loadings can be established. This assumption is not a realistic depiction of the potential plume transport, but provides a “worst case scenario”. If there is no significant potential risk to the receptors in the Buffalo River under these assumed conditions, then this exposure pathway can be excluded from further consideration.

4.1.2 Areas B and C

Maximum constituent concentrations from investigation Areas B and C were used in determining resultant concentrations in the river as a result of discharge from the upper tills. As mentioned in the assumptions, this maximum concentration was delivered to the discharge length east of Area B. Only the fluxes from this area, obtained from the 2-D modelling (Figure 9) were used to determine the estimated concentrations, regardless of where the maximum concentration originated.

The discharge along a 276 ft (84 m) section at the southeast perimeter of Area B is 2.3 gal/day ($1.008 \times 10^{-7} \text{ m}^3/\text{s}$). The calculations are tabulated in Table 12. Using benzene as an example, the following equation was then used to determine the discharge concentrations:

$$\begin{aligned}\text{Resultant River Concentrations} &= \frac{\text{volumetric flow (discharge)} \times \text{concentration}_{\text{max}}}{\text{river flow}} \\ &= \frac{(1.008 \times 10^{-7} \text{ m}^3/\text{s})(0.025 \text{ mg/L})}{(1.42 \text{ m}^3/\text{s})} \\ &= 1.77 \times 10^{-9} \text{ mg/L}\end{aligned}$$

This value was then compared to both the TOGS 1.1.1 Protection for Source of Drinking Water (Surface Water), Type H(WS) and the criteria for Fish Propagation (Fresh Water), Type A(C).

None of the compounds in Area B and C shallow groundwater are predicted to reach the Buffalo River at a concentration above the TOGS HW(S) or A(C) criteria. Given that dilution was not taken into account (by dispersion) or mass loss (by sorption and/or degradation), actual discharge concentrations would be lower than the predicted discharge concentrations.

4.1.3 Areas C and E

As in the previous section, the maximum concentrations of constituents in Areas C and E were assumed to be present to the discharge point. Discharge is assumed to occur across a 508 ft (155m) length section on the eastern end of Area E. Discharge, as estimated from the 2-D modelling is 3.7 gal/day ($1.621 \times 10^{-7} \text{ m}^3/\text{s}$). Discharge of constituents to the river is tabulated in Table 13. Again, none of the compounds in Areas C and E shallow groundwater reach the Buffalo River at concentrations in excess of TOGS H(WS) or A(C) surface water criteria. This is a conservative calculation and actual

discharged compounds would be expected to be at even lower concentrations than these predicted concentrations due to dilution (dispersion of plume) and mass loss (by sorption and/or degradation) during transport.

4.1.4 Other Evidence of Limited Migration of BCC Constituents

Observed groundwater chemistry at RFI wells and piezometers and further one- and two-dimensional modelling indicate that although a potential pathway may exist, it does not appear that chemicals of concern from BCC would discharge to the Buffalo River at significant concentrations greater than NYSDEC surface water criteria. One dimensional (1D) modelling was performed using BCC shallow subsurface hydrogeological parameters (as described in the CMS). Three areas:

- Area B;
- Area E downgradient of the former lagoons; and
- Area E Tank Farm.

were used to describe 1D flow using a chemical representative of that investigation area (aniline, chloroform and chlorobenzene, respectively). The modelled flow took into account only movement in the upper tills on the BCC site, and not the alluvium which is adjacent to the Buffalo River and occupied by PVS.

The 1D modelling used conservative parameters which included:

- continuous source and loading for modelled time frame (30-85 years);
- maximum observed concentration for the chemical parameter used;
- no biodegradation; and
- low porosity ($n = 0.10$).

The results of the modelling indicate that in all areas, none of the representative chemicals migrate a significant distance beyond the BCC property line. Groundwater chemistry observed in the RFI wells support the model's findings. COCs characteristic of investigation areas B, C and E were not observed in supplemental RFI investigation wells, located along the perimeter of the PVS site, adjacent to and downgradient of Areas B, C and E.

4.1.5 Risk Calculations for Ingestion of Buffalo River Water

Even though a low potential risk for the migration of contaminants from BCC to the Buffalo River water has been shown, risk calculations were performed to determine the carcinogenic and non-carcinogenic risks of incidental ingestion of river water, during swimming. Table 14 summarizes the risk calculations. Intake of river water was calculated from the following equation (U.S. EPA, 1989):

$$\text{Intake (mg/kg - d)} = \frac{\text{CW} \times \text{CR} \times \text{ET} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT}}$$

Where:

CW = Chemical Concentration
= chemical specific (mg·L⁻¹)

CR = Contact Rate
= 0.050 L·hr⁻¹

ET = Exposure Time
= 3 hr·event⁻¹

EF = Exposure Frequency
= 7 events·yr⁻¹

ED = Exposure Duration
= 40 y

BW = Body Weight
= 70 kg

AT = Averaging Time
= 10950 d (carcinogen)
= 25550 d (non-carcinogen)

The input variables are consistent with accepted values from the U.S. EPA (U.S. EPA, 1989). Representative chemicals were chosen from the VOCs, SVOCs, inorganics and PCBs categories. The maximum concentration of these chemicals was then used in the intake calculation. The intake value was then divided by either a reference dose (R_fD) for non-carcinogenic chemicals or a slope factor (SF) for carcinogenic chemicals to calculate a hazard quotient (HQ) or numerical cancer risk (NCR), respectively. A HQ less than 1 indicates that no potential unacceptable non-carcinogenic risk is identified. Similarly, a NCR less than one in a million (10^{-6}) indicates no unacceptable cancer risk exists.

Based on these assumptions and calculations, only one compound, arsenic, produced a potential for an unacceptable NCR. A NCR of 5.03×10^{-5} was calculated. However, this NCR is within the range of risks typically considered acceptable by the US EPA (10^{-6} - 10^{-4}) (U.S. EPA, 1989). Given that a low potential exists for arsenic to be discharged to the Buffalo River from migration of shallow groundwater from Areas B, C or E, arsenic is considered very unlikely to pose an unacceptable risk.

4.1.6 Exposure Assessment Conclusions

Based on the results of the above exposure assessment, the following conclusions are made:

- Conservative risk calculations indicate that the estimated potential groundwater constituent discharge concentrations from Areas B, C and E to the river are below NYSDEC surface water criteria, based on results from 1D transport and 2D flow modelling;
- One-dimensional transport modelling indicates groundwater compounds representing Areas B, C, and E do not reach the Buffalo River;
- Shallow groundwater chemistry observed in RFI wells immediately downgradient of Areas B, C, and E indicates that constituents characteristic of Areas B, C and E are not reaching the Buffalo River; and
- Observed maximum concentrations of representative groundwater constituents, if discharged to the river from Areas B, C, and E, do not pose an unacceptable risk if ingested while swimming in the Buffalo River.

5.0 RISK CHARACTERIZATION AND UNCERTAINTY ANALYSIS

An evaluation was performed for major sources of uncertainty in this RA. Uncertainties can be broadly divided between uncertainties associated with the toxicity analysis and those associated with the exposure assessment. Overall, the RA approach employed herein is considered to be conservative (i.e. likely to err in the direction of overestimation of potential risk) for the key reasons outlined in the following sections.

5.1 Uncertainties in Toxicity Analysis

The following areas of uncertainty, which can lead to either over- or under-estimations of hazard potential, were identified during the RA:

- Several compounds do not have R_fC or R_fD values available. However, for each of these substances, analysis of exposure pathways failed to identify completed source-pathway-receptor linkages, which would be a prerequisite to any potential for risk; and
- All toxicity reference values used were adopted from limits derived by regulatory agencies. These toxicity limits often have large uncertainty factors (i.e. 100-fold or greater) applied to exposure levels from animal studies where no adverse effects are observed (i.e. to the No Observed Adverse Effect Level-NOAEL). For carcinogens, the screening approach relied on reference values with ILCR values of one-in-a-million, whereas higher levels (up to one-in-ten-thousand) are often considered acceptable for the purposes of risk assessments at contaminated sites.

5.2 Uncertainties in the Exposure Assessment

The exposure assessment was based on several conservative assumptions. The uncertainties of using these assumptions are listed below.

- U.S. EPA default values for exposure parameters were incorporated into quantification of exposure. The selection of exposure parameters such as the frequency of contact or duration of exposure for industrial workers is likely to over-estimate the exposure;
- The highest measured concentrations of contaminants in groundwater and soil were used to estimate exposures, which will likely over-estimate the risk. Therefore, if exposure to maximum concentrations resulted in low risk, there is confidence that activities in and around Area ABCE would not pose a hazard. Note that the use of sampling data collected for environmental investigations at Area ABCE may over-estimate actual site-related risks in the area since sampling events are typically focused in areas where the greatest contamination is suspected and, therefore, are not representative of site-wide conditions;
- Substances, which were not detected, were assumed to be present at a concentration equal to the detection limit, although they are likely to have been either absent or present only at lower concentrations;
- Sensitive receptors were implicitly considered by using a comparator (i.e. the reference dose or cancer slope factor) which takes into account sensitive individuals; and
- The use of numerical groundwater model simulations to estimate groundwater flow rates, directions, and discharge points, and the inherent uncertainties associated with that modelling, may lead to an over- or underestimation of actual exposure. This uncertainty cannot be adequately addressed without specific sampling and modelling data for each of the chemicals of potential concern. On the other hand, it should be

noted, that model input parameters and assumptions were selected to be conservative (e.g. no dilution, degradation or sorption; use of highest concentration regardless of proximity to discharge location).

For this assessment, the general approach was to use conservative assumptions, detailed throughout the text, which would individually tend to overestimate exposure. Since many of these uncertainties are multiplicative, collectively they will tend to overestimate potential exposure for the scenarios described above and, therefore, will overestimate potential risk. Any refinement of exposure assumptions would tend to lower the estimates of exposure, and further strengthen the “acceptable” risk observations stated above. While it is possible to refine the exposure estimates, such further work is not warranted at this time in light of the positive conclusions arising from these analyses.

6.0 CONCLUSIONS

Soil

Metals and organics in soil and fill were detected at various locations and depths in the investigation Areas ABCE. However, the direct contact exposure pathway was generally recognized as being blocked (i.e. by surface capping such as concrete or asphalt) or managed by administrative controls (i.e. access restrictions, health and safety procedures). Moreover, substances identified as being of potential concern based on the step-wise chemical screening outlined above were generally those that (a) have not been detected, but for which method detection limits were not sufficiently low (due to sample matrix) to evaluate comparison with risk-based levels, or (b) have no corresponding regulatory criteria or derived I/C risk-based levels, preventing their elimination from further consideration during screening.

It is concluded that there are likely no unacceptable health risks to on- and off-site human and environmental receptors from soil-borne contaminants.

Groundwater

A number of substances were identified as being of potential concern in shallow groundwater at Areas A, B, C and E. A hydraulic containment system is proposed for Area A which is adjacent to the Buffalo River. For the remaining investigation areas, (B, C and E) identification of the potential substances of concern was based on a conservative screening approach, involving comparison with concentrations to corresponding TAGM 3028 GALs and TOGS 1.1.1 criteria. For many substances, detection limits were not sufficiently low (due to sample matrix effects) to determine whether the TAGM values were exceeded, and these substances were, therefore, considered to be present at a concentration equal to the detection limit. Potential pathways for on-site and off-site receptors to be exposed to substances in groundwater were evaluated. The only plausible potential exposure pathway identified in the CPM was the discharge of shallow groundwater to the Buffalo River.

Several assumptions were made to determine if resultant concentrations in the river were in excess of TOGS 1.1.1 surface drinking water criteria were exceeded. A key assumption was that the maximum concentration of a compound, no matter where it is located in Area B, C and E, was transported to the river. This is an unrealistic and very conservative assumption which also ignores processes which would cause contaminant concentrations in groundwater to decrease during its transport to the Buffalo River. Therefore, this scenario is a "worst case" scenario and used only as an exercise to evaluate potential risk. Even with the use of these assumptions, no BCC-derived chemicals from Areas B, C and E were identified as reaching the Buffalo River.

Nevertheless, risk calculations were performed to determine if a potential risk existed by incidental ingestion of Buffalo River water using the maximum concentrations observed in Areas B, C and E. One metal, arsenic was identified as having a potential risk with a NCR of 5.03×10^{-5} . However, this calculation is conservative since it ignored dilution and sorption processes, that would reduce the concentration of the contaminant. In any event, the calculated NCR is within the range of ILCRs generally considered to be acceptable by the U.S. EPA ($10^{-6} - 10^{-4}$). It is concluded that there are likely no unacceptable health risks to on- and off-site human and environmental receptors from groundwater-borne contaminants arising from Areas A, B, C and E.

Golder Associates Ltd.

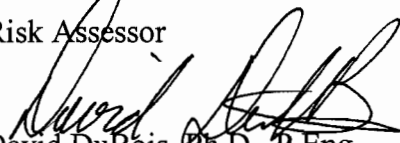
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Hydrogeologist



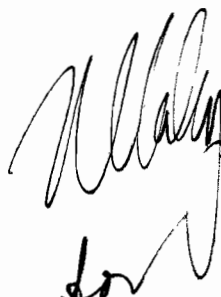
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7.0 REFERENCES

- Atkinson, J.F., T. Bajak, M. Morgante, S. Marshall and J.V. DePinto, 1993. Model Data Requirements and Mass Loading Estimates for the Buffalo River, Mass Balance Study (ARCS/RAM Program). Prepared for: United States environmental Protection Agency, Great Lakes National Program Office.
- Buffalo Color Corporation (BCC), "Groundwater Monitoring Reports (NYD020335052)" (Periods ending June 30, 1997; December 31, 1996; June 30, 1996; and May 21-June 23, 1993).
- Golder Associates Inc., December 1998, "Final Report on the RCRA Facility Investigation, Buffalo Colors Corporation, Buffalo, New York (Revision 1).
- Health Effects Assessment Summary Tables (HEAST) 1997. Annual Update, FY 1997. National Center For Environmental Assessment (NCEA), Office of Research and Development and Office of Emergency and Remedial Response, Washington, DC.
- Integrated Risk Information System (IRIS) 1999. U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH. On-line database (<http://www.epa.gov/iris>).
- New York State Department of Environmental Conservation (NYSDEC) 1994. Determination of Soil Cleanup Objectives and Cleanup Levels. Technical and Administrative Guidance Memorandum 4046. NYSDEC Division of Hazardous Waste Remediation.
- New York State Department of Environmental Conservation (NYSDEC) 1997. "Contained In" Criteria for Environmental Media. Technical Administrative Guidance Memorandum 3028, NYSDEC Division of Hazardous Substances Regulation, Bureau of Technical Support.
- New York State Department of Environmental Conservation (NYSDEC) 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1.
- New York State Department of Health (NYSDOH), Bureau of Environmental Exposure Investigation, October 1996, "Draft Technical Report, Seneca-Babcock Neighborhood Soil Sampling Program, Results of December 1994 Sampling".

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- U.S. Environmental Protection Agency (U.S. EPA) 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002
- U.S. Environmental Protection Agency (U.S. EPA) 1990. Federal Register: 55(145) Proposed RCRA subpart S, July 27, 1990.
- U.S. Environmental Protection Agency (U.S. EPA), 1994. Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities: Office of Solid Waste and Emergency Response, Washington, DC. EPA/540/F-94/043, August, 1994.
- U.S. Environmental Protection Agency (U.S. EPA), 1996a. Soil Screening Guidance: Technical Background Document, EPA/540/R95/128
- U.S. Environmental Protection Agency (U.S. EPA), 1996b. Soil Screening Guidance: User's Guide, EPA/540/R96/018
- U.S. Environmental Protection Agency (U.S. EPA), 1999a. Region 3 Risk-Based Concentrations. Dated 4/12/1999.
(<http://www.epa.gov/reg3hwmd/risk/riskmenu.htm>).
- U.S. Environmental Protection Agency (U.S. EPA), 1999b. Region 9 Preliminary Remediation Goals. Expires 05/01/1999.
(<http://www.epa.gov/region09/waste/sfund/prg/index.htm>).

TABLE 1
BUFFALO COLOR CORPORATION
SOIL ANALYTES COMPARED TO
TAGM 4046 CRITERIA¹

Analytes	CAS Number	TAGM 4046 ² Criteria (mg/kg)	Maximum Concentration (mg/kg)	Number of Samples Exceeding TAGM 4046 Criteria	Percentage of Samples Exceeding TAGM 4046 Criteria	Number of Samples Exceeding TAGM 4046 Criteria Not Exceeding Detection ³	Percentage of Samples Exceeding TAGM 4046 Criteria Not Exceeding Detection ³
Volatile							
Organic Compounds							
ACETONE	67-64-1	0.583	2.2	2	6%	1	3%
BENZENE	71-43-2	0.308	0.81	2	6%	2	6%
CHLOROBENZENE	108-90-7	8.745	26	2	6%	0	0%
METHYLENE CHLORIDE	75-09-2	0.557	0.81	2	6%	2	6%
TOLUENE	108-88-3	7.95	0.81	0	0%	0	0%
M+P-XYLENE	108-38-3/106-42-3	6.36	2	0	0%	0	0%
Semi-Volatile							
Organic Compounds							
ACENAPHTHENE	83-32-9	487.6	110	0	0%	0	0%
ACENAPHTHYLENE	208-96-8	217.9	9	0	0%	0	0%
ANILINE	62-53-3	0.37	17	31	94%	23	70%
ANTHRACENE	120-12-7	3710	190	0	0%	0	0%
BENZO(A)ANTHRACENE	56-55-3	14.63	270	2	6%	0	0%
BENZO(A)PYRENE	50-32-8	58.3	200	1	3%	0	0%
BENZO(B)FLUORANTHENE	205-99-2	5.83	260	5	15%	0	0%
BENZO(G,H)PERYLENE	191-24-2	42400	88	0	0%	0	0%
BENZO(K)FLUORANTHENE	207-08-9	5.83	84	3	9%	0	0%
BUTYL BENZYL PHTHALATE	85-68-7	643.95	9	0	0%	0	0%
DI-N-BUTYL PHTHALATE	84-74-2	42.93	9	0	0%	0	0%
INDENO(1,2,3-CD)PYRENE	193-39-5	16.96	100	1	3%	0	0%
CARBAZOLE	86-74-8	NO TAGM	120	11	33%	3	9%
CHRYSENE	218-01-9	2.12	230	0	0%	0	0%
DIBENZO (A,H) ANTHRACENE	53-70-3	8745000	31	0	0%	0	0%
DIBENZOFURAN	132-64-9	32.6	130	1	3%	0	0%
1,2-DICHLOROBENZENE	95-50-1	42.3	9	0	0%	0	0%
1,4-DICHLOROBENZENE	106-46-7	45.05	9	0	0%	0	0%
N,N-DIETHYLANILINE	91-66-7	NO TAGM	18	0	0%	0	0%
BIS (2-ETHYLHEXYL)PHTHALATE	117-81-7	2307.1	9	0	0%	0	0%
FLUORANTHENE	206-44-0	10070	370	0	0%	0	0%
FLUORENE	86-73-7	1934.5	140	0	0%	0	0%
2-METHYLNAPHTHALENE	91-57-6	192.7	88	0	0%	0	0%
1-NAPHTHYLAMINE	134-32-7	NO TAGM	18	0	0%	0	0%
NAPHTHALENE	91-20-3	68.9	200	1	3%	0	0%
NITROBENZENE	98-95-3	0.954	9	9	27%	8	24%
N-NITROSODIPHENYLAMINE	86-30-6	NO TAGM	9	0	0%	0	0%
PHENANTHRENE	85-01-8	1156.7	460	0	0%	0	0%
PYRENE	129-00-0	3523.2	370	0	0%	0	0%
P-TOLUIDINE	106-49-0	NO TAGM	36	0	0%	0	0%
1,2,4-TRICHLOROBENZENE	120-82-1	17.8	9	0	0%	0	0%

TABLE 1
BUFFALO COLOR CORPORATION
SOIL ANALYTES COMPARED TO
TAGM 4046 CRITERIA¹

Analytes	CAS Number	TAGM 4046 ² Criteria (mg/kg)	Maximum Concentration (mg/kg)	Number of Samples Exceeding TAGM 4046 Criteria	Percentage of Samples Exceeding TAGM 4046 Criteria	Number of Samples Exceeding TAGM 4046 Criteria Not Exceeding Detection ³	Percentage of Samples Exceeding TAGM 4046 Criteria Not Exceeding Detection ³
Metals							
ALUMINUM	7429-90-5	14400	17000	5	15%	0	0%
ANTIMONY	7440-36-0	NO TAGM	65.7				
ARSENIC	7440-36-2	19	434	14	42%	0	0%
BARIUM	7440-36-3	234	2560	4	12%	0	0%
CADMIUM	7440-43-9	4	31	5	15%	0	0%
CHROMIUM	7440-47-3	54	591	11	33%	0	0%
CHROMIUM (VI)	18450-29-9	SITE SPECIFIC	29.9				
COBALT	7440-48-4	9	40.5	16	48%	0	0%
COPPER	7440-50-8	128	943	11	33%	0	0%
CYANIDE-TOTAL	57-12-5	SITE SPECIFIC	32.7				
IRON	7439-89-6	41300	496000	10	30%	0	0%
LEAD	7439-92-1	728	1370	2	6%	0	0%
MANGANESE	7439-96-5	695	3440	6	18%	0	0%
MERCURY	7439-97-6	0.4	18	12	36%	0	0%
NICKEL	7440-02-0	37	397	9	27%	0	0%
SELENIUM	7782-49-2	1.1	109	30	91%	0	0%
SILVER	7440-22-4	NO TAGM	9.08				
VANADIUM	7440-62-2	37	76.5	6	18%	0	0%
ZINC	7440-66-6	687	10300	7	21%	0	0%
PCBs							
AROCLOR 1254	11097-69-1	0.59	0.31	0	0%	0	0%

NOTES:

TAGM: TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM

1: (CORRECTED TO 5.3% TOC)

2: NYDEC, 1994

3: NON-DETECTS WERE RETAINED AT THE ANALYTICAL DETECTION LIMITS

TABLE 2
BUFFALO COLOR CORPORATION
SOIL ANALYTES COMPARED TO
TAGM 3028 SOIL ACTION LEVELS

Analyses	CAS Number	TAGM 3028 Residential SALS ¹ (mg/kg)	Maximum Concentration (mg/kg)	Number of Samples Exceeding TAGM 3028 SALS	Percentage of Samples Exceeding TAGM 3028 SALS	Number of Samples Exceeding TAGM 3028 SALS Not Exceeding Detection ²	Number of Samples Exceeding TAGM 3028 SALS Not Exceeding Detection ²
Volatile Organic Compounds							
ACETONE	67-64-1	7821.428571	2.2	0	0%	0	0%
BENZENE	71-43-2	22.02590207	3.81	0	0%	0	0%
CHLOROBENZENE	108-90-7	1584.285714	29	0	0%	0	0%
METHYLENE CHLORIDE	75-09-2	85.10688	3.81	0	0%	0	0%
Semi-Volatile Organic Compounds							
ANILINE	62-53-3	112.0814035	20	0	0%	0	0%
BENZO(A)ANTHRACENE	56-55-3	0.875	273	15	45%	4	12%
BENZO(A)PYRENE	50-32-8	0.0875	203	33	100%	18	55%
BENZO(B)FLUORANTHENE	205-98-2	0.875	263	16	48%	3	9%
BENZO(K)FLUORANTHENE	207-08-9	8.75	87	3	9%	0	0%
INDENO(1,2,3-CD)PYRENE	183-39-5	0.875	103	14	42%	4	12%
CARBAZOLE	66-74-8	31.8375	123	1	3%	0	0%
CHRYSENE	218-01-9	87.5	233	1	3%	0	0%
DIBENZOFURAN	132-64-9	NO TAGM	133	0	0%	0	0%
N,N-DIETHYLANILINE	91-88-7	NO TAGM	21	0	0%	0	0%
1-NAPHTHYLAMINE	134-32-7	NO TAGM	21	0	0%	0	0%
NAPHTHALENE	91-20-3	310	203	0	0%	0	0%
NITROBENZENE	98-95-3	38.10714286	12	0	0%	0	0%
N-NITROSDIPHENYLAMINE	86-30-8	130.3571543	12	0	0%	0	0%
P-TOLUIDINE	106-48-0	NO TAGM	39	0	0%	0	0%
Inorganics							
ALUMINUM	7429-90-5	NO TAGM	17003	1	3%	1	3%
ANTIMONY	7440-38-0	31.28571429	88.7	33	100%	0	0%
ARSENIC	7440-38-2	0.425833333	437	0	0%	0	0%
BARIUM	7440-39-3	5475	415	0	0%	0	0%
CADMIUM	7440-43-9	78	34	0	0%	0	0%
CHROMIUM	7440-47-3	NO TAGM	584	0	0%	0	0%
CHROMIUM (VI)	18450-29-9	391.0714286	32.9	0	0%	0	0%
COBALT	7440-48-4	NO TAGM	43.5	0	0%	0	0%
COPPER	7440-50-8	NO TAGM	646	0	0%	0	0%
CYANIDE-TOTAL	57-12-5	1600	35.7	0	0%	0	0%
IRON	7439-89-6	NO TAGM	486003	4	12%	0	0%
LEAD ³	7439-92-1	400	1373	0	0%	0	0%
MANGANESE	7439-96-5	10650	3443	0	0%	0	0%
MERCURY	7439-97-8	23.46428571	21	0	0%	0	0%
NICKEL	7440-02-0	1564.285714	400	0	0%	0	0%
SELENIUM	7782-49-2	391.0714286	112	0	0%	0	0%
SILVER	7440-22-4	391.0714286	9.42	0	0%	0	0%
VANADIUM	7440-62-2	547.5	70.5	0	0%	0	0%
ZINC	7440-66-6	23464.28571	10303	0	0%	0	0%

NOTES:

TAGM: TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM

SAL: SOIL ACTION LEVEL

- 1: "CONTAINED IN" CRITERIA FOR ENVIRONMENTAL MEDIA. TECHNICAL ADMINISTRATIVE GUIDANCE MEMORANDUM 3028, NYSDC, 1997
- 2: NON-DETECTS WERE RETAINED AT THE ANALYTICAL DETECTION LIMITS
- 3: LEAD CRITERIA DERIVED FROM USEPA IUBK MODEL (U.S. EPA, 1994 AND 1998)

TABLE 3
BUFFALO COLOR CORPORATION
SOIL ANALYTES COMPARED TO
INDUSTRIAL/COMMERCIAL RISK-BASED LEVELS

Analyst	CAS Number	IC RBL Criteria ¹ (mg/kg)	Maximum Concentration (mg/kg)	Number of Samples Exceeding I/C RBL	Percentage of Samples Exceeding I/C RBL	Number of Samples Exceeding I/C RBL Not Exceeding Detection ²	Percentage of Samples Exceeding I/C RBL Not Exceeding Detection ²
Semi-Volatile Organic Compounds							
BENZO(A)ANTHRACENE	56-55-3	7.84	270	4	12%	0	0%
BENZO(A)PYRENE	50-32-8	0.784	200	16	47%	0	0%
BENZO(B)FLUORANTHENE	205-99-2	7.84	280	5	15%	0	0%
BENZO(K)FLUORANTHENE	207-08-9	78.4	84	1	3%	0	0%
INDENO(1,2,3-CD)PYRENE	193-39-5	7.84	100	2	6%	0	0%
CARBAZOLE	86-74-8	286.16	120	0	0%	0	0%
CHRYSENE	218-01-9	784	230	0	0%	0	0%
DIBENZOFURAN	132-64-9	8180	130	0	0%	0	0%
N,N-DIETHYLANILINE	91-66-7	NO RBL	18	0	0%	0	0%
1-NAPHTHYLAMINE	134-32-7	NO RBL	18	0	0%	0	0%
P-TOLUIDINE	108-49-0	NO RBL	36	0	0%	0	0%
Inorganics							
ALUMINUM	7429-90-5	2040000	17000	0	0%	0	0%
ANTIMONY	7440-36-0	8180	85.7	0	0%	0	0%
ARSENIC	7440-38-2	3.81546666	434	33	97%	0	0%
CHROMIUM	7440-47-3	6130	591	0	0%	0	0%
COBALT	7440-48-4	123000	40.5	0	0%	0	0%
COPPER	7440-50-8	81760	943	0	0%	0	0%
IRON	7439-89-6	613000	496000	0	0%	0	0%
LEAD ³	7439-92-1	400	1370	4	12%	0	0%

NOTES:

I/C: INDUSTRIAL/COMMERCIAL

1: CALCULATIONS CONSISTENT WITH U.S. EPA CALCULATION METHODOLOGY (U.S. EPA, 1990A, B)

2: NON-DETECTS WERE RETAINED AT THE ANALYTICAL DETECTION LIMITS

3: LEAD CRITERIA DERIVED FROM USEPA IUBK MODEL (U.S. EPA, 1994 AND 1998)

TABLE 4
BUFFALO COLOR CORPORATION
SOIL ANALYTES COMPARED TO
LOCAL BACKGROUND CONCENTRATIONS¹

Analytes	CAS Number	Background Mean Concentration ¹ (mg/kg)	Background Concentration Range ¹ (mg/kg)	Maximum Concentration (mg/kg)	Number of Samples Exceeding Background Concentration	Percentage of Samples Exceeding Background Concentration	Number of Samples Exceeding Background Concentrations		Percentage of Samples Exceeding Background Concentrations	
							Not Exceeding Detection ²	Exceeding Detection ²	Not Exceeding Detection ²	Exceeding Detection ²
Semi-Volatile Organic Compounds										
BENZO(A)ANTHRACENE	56-55-3	2.4	0.29 - 7.7	270	10	29%	0	0	0%	0%
BENZO(A)PYRENE	50-32-8	2.3	0.32 - 6.9	200	11	32%	0	0	0%	0%
BENZO(B)FLUORANTHENE	205-99-2	2.4	0.33 - 7.0	260	12	35%	0	0	0%	0%
BENZO(K)FLUORANTHENE	207-08-9	2.3	0.34 - 6.3	84	8	24%	0	0	0%	0%
INDENO(1,2,3-CD)PYRENE	193-39-5	1.9	0.25 - 6.3	100	9	26%	0	0	0%	0%
N,N-DIETHYLANILINE	91-86-7	NO BACKGROUND	NO BACKGROUND	18	29	94%				
1-NAPHTHYLAMINE	134-32-7	NO BACKGROUND	NO BACKGROUND	18	31	94%				
P-TOLUIDINE	106-49-0	NO TAGM								
Inorganics										
ARSENIC	7440-38-2	19	6.0 - 97	434	14	41%	0	0	0%	0%
LEAD	7439-92-1	728	168 - 2520	1370	2	6%	0	0	0%	0%

NOTES:

NA: NOT AVAILABLE

1: NYSDOH, 1996

2: NON-DETECTS WERE RETAINED AT THE ANALYTICAL DETECTION LIMITS

TABLE 5
BUFFALO COLOR CORPORATION
SOIL ANALYTES REMAINING
AFTER IDENTIFICATION OF OVERLYING
INSTITUTIONAL CONTROLS

Analytes	CAS Number	Maximum Concentration (mg/kg)	Number of Samples Not Excluded By Institutional Controls	Percentage of Samples Not Excluded By Institutional Controls
Semi-Volatile Organic Compounds				
BENZO(A)ANTHRACENE	56-55-3	13	4	100%
BENZO(A)PYRENE	50-32-8	15	5	100%
BENZO(B)FLUORANTHENE	205-99-2	18	5	100%
BENZO(K)FLUORANTHENE	207-08-9	9.5	5	100%
INDENO(1,2,3-CD)PYRENE	193-39-5	7.9	5	100%
N,N-DIETHYLANILINE	91-66-7	9.6	13	100%
1-NAPHTHYLAMINE	134-32-7	9.6	13	100%
P-TOLUIDINE	106-49-0	19	13	100%

NOTES:

NON-DETECTS WERE RETAINED AT THE ANALYTICAL DETECTION LIMITS

TABLE 6
BUFFALO COLOR CORPORATION
GROUNDWATER ANALYTES COMPARED TO
BACKGROUND CONCENTRATIONS
AS DETERMINED FROM PERIMETER WELLS

Analytes	CAS Number	Minimum Background Concentrations ¹ (mg/L)	Maximum Analyzed Concentration (mg/L)	Number of Samples Exceeding Minimum Background Concentrations	Percentage of Samples Exceeding Minimum Background Concentrations	Number of Samples Exceeding Background Not Exceeding Detection ²	Percentage of Samples Exceeding Background Not Exceeding Detection ²
Volatile Organic Compounds							
ACETONE	67-64-1	0.01	1	15	45%	7	21%
BENZENE	71-43-2	0.005	0.5	7	21%	4	12%
CHLOROBENZENE	108-90-7	0.005	10	10	30%	2	6%
CHLOROFORM	67-66-3	0.005	0.5	3	9%	0	0%
1,1-DICHLOROETHANE	75-34-3	0.005	0.5	3	9%	3	9%
CIS-1,2-DICHLOROETHENE	156-59-2	0.005	0.5	3	9%	3	9%
TRANS-1,2-DICHLOROETHENE	156-60-5	0.005	0.5	3	9%	3	9%
ETHYLBENZENE	100-41-4	0.005	0.5	3	9%	3	9%
METHYLENE CHLORIDE	75-09-2	0.005	0.5	3	9%	3	9%
TETRACHLOROETHENE	127-18-4	0.005	0.5	5	15%	3	9%
TOLUENE	108-88-3	0.005	0.5	4	12%	3	9%
1,1,1-TRICHLOROETHANE	71-55-6	0.005	0.5	3	9%	3	9%
M+P-XYLENE	108-38-3/106-42-3	0.005	0.5	4	12%	3	9%
O-XYLENE	95-47-6	0.005	0.5	4	12%	3	9%

TABLE 6
BUFFALO COLOR CORPORATION
GROUNDWATER ANALYTES COMPARED TO
BACKGROUND CONCENTRATIONS
AS DETERMINED FROM PERIMETER WELLS

Analyses	CAS Number	Minimum Background Concentrations ¹ (mg/L)	Maximum Analyzed Concentration (mg/L)	Number of Samples Exceeding Minimum Background Concentrations	Percentage of Samples Exceeding Minimum Background Concentrations	Number of Samples Exceeding Background Not Exceeding Detection ²	Percentage of Samples Exceeding Background Not Exceeding Detection ³
Semi-Volatile Organic Compounds							
ACENAPHTHENE	83-32-9	0.005	0.006	1	3%	0	0%
ANILINE	62-53-3	0.005	0.032	4	13%	0	0%
ANTHRACENE	120-12-7	0.005	0.031	1	3%	0	0%
BENZO(A)ANTHRACENE	56-55-3	0.005	0.005	0	0%	0	0%
BENZO(A)PYRENE	50-32-8	0.005	0.005	0	0%	0	0%
BENZO(B)FLUORANTHENE	205-99-2	0.005	0.005	0	0%	0	0%
BENZO(K)FLUORANTHENE	207-08-9	0.005	0.005	0	0%	0	0%
BUTYL BENZYL PHTHALATE	85-69-7	0.005	0.0084	11	34%	8	25%
CARBAZOLE	86-74-8	0.005	0.005	0	0%	0	0%
4-CHLOROANILINE	106-47-8	0.005	0.005	0	0%	0	0%
BIS(2-CHLOROETHYL)ETHER	111-44-4	0.005	0.005	0	0%	0	0%
4-CHLORO-3-METHYLPHENOL	59-50-7	0.01	0.01	0	0%	0	0%
2-CHLOROPHENOL	95-57-8	0.01	0.041	4	13%	0	0%
CHRYSENE	218-01-9	0.005	0.005	0	0%	0	0%
DIBENZO(A,H)ANTHRACENE	53-70-3	0.005	0.005	0	0%	0	0%
DIBENZOFURAN	132-64-9	0.005	0.005	0	0%	0	0%
1,2-DICHLOROBENZENE	95-50-1	0.005	0.037	6	19%	0	0%
1,3-DICHLOROBENZENE	541-73-1	0.005	0.026	2	6%	0	0%
1,4-DICHLOROBENZENE	106-46-7	0.005	0.035	6	19%	0	0%
2,4-DICHLOROPHENOL	120-83-2	0.01	0.01	0	0%	0	0%
N,N-DIETHYLANILINE	91-66-7	0.01	0.01	0	0%	0	0%
DIETHYLPHTHALATE	84-66-2	0.005	0.0058	1	3%	0	0%
N,N-DIMETHYLANILINE	121-69-7	0.01	0.01	0	0%	0	0%
2,4-DIMETHYLPHENOL	105-67-9	0.01	0.01	0	0%	0	0%
4,6-DINITRO-2-METHYLPHENOL	534-52-1	0.02	0.02	0	0%	0	0%
2,4-DINITROPHENOL	51-28-5	0.02	0.02	0	0%	0	0%
2,4-DINITROTOLUENE	121-14-2	0.005	0.005	0	0%	0	0%
2,6-DINITROTOLUENE	606-20-2	0.005	0.005	0	0%	0	0%
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	0.005	0.079	15	47%	0	0%
N-ETHYLANILINE	103-69-5	0.02	0.02	0	0%	0	0%
FLUORANTHENE	206-44-0	0.005	0.016	2	6%	1	3%
HEXACHLOROBENZENE	118-74-1	0.005	0.005	0	0%	0	0%
INDENO(1,2,3-CD)PYRENE	193-39-5	0.005	0.005	0	0%	0	0%
N-METHYLANILINE	100-61-8	0.05	0.05	0	0%	0	0%
2-METHYLPHENOL	95-48-7	0.01	0.01	0	0%	0	0%
4-METHYLPHENOL	106-44-5	0.01	0.01	0	0%	0	0%
NAPHTHALENE	91-20-3	0.005	0.01	1	3%	0	0%
1-NAPHTHYLAMINE	134-32-7	0.01	0.03	2	6%	0	0%
2-NAPHTHYLAMINE	91-59-8	0.01	0.01	0	0%	0	0%
3-NITROANILINE	99-09-2	0.005	0.005	0	0%	0	0%
4-NITROANILINE	100-01-6	0.005	0.005	0	0%	0	0%
NITROBENZENE	98-95-3	0.005	0.014	10	31%	8	25%
2-NITROPHENOL	88-75-5	0.01	0.01	0	0%	0	0%
4-NITROPHENOL	100-02-7	0.02	0.02	0	0%	0	0%
N-NITROSODIPHENYLAMINE	86-30-6	0.005	0.005	0	0%	0	0%
PENTACHLOROPHENOL	87-86-5	0.02	0.02	0	0%	0	0%
PHENANTHRENE	85-01-8	0.005	0.005	0	0%	0	0%
PYRENE	129-00-0	0.005	0.05	3	9%	2	6%
O-P-TOLUIDINE	95-53-4/106-49-0	0.01	0.02	2	6%	0	0%
P-TOLUIDINE	106-49-0	0.02	0.02	0	0%	0	0%
1,2,4-TRICHLOROBENZENE	120-82-1	0.005	1.7	4	13%	0	0%
2,4,5-TRICHLOROPHENOL	95-95-4	0.01	0.01	0	0%	0	0%
2,4,6-TRICHLOROPHENOL	88-06-2	0.01	0.01	0	0%	0	0%

TABLE 6
BUFFALO COLOR CORPORATION
GROUNDWATER ANALYTES COMPARED TO
BACKGROUND CONCENTRATIONS
AS DETERMINED FROM PERIMETER WELLS

Analyses	CAS Number	Minimum Background Concentrations ¹ (mg/L)	Maximum Analyzed Concentration (mg/L)	Number of Samples Exceeding Minimum Background Concentrations	Percentage of Samples Exceeding Minimum Background Concentrations	Number of Samples Exceeding Background Not Exceeding Detection ²	Percentage of Samples Exceeding Background Not Exceeding Detection ²
INORGANICS							
ALUMINUM	7429-90-5	0.339	756	31	94%	0	0%
ANTIMONY	7440-38-0	0.06	0.1	13	41%	13	41%
ARSENIC	7440-39-2	0.01	0.816	18	55%	0	0%
BARIUM	7440-39-3	0.02	4.99	32	97%	2	6%
CADMIUM	7440-43-9	0.005	0.005	0	0%	0	0%
CHLORIDE	16887-00-6	65.4	6010	20	61%	0	0%
CHROMIUM	7440-47-3	0.01	1.93	20	61%	2	6%
CHROMIUM (VI)	18450-29-9	0.01	0.0422	9	27%	6	18%
COBALT	7440-48-4	0.05	0.48	1	3%	0	0%
COPPER	7440-50-8	0.02	5.29	16	48%	1	3%
CYANIDE-TOTAL	57-12-5	0.01	0.19	5	16%	1	3%
IRON	7439-89-6	0.425	1880	31	94%	0	0%
LEAD	7439-92-1	0.05	2.51	6	18%	0	0%
MANGANESE	7439-96-5	1.18	81.1	11	33%	0	0%
MERCURY	7439-97-6	0.0003	0.00155	5	15%	0	0%
NICKEL	7440-02-0	0.04	1.57	17	52%	1	3%
NO ₃ -N	7697-37-2	0.05	3.13	21	64%	13	39%
NO ₃ /NO ₂ -N		0.05	3.13	23	70%	14	42%
NO ₂ -N	14797-65-0	0.01	0.394	10	31%	1	3%
PHOSPHORUS-TOTAL	7723-14-0	0.05	4.49	9	27%	0	0%
SELENIUM	7782-49-2	0.005	1.02	3	9%	1	3%
SULFATE	14808-79-8	226	1760	0	0%	0	0%
SULFIDE	18496-25-8	1	17.2	2	6%	0	0%
VANADIUM	7440-62-2	0.00581	1.8	29	88%	25	76%
ZINC	7440-66-6	0.0112	26.8	30	91%	2	6%
PCBs							
AROCOR 1016	12674-11-2	0.0005	0.005	4	16%	4	16%
AROCOR 1221	11104-28-2	0.0005	0.005	4	16%	4	16%
AROCOR 1232	11141-16-5	0.0005	0.005	4	16%	4	16%
AROCOR 1242	53469-21-9	0.0005	0.005	4	16%	4	16%
AROCOR 1248	12672-29-6	0.0005	0.005	4	16%	4	16%
AROCOR 1254	11097-69-1	0.0005	0.005	4	16%	4	16%
AROCOR 1260	11096-82-5	0.0005	0.005	4	16%	4	16%
Alcohols							
N-BUTANOL	71-36-3	1	1	0	0%	0	0%
METHANOL	67-56-1	1	1	0	0%	0	0%
2-PROPANOL	67-63-0	1	1	0	0%	0	0%
ETHANOL	64-17-5	1	1	0	0%	0	0%

NOTES:

- 1: BACKGROUND CONCENTRATION FROM COMPOSITE WELL DERIVED FROM DATA FROM WELLS RFI-20, 33 AND 43)
2: NON-DETECTS WERE RETAINED AT THE ANALYTICAL DETECTION LIMITS

TABLE 7
BUFFALO COLOR CORPORATION
GROUNDWATER ANALYTES COMPARED TO
GROUNDWATER TOGS 1.1 CLASS GA STANDARDS

Analytes	CAS Number	TOGS GA ¹ Criteria (mg/L)	Maximum Concentration (mg/L)	Number of Samples Exceeding TOGS GA Criteria	Percentage of Samples Exceeding TOGS GA Criteria	Number of Samples Exceeding TOGS GA Criteria Not Exceeding Detection ²	Percentage of Samples Exceeding TOGS GA Criteria Not Exceeding Detection ²
Volatiles							
Organic Compounds							
ACETONE	67-64-1	0.05	1	4	12%	0	0%
BENZENE	71-43-2	0.001	0.5	33	100%	30	91%
CHLOROBENZENE	108-90-7	0.005	10	10	30%	2	6%
CHLOROFORM	67-66-3	0.007	0.5	3	9%	0	0%
1,1-DICHLOROETHANE	75-34-3	0.005	0.5	3	9%	3	9%
CIS-1,2-DICHLOROETHENE	156-59-2	0.005	0.5	3	9%	3	9%
TRANS-1,2-DICHLOROETHENE	156-60-5	0.005	0.5	3	9%	3	9%
ETHYLBENZENE	100-41-4	0.005	0.5	3	9%	3	9%
METHYLENE CHLORIDE	75-09-2	0.005	0.5	3	9%	3	9%
TETRACHLOROETHENE	127-18-4	0.005	0.5	5	15%	3	9%
TOLUENE	108-88-3	0.005	0.5	4	12%	3	9%
1,1,1-TRICHLOROETHANE	71-55-6	0.005	0.5	3	9%	2	6%
M+P-XYLENE	108-38-3/106-42-3	0.01	0.5	3	9%	2	6%
O-XYLENE	95-47-6	0.005	0.5	4	12%	3	9%
Semi-Volatiles							
Organic Compounds							
ACENAPHTHENE	83-32-9	0.02	0.096	1	3%	1	3%
ANILINE	62-53-3	0.005	0.096	5	15%	1	3%
ANTHRACENE	120-12-7	0.05	0.096	1	3%	1	3%
BUTYL BENZYL PHTHALATE	85-68-7	0.05	0.096	1	3%	1	3%
2-CHLOROPHENOL	95-57-8	NO TOGS	0.096				
1,2-DICHLOROBENZENE	95-50-1	0.003	0.096	33	100%	27	82%
1,3-DICHLOROBENZENE	541-73-1	0.003	0.096	33	100%	31	94%
1,4-DICHLOROBENZENE	106-46-7	0.003	0.096	33	100%	27	82%
DIETHYLPHTHALATE	84-66-2	0.05	0.096	1	3%	1	3%
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	0.005	0.096	16	48%	1	3%
FLUORANTHENE	206-44-0	0.05	0.096	1	3%	1	3%
NAPHTHALENE	91-20-3	0.01	0.096	1	3%	1	3%
1-NAPHTHYLAMINE	134-32-7	NO TOGS	0.096				
NITROBENZENE	98-95-3	0.0004	0.096	33	100%	31	94%
PYRENE	129-00-0	0.05	0.096	1	3%	1	3%
O+P-TOLUIDINE	95-53-4/106-49-0	0.005	0.096	33	100%	31	94%
1,2,4-TRICHLOROBENZENE	120-82-1	0.005	1.7	5	15%	1	3%

TABLE 7
BUFFALO COLOR CORPORATION
GROUNDWATER ANALYTES COMPARED TO
GROUNDWATER TOGS 1.1.1 CLASS GA STANDARDS

Analytes	CAS Number	TOGS GA ¹ Criteria (mg/L)	Maximum Concentration (mg/L)	Number of Samples Exceeding TOGS GA Criteria	Percentage of Samples Exceeding TOGS GA Criteria	Number of Samples Exceeding TOGS GA Criteria Not Exceeding Detection ²	Percentage of Samples Exceeding TOGS GA Criteria Not Exceeding Detection ²
Metals							
ALUMINUM	7429-90-5	0.1	756	33	100%	1	3%
ANTIMONY	7440-36-0	0.003	0.1	32	100%	32	100%
ARSENIC	7440-38-2	0.025	0.816	7	21%	0	0%
BARIUM	7440-39-3	1	4.99	1	3%	0	0%
CHLORIDE	16887-00-6	250	6010	17	52%	0	0%
CHROMIUM	7440-47-3	0.05	1.93	10	30%	1	3%
CHROMIUM (VI)	18450-29-9	0.05	0.0422	0	0%	0	0%
COBALT	7440-48-4	NO TOGS	0.48	2	6%	0	0%
COPPER	7440-50-8	0.2	5.29	0	0%	0	0%
CYANIDE-total	57-12-5	0.2	0.19	0	0%	0	0%
IRON	7439-89-6	0.3	1880	32	97%	0	0%
LEAD	7439-92-1	0.025	2.51	33	100%	27	82%
MANGANESE	7439-96-5	0.3	81.1	24	73%	0	0%
MERCURY	7439-97-6	0.0007	0.00155	2	6%	0	0%
NICKEL	7440-02-0	0.1	1.57	11	33%	1	3%
NO ₃ -N	7697-37-2	10	3.13	0	0%	0	0%
NO ₂ -N	14797-65-0	1	0.5	0	0%	0	0%
PHOSPHORUS	7723-14-0	NO TOGS	4.49	2	6%	0	0%
SELENIUM	7782-49-2	0.01	1.02	33	100%	28	85%
SULFIDE	18496-25-8	0.5	17.2	1	3%	0	0%
VANADIUM	7440-62-2	NO TOGS	1.8	1	3%	0	0%
ZINC	7440-66-6	2	26.8	25	100%	25	100%
PCBs							
AROCCLOR 1016	12674-11-2	0.00009	0.005	25	100%	25	100%
AROCCLOR 1221	11104-28-2	0.00009	0.005	25	100%	25	100%
AROCCLOR 1232	11141-16-5	0.00009	0.005	25	100%	25	100%
AROCCLOR 1242	53469-21-9	0.00009	0.005	25	100%	25	100%
AROCCLOR 1248	12672-29-6	0.00009	0.005	25	100%	25	100%
AROCCLOR 1254	11097-69-1	0.00009	0.005	25	100%	25	100%
AROCCLOR 1260	11096-82-5	0.00009	0.005	25	100%	25	100%

NOTES:

TOGS: TECHNICAL AND OPERATIONAL GUIDANCE SERIES (1.1.1)

1: AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES AND GROUNDWATER EFFLUENT LIMITATIONS

2: NON-DETECTS WERE RETAINED AT THE ANALYTICAL DETECTION LIMITS

TABLE 8
BUFFALO COLOR CORPORATION
GROUNDWATER ANALYTES
COMPARED TO TAGM 3028
GROUNDWATER ACTION LEVELS

Analytes	CAS Number	TAGM 3028 GAL ¹ (mg/L)	Maximum Concentration (mg/L)	Number of Samples Exceeding TAGM 3028 GAL	Percentage of Samples Exceeding TAGM 3028 GAL	Number of Samples Exceeding TAGM 3028 GAL Not Exceeding Detection ²	Percentage of Samples Exceeding TAGM 3028 GAL Not Exceeding Detection ²
Volatiles							
Organic Compounds							
ACETONE	67-64-1	0.05	1	4	12%	0	0%
BENZENE	71-43-2	0.0007	0.5	33	100%	30	91%
CHLOROBENZENE	108-90-7	0.005	10	10	30%	2	6%
CHLOROFORM	67-66-3	0.007	0.5	3	9%	0	0%
1,1-DICHLOROETHANE	75-34-3	0.005	0.5	3	9%	3	9%
CIS-1,2-DICHLOROETHENE	156-59-2	0.005	0.5	3	9%	3	9%
TRANS-1,2-DICHLOROETHENE	156-60-5	0.005	0.5	3	9%	3	9%
ETHYLBENZENE	100-41-4	0.005	0.5	3	9%	3	9%
METHYLENE CHLORIDE	75-09-2	0.005	0.5	3	9%	3	9%
TETRACHLOROETHENE	127-18-4	0.005	0.5	5	15%	3	9%
TOLUENE	108-88-3	0.005	0.5	4	12%	3	9%
1,1,1-TRICHLOROETHANE	71-55-6	0.005	0.5	3	9%	3	9%
M+P-XYLENE	108-38-3/106-42-3	0.01	0.5	3	9%	2	6%
O-XYLENE	95-47-6	0.005	0.5	4	12%	3	9%
Semi-Volatiles							
Organic Compounds							
ACENAPHTHENE	83-32-9	0.02	0.096	1	3%	1	3%
ANILINE	62-53-3	0.005	0.096	5	15%	1	3%
ANTHRACENE	120-12-7	0.05	0.096	1	3%	1	3%
BUTYL BENZYL PHTHALATE	85-68-7	0.05	0.096	1	3%	1	3%
2-CHLOROPHENOL	95-57-8	NO TAGM	0.096				
1,2-DICHLOROBENZENE	95-50-1	0.0047	0.096	33	100%	27	82%
1,3-DICHLOROBENZENE	541-73-1	0.005	0.096	3	9%	1	3%
1,4-DICHLOROBENZENE	106-46-7	0.0047	0.096	33	100%	27	82%
DIETHYLPHTHALATE	84-66-2	0.05	0.096	1	3%	1	3%
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	0.005	0.096	16	48%	1	3%
FLUORANTHENE	206-44-0	0.05	0.096	1	3%	1	3%
NAPHTHALENE	91-20-3	0.01	0.096	1	3%	1	3%
1-NAPHTHYLAMINE	134-32-7	0.005	0.096	33	100%	31	94%
NITROBENZENE	98-95-3	0.005	0.096	11	33%	9	27%
PYRENE	129-00-0	0.0002	0.096	33	100%	32	97%
O+P-TOLUIDINE	95-53-4/106-49-0	0.005	0.096	33	100%	31	94%
1,2,4-TRICHLOROBENZENE	120-82-1	0.005	1.7	5	15%	1	3%

TABLE 8
BUFFALO COLOR CORPORATION
GROUNDWATER ANALYTES
COMPARED TO TAGM 3028
GROUNDWATER ACTION LEVELS

Analytes	CAS Number	TAGM 3028 GAL ¹ (mg/L)	Maximum Concentration (mg/L)	Number of Samples Exceeding TAGM 3028 GAL		Percentage of Samples Exceeding TAGM 3028 GAL		Number of Samples Exceeding TAGM 3028 GAL		Percentage of Samples Exceeding TAGM 3028 GAL	
				Exceeding	Not Exceeding	Exceeding	Not Exceeding	Exceeding	Not Exceeding	Exceeding	Not Exceeding
Metals											
ALUMINUM	7429-90-5	NO TAGM	756	32		100%		32		100%	
ANTIMONY	7440-38-0	0.003	0.1	7		21%		0		0%	
ARSENIC	7440-38-2	0.025	0.816	1		3%		0		0%	
BARIUM	7440-39-3	1	4.99								
CHLORIDE	16887-00-6	NO TAGM	6010	10		30%		1		3%	
CHROMIUM	7440-47-3	0.05	1.93	0		0%		0		0%	
CHROMIUM (VI)	18450-29-9	0.05	0.0422								
COBALT	7440-48-4	NO TAGM	0.48	2		6%		0		0%	
COPPER	7440-50-8	0.2	5.29	1		3%		0		0%	
CYANIDE-TOTAL	57-12-5	0.1	0.19	32		97%		0		0%	
IRON	7439-89-6	0.3	1880	33		100%		27		82%	
LEAD	7439-92-1	0.015	2.51	24		73%		0		0%	
MANGANESE	7439-96-5	0.3	81.1	0		0%		0		0%	
MERCURY	7439-97-6	0.002	0.00155	11		33%		1		3%	
NICKEL	7440-02-0	0.1	1.57								
NO ₃ -N	7697-37-2	NO TAGM	3.13								
NO ₃ /NO ₂ -N		NO TAGM	3.13								
NO ₂ -N	14797-65-0	NO TAGM	0.5								
PHOSPHORUS	7723-14-0	NO TAGM	4.49	2		6%		0		0%	
SELENIUM	7782-49-2	0.01	1.02	33		100%		28		85%	
SULFIDE	18496-25-8	0.05	17.2	1		3%		0		0%	
VANADIUM	7440-62-2	0.25	1.8	4		12%		0		0%	
ZINC	7440-66-6	0.3	26.8								
PCBs											
AROCOR 1016	12674-11-2	NO TAGM	0.005								
AROCOR 1221	11104-28-2	NO TAGM	0.005								
AROCOR 1232	11141-16-5	NO TAGM	0.005								
AROCOR 1242	53469-21-9	NO TAGM	0.005								
AROCOR 1248	12672-29-6	NO TAGM	0.005								
AROCOR 1254	11097-69-1	NO TAGM	0.005								
AROCOR 1260	11096-82-5	NO TAGM	0.005								

NOTES:

TAGM: TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM

- 1: "CONTAINED IN" CRITERIA FOR ENVIRONMENTAL MEDIA. TECHNICAL ADMINISTRATIVE GUIDANCE MEMORANDUM 3028, NYSDEC, 1997
 2: NON-DETECTS WERE RETAINED AT THE ANALYTICAL DETECTION LIMITS

TABLE 9
BUFFALO COLOR CORPORATION
REVIEW OF SOIL SCREENING PROCESS
AND RESULTANT CONSTITUENTS RETAINED FOR FURTHER REVIEW

Original Confirmatory Suite of Analysis		Compounds Retained After TAGM 4046 ¹ Soil Screening		Compounds Retained After TAGM 3028 ² SAL Screening		Compounds Retained After Calculated IC RBL ³ Screening		Compounds Retained After Buffalo Area Background ⁴ Screening		Compounds Retained After Institutional Controls ⁵ Exist?		Compounds Retained
Analysis	Maximum Concentration (mg/kg)	TAGM 4046 ¹ (mg/kg)	Action	TAGM 3028 ² (mg/kg)	Action	IC RBL Criteria ³ (mg/kg)	Action	Background Mean Concentration ⁴ (mg/kg)	Background Concentration Range ⁴ (mg/kg)	Action	Institutional Controls ⁵	Action
VOCs												
ACETONE	2.2	0.58	RETAIN - EXCEEDED	7821	EXCLUDE - BELOW CRITERIA							0
BENZENE	0.81	0.31	RETAIN - EXCEEDED	22.0	EXCLUDE - BELOW CRITERIA							
CHLOROBENZENE	26	8.75	RETAIN - EXCEEDED	1564	EXCLUDE - BELOW CRITERIA							
METHYLENE CHLORIDE	0.81	0.58	RETAIN - EXCEEDED	85.2	EXCLUDE - BELOW CRITERIA							
TOLUENE	0.81	7.95	EXCLUDE - BELOW CRITERIA									
M-P-XYLENE	2	6.36	EXCLUDE - BELOW CRITERIA									
ACENAPHTHENE	110	488	EXCLUDE - BELOW CRITERIA									
ACENAPHTHYLENE	9	218	EXCLUDE - BELOW CRITERIA									
ANILINE	17	0.37	RETAIN - EXCEEDED	112	EXCLUDE - BELOW CRITERIA							
ANTHRACENE	190	3710	EXCLUDE - BELOW CRITERIA									
SVOCs												
BIPHENYL	278	14.3	RETAIN - EXCEEDED	9.26	RETAIN - EXCEEDED	288	EXCLUDE - BELOW CRITERIA	2.4	0.29 - 6.77	RETAIN - EXCEEDED	RETAIN	8
DI-N-BUTYL PHTHALATE	200	52.3	RETAIN - EXCEEDED	8.26	RETAIN - EXCEEDED	784	EXCLUDE - BELOW CRITERIA	2.3	0.32 - 6.9	RETAIN - EXCEEDED	RETAIN	
BENZOG(4,1)PERYLENE	264	5.13	RETAIN - EXCEEDED	9.75	RETAIN - EXCEEDED			2.4	0.23 - 7.0	RETAIN - EXCEEDED	RETAIN	
BENZOG(4,1)PERYLENE	88	42400	EXCLUDE - BELOW CRITERIA								RETAIN	
1,2,3,4,5-PENTACHLOROBENZENE	14	5.23	RETAIN - EXCEEDED	8.76	RETAIN - EXCEEDED						RETAIN	
BUTYL BENZYL PHTHALATE	9	644	EXCLUDE - BELOW CRITERIA								RETAIN	
DI-N-BUTYL PHTHALATE	9	42.9	EXCLUDE - BELOW CRITERIA								RETAIN	
CARBAZOLE	120	-	RETAIN - NO CRITERIA	31.8	RETAIN - EXCEEDED	288	EXCLUDE - BELOW CRITERIA				RETAIN	
CHRYSENE	230	2.12	RETAIN - EXCEEDED	87.5	RETAIN - EXCEEDED						RETAIN	
DIBENZO (A,H) ANTHRACENE	31	8745000	RETAIN - EXCEEDED								RETAIN	
PCBs												
DIBENZOFURAN	130	32.6	RETAIN - EXCEEDED	-	RETAIN - NO CRITERIA	8180	EXCLUDE - BELOW CRITERIA					0
1,2-DICHLOROBENZENE	9	42.3										
1,4-DICHLOROBENZENE	9	45.1										
BIS (2-ETHYLHEXYL)PHTHALATE	9	2307	EXCLUDE - BELOW CRITERIA									
FLUORANTHENE	370	10070	EXCLUDE - BELOW CRITERIA									
FLUORENE	140	1935	EXCLUDE - BELOW CRITERIA									
2-METHYLNAPHTHALENE	88	193	EXCLUDE - BELOW CRITERIA									
1-METHYLNAPHTHALENE	18		EXCLUDE - BELOW CRITERIA									
NAPHTHALENE	200	68.9	RETAIN - EXCEEDED	310	EXCLUDE - BELOW CRITERIA							
NITROBENZENE	9	0.95	RETAIN - EXCEEDED	38.1	EXCLUDE - BELOW CRITERIA							
N-NITROSODIPHENYLAMINE	9	-	RETAIN - NO CRITERIA	130	EXCLUDE - BELOW CRITERIA							
PHENANTHRENE	480	1157	EXCLUDE - BELOW CRITERIA									
PTRENE	370	3523	EXCLUDE - BELOW CRITERIA									
INORGANICS												
1,2,4-TRICHLOROBENZENE	9	17.8	EXCLUDE - BELOW CRITERIA									0
ALUMINUM	17000	14400	RETAIN - EXCEEDED	-	RETAIN - NO CRITERIA	2040000	EXCLUDE - BELOW CRITERIA					
ANTIMONY	85.7	-	RETAIN - NO CRITERIA	31.3	RETAIN - EXCEEDED	8180	EXCLUDE - BELOW CRITERIA					
ARSENIC	434	19	RETAIN - EXCEEDED	0.43	RETAIN - EXCEEDED	3.82	RETAIN - EXCEEDED					
BARIUM	2580	234	RETAIN - EXCEEDED	5775	EXCLUDE - BELOW CRITERIA							
CADMIUM	31	4	RETAIN - EXCEEDED	78	EXCLUDE - BELOW CRITERIA							
CHROMIUM	591	54	RETAIN - EXCEEDED	-	RETAIN - NO CRITERIA	8130	EXCLUDE - BELOW CRITERIA					
CHROMIUM (VI)	28.9	-	RETAIN - SITE SPECIFIC	381	EXCLUDE - BELOW CRITERIA							
COBALT	40.5	8	RETAIN - EXCEEDED	-	RETAIN - NO CRITERIA	123000	EXCLUDE - BELOW CRITERIA					
COPPER	943	128	RETAIN - EXCEEDED	-	RETAIN - NO CRITERIA	2680000	EXCLUDE - BELOW CRITERIA					
CYANIDE-TOTAL	32.7	-	RETAIN - SITE SPECIFIC	1800	EXCLUDE - BELOW CRITERIA							
IRON	498000	41300	RETAIN - EXCEEDED	-	RETAIN - NO CRITERIA	813000	EXCLUDE - BELOW CRITERIA					
LEAD	1370	728	RETAIN - EXCEEDED	400	RETAIN - EXCEEDED	400	RETAIN - EXCEEDED	728	168 - 2320	EXCLUDED		
MANGANESE	3440	885	RETAIN - EXCEEDED	10950	EXCLUDE - BELOW CRITERIA							
MERCURY	18	0.4	RETAIN - EXCEEDED	23.5	EXCLUDE - BELOW CRITERIA							
NICKEL	397	37	RETAIN - EXCEEDED	1564	EXCLUDE - BELOW CRITERIA							
SELENIUM	108	1.1	RETAIN - EXCEEDED	381	EXCLUDE - BELOW CRITERIA							
SILVER	9.08	-	RETAIN - NO CRITERIA	351	EXCLUDE - BELOW CRITERIA							
VANADIUM	76.5	37	RETAIN - EXCEEDED	548	EXCLUDE - BELOW CRITERIA							
ZINC	10300	687	RETAIN - EXCEEDED	23484	EXCLUDE - BELOW CRITERIA							
PCBs												
AROCOLOR 1254	0.31	0.59	EXCLUDE - BELOW CRITERIA									0

TAGM: Technical and Administrative Guidance Memorandum
SALs: Soil Action Levels
IC: Industrial/Commercial
RBL: Risk-Based Levels
1: NYSDDEC, 1984
2: NYSDDEC, 1997
3: Calculations consistent with U.S. EPA Methodology (U.S. EPA, 1988a,b)
4: NYSDOH, 1986
5: arsenic excluded despite maximum concentrations exceeding background range (see text for discussion)

SUCCESSIVE SCREENING STEPS

TABLE 10
BUFFALO COLOR CORPORATION
REVIEW OF GROUNDWATER SCREENING PROCESS
AND RESULTANT CONSTITUENTS RETAINED FOR FURTHER REVIEW

	Analytes	Maximum Analyzed Concentration (mg/L)	Minimum Background Concentrations ¹ (mg/L)	Action	TOGS GA ² Criteria (mg/L)	TAGM 3028 GAL ³ (mg/L)	Action	COMPOUNDS RETAINED
VOCs	ACETONE	1	0.01	RETAIN - EXCEEDED	0.05	0.05	RETAIN - EXCEEDED	14
	BENZENE	0.5	0.005	RETAIN - EXCEEDED	0.001	0.0007	RETAIN - EXCEEDED	
	CHLOROBENZENE	10	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	CHLOROFORM	0.5	0.005	RETAIN - EXCEEDED	0.007	0.007	RETAIN - EXCEEDED	
	1,1-DICHLOROETHANE	0.5	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	CIS-1,2-DICHLOROETHENE	0.5	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	TRANS-1,2-DICHLOROETHENE	0.5	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	ETHYLBENZENE	0.5	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	METHYLENE CHLORIDE	0.5	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	TETRACHLOROETHENE	0.5	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	TOLUENE	0.5	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	1,1,1-TRICHLOROETHANE	0.5	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	M+P-XYLENE	0.5	0.005	RETAIN - EXCEEDED	0.01	0.01	RETAIN - EXCEEDED	
SVOCs	O-XYLENE	0.5	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	17
	ACENAPHTHENE	0.006	0.005	RETAIN - EXCEEDED	0.02	0.02	RETAIN - EXCEEDED	
	ANILINE	0.032	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	ANTHRACENE	0.031	0.005	RETAIN - EXCEEDED	0.05	0.05	RETAIN - EXCEEDED	
	BENZO(A)ANTHRACENE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	BENZO(A)PYRENE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	BENZO(B)FLUORANTHENE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	BENZO(K)FLUORANTHENE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	BUTYL BENZYL PHTHALATE	0.0084	0.005	RETAIN - EXCEEDED	0.05	0.05	RETAIN - EXCEEDED	
	CARBAZOLE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	4-CHLOROANILINE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	BIS(2-CHLOROETHYL)ETHER	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	4-CHLORO-3-METHYLPHENOL	0.01	0.01	EXCLUDE - BELOW CRITERIA				
	2-CHLOROPHENOL	0.041	0.01	RETAIN - EXCEEDED	NO TOGS	NO TAGM	RETAIN - NO CRITERIA	
	CHRYSENE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	DIBENZO(A,H)ANTHRACENE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	DIBENZOFURAN	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	1,2-DICHLOROBENZENE	0.037	0.005	RETAIN - EXCEEDED	0.003	0.0047	RETAIN - EXCEEDED	
	1,3-DICHLOROBENZENE	0.026	0.005	RETAIN - EXCEEDED	0.003	0.005	RETAIN - EXCEEDED	
	1,4-DICHLOROBENZENE	0.035	0.005	RETAIN - EXCEEDED	0.003	0.0047	RETAIN - EXCEEDED	
	2,4-DICHLOROPHENOL	0.01	0.01	EXCLUDE - BELOW CRITERIA				
	N,N-DIETHYLANILINE	0.01	0.01	EXCLUDE - BELOW CRITERIA				
	DIETHYLPHTHALATE	0.0058	0.005	RETAIN - EXCEEDED	0.05	0.05	RETAIN - EXCEEDED	
	N,N-DIMETHYLANILINE	0.01	0.01	EXCLUDE - BELOW CRITERIA				
	2,4-DIMETHYLPHENOL	0.01	0.01	EXCLUDE - BELOW CRITERIA				
	4,6-DINITRO-2-METHYLPHENOL	0.02	0.02	EXCLUDE - BELOW CRITERIA				
	2,4-DINITROPHENOL	0.02	0.02	EXCLUDE - BELOW CRITERIA				
	2,4-DINITROTOLUENE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	2,6-DINITROTOLUENE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	BIS(2-ETHYLHEXYL)PHTHALATE	0.079	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	N-ETHYLANILINE	0.02	0.02	EXCLUDE - BELOW CRITERIA				
	FLUORANTHENE	0.016	0.005	RETAIN - EXCEEDED	0.05	0.05	RETAIN - EXCEEDED	
	HEXACHLOROBENZENE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	INDENO(1,2,3-CD)PYRENE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	N-METHYLANILINE	0.05	0.05	EXCLUDE - BELOW CRITERIA				
	2-METHYLPHENOL	0.01	0.01	EXCLUDE - BELOW CRITERIA				
	4-METHYLPHENOL	0.01	0.01	EXCLUDE - BELOW CRITERIA				
	NAPHTHALENE	0.01	0.005	RETAIN - EXCEEDED	0.01	0.01	RETAIN - EXCEEDED	
	1-NAPHTHYLAMINE	0.03	0.01	RETAIN - EXCEEDED	NO TOGS	0.005	RETAIN ⁵	
	2-NAPHTHYLAMINE	0.01	0.01	EXCLUDE - BELOW CRITERIA				
	3-NITROANILINE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	4-NITROANILINE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	NITROBENZENE	0.014	0.005	RETAIN - EXCEEDED	0.0004	0.005	RETAIN - EXCEEDED	
	2-NITROPHENOL	0.01	0.01	EXCLUDE - BELOW CRITERIA				
	4-NITROPHENOL	0.02	0.02	EXCLUDE - BELOW CRITERIA				
	N-NITROSODIPHENYLAMINE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	PENTACHLOROPHENOL	0.02	0.02	EXCLUDE - BELOW CRITERIA				
	PHENANTHRENE	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	PYRENE	0.05	0.005	RETAIN - EXCEEDED	0.05	0.0002	RETAIN - EXCEEDED	
	O+P-TOLUIDINE	0.02	0.01	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	P-TOLUIDINE	0.02	0.02	EXCLUDE - BELOW CRITERIA				
	1,2,4-TRICHLOROBENZENE	1.7	0.005	RETAIN - EXCEEDED	0.005	0.005	RETAIN - EXCEEDED	
	2,4,5-TRICHLOROPHENOL	0.01	0.01	EXCLUDE - BELOW CRITERIA				
	2,4,6-TRICHLOROPHENOL	0.01	0.01	EXCLUDE - BELOW CRITERIA				
INORGANICS	ALUMINUM	756	0.339	RETAIN - EXCEEDED	0.1	NO TAGM	RETAIN ⁵	22
	ANTIMONY	0.1	0.06	RETAIN - EXCEEDED	0.003	0.003	RETAIN - EXCEEDED	
	ARSENIC	0.816	0.01	RETAIN - EXCEEDED	0.025	0.025	RETAIN - EXCEEDED	
	BARIUM	4.99	0.02	RETAIN - EXCEEDED	1	1	RETAIN - EXCEEDED	
	CADMIUM	0.005	0.005	EXCLUDE - BELOW CRITERIA				
	CHLORIDE	6010	65.4	RETAIN - EXCEEDED	250	NO TAGM	RETAIN ⁽⁶⁾	
	CHROMIUM	1.93	0.01	RETAIN - EXCEEDED	0.05	0.05	RETAIN - EXCEEDED	
	CHROMIUM (VI)	0.0422	0.01	RETAIN - EXCEEDED	0.05	0.05	EXCLUDE - BELOW CRITERIA	
	COBALT	0.48	0.05	RETAIN - EXCEEDED	NO TOGS	NO TAGM	RETAIN - NO CRITERIA	
	COPPER	5.29	0.02	RETAIN - EXCEEDED	0.2	0.2	RETAIN - EXCEEDED	
	CYANIDE-TOTAL	0.19	0.01	RETAIN - EXCEEDED	0.2	0.1	RETAIN ⁵	
	IRON	1880	0.425	RETAIN - EXCEEDED	0.3	0.3	RETAIN - EXCEEDED	
	LEAD	2.51	0.05	RETAIN - EXCEEDED	0.025	0.015	RETAIN - EXCEEDED	
	MANGANESE	81.1	1.18	RETAIN - EXCEEDED	0.3	0.3	RETAIN - EXCEEDED	
	MERCURY	0.00155	0.0003	RETAIN - EXCEEDED	0.0007	0.002	RETAIN - EXCEEDED	
	NICKEL	1.57	0.04	RETAIN - EXCEEDED	0.1	0.1	RETAIN - EXCEEDED	
	NO ₃ -N	3.13	0.05	RETAIN - EXCEEDED	10	NO TAGM	RETAIN ⁵	
	NO ₃ /NO ₂ -N	3.13	0.05	RETAIN - EXCEEDED	10	NO TAGM	RETAIN ⁵	
	NO ₂ -N	0.394	0.01	RETAIN - EXCEEDED	1	NO TAGM	RETAIN ⁵	
	PHOSPHORUS-TOTAL	4.49	0.05	RETAIN - EXCEEDED	NO TOGS	NO TAGM	RETAIN - NO CRITERIA	
	SELENIUM	1.02	0.005	RETAIN - EXCEEDED	0.01	0.01	RETAIN - EXCEEDED	
	SULFATE	1760	226	EXCLUDE - BELOW CRITERIA				
	SULFIDE	17.2	1	RETAIN - EXCEEDED	0.5	0.05	RETAIN - EXCEEDED	
	VANADIUM	1.8	0.00581	RETAIN - EXCEEDED	NO TOGS	0.25	RETAIN ⁵	
	ZINC	26.8	0.0112	RETAIN - EXCEEDED	2	0.3	RETAIN - EXCEEDED	
PCBs	AROCLOR 1016	0.005	0.0005	RETAIN - EXCEEDED	0.00009	NO TAGM	RETAIN ⁵	7
	AROCLOR 1221	0.005	0.0005	RETAIN - EXCEEDED	0.00009	NO TAGM	RETAIN ⁵	
	AROCLOR 1232	0.005	0.0005	RETAIN - EXCEEDED	0.00009	NO TAGM	RETAIN ⁵	
	AROCLOR 1242	0.005	0.0005	RETAIN - EXCEEDED	0.00009	NO TAGM	RETAIN ⁵	
	AROCLOR 1248	0.005	0.0005	RETAIN - EXCEEDED	0.00009	NO TAGM	RETAIN ⁵	
	AROCLOR 1254	0.005	0.0005	RETAIN - EXCEEDED	0.00009	NO TAGM	RETAIN ⁵	
	AROCLOR 1260	0.005	0.0005	RETAIN - EXCEEDED	0.00009	NO TAGM	RETAIN ⁵	
ALCOHOLS	N-BUTANOL	1	1	EXCLUDE - BELOW CRITERIA	0.05	0.05		0
	METHANOL	1	1	EXCLUDE - BELOW CRITERIA	0.05	0.05		
	2-PROPANOL	1	1	EXCLUDE - BELOW CRITERIA	0.05	0.05		
	ETHANOL	1	1	EXCLUDE - BELOW CRITERIA	0.05	0.05		

TOGS: Technical and Operational Guidance Series 1.1.1
TAGM: Technical and Administrative Guidance Memorandum
GAL: Groundwater Action Level
1: Background Concentrations from Composite Well Derived from Wells RFI-20, 33 and 43
2: Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, NYSDEC, 1998
3: "Contained-In" Criteria for Environmental Media. TAGM 3028, NYSDEC, 1997
5: Compound only retained if resultant Buffalo River Concentration from Areas B, C and E is either above criteria or absent of a criteria.

SUCCESSIVE SCREENING STEPS



TABLE 11
BUFFALO COLOR CORPORATION
RfDs and SFs USED IN THE RISK ASSESSMENT

Analytes	CAS Number	RfD (mg/kg-d)	SF (1/mg/kg-d)
Semi-Volatile Organic Compounds			
BENZO(A)ANTHRACENE	56-55-3	-	7.30E-01
BENZO(A)PYRENE	50-32-8	-	7.3
BENZO(B)FLUORANTHENE	205-99-2	-	7.30E-01
BENZO(G,H,I)PERYLENE	191-24-2	-	-
BENZO(K)FLUORANTHENE	207-08-9	-	7.30E-02
INDENO(1,2,3-CD)PYRENE	193-39-5	-	7.30E-01
CARBAZOLE	86-74-8	-	2.00E-02
CHRYSENE	218-01-9	-	7.30E-03
DIBENZOFURAN	132-64-9	4.00E-03	N
N,N-DIETHYLANILINE	91-66-7	-	-
N-ETHYLANILINE	103-69-5	-	-
1-NAPHTHYLAMINE	134-32-7	-	-
P-TOLUIDINE	106-49-0	-	-
Inorganics			
ALUMINUM	7429-90-5	1	N
ANTIMONY	7440-36-0	4.00E-03	I
ARSENIC	7440-38-2	3.00E-04	I
CHROMIUM	7440-47-3	3.00E-03	I
COBALT	7440-48-4	6.00E-02	X
COPPER	7440-50-8	4.00E-02	H
IRON	7439-89-6	3.00E-01	N
LEAD ¹	7439-92-1	-	-

NOTES:

I/C: INDUSTRIAL/COMMERCIAL

1: LEAD CRITERIA DERIVED FROM USEPA IUBEK MODEL (U.S.EPA, 1994 AND 1998)

H: HEAST - Health Effects Assessment Summary Tables

I: IRIS - Integrated Risk Information System

N: NCEA-National Centre for Environmental Assessment

TABLE 12
BUFFALO COLOR CORPORATION
ESTIMATED CONCENTRATIONS IN THE BUFFALO RIVER
FROM AREAS B AND C

Analytes	CAS Number	TOGS HW(S) CRITERIA	TOGS A(C) CRITERIA (mg/L)	Maximum Shallow Groundwater Concentrations (mg/L)	Estimated Resutant Buffalo River Concentrations (mg/L)
Volatile					
Organic Compounds					
ACETONE	67-64-1	0.05	-	0.62	4.40E-08
BENZENE	71-43-2	0.001	0.21	0.025	1.77E-09
CHLOROBENZENE	108-90-7	0.005	0.005	0.76	5.39E-08
CHLOROFORM	67-66-3	0.007	-	0.025	1.77E-09
1,1-DICHLOROETHANE	75-34-3	0.005	-	0.025	1.77E-09
CIS-1,2-DICHLOROETHENE	156-59-2	0.005	-	0.025	1.77E-09
TRANS-1,2-DICHLOROETHENE	156-60-5	0.005	-	0.025	1.77E-09
ETHYLBENZENE	100-41-4	0.005	0.017	0.025	1.77E-09
METHYLENE CHLORIDE	75-09-2	0.005	-	0.025	1.77E-09
TETRACHLOROETHENE	127-18-4	0.0007	-	0.19	1.35E-08
TOLUENE	108-88-3	0.005	0.1	0.025	1.77E-09
1,1,1-TRICHLOROETHANE	71-55-6	0.005	-	0.025	1.77E-09
M+P-XYLENE	108-38-3/106-42-3	0.01	0.065	0.025	1.77E-09
O-XYLENE	95-47-6	0.005	0.065	0.025	1.77E-09
Semi-Volatile					
Organic Compounds					
ACENAPHTHENE	83-32-9	0.0053	0.0053	0.006	4.26E-10
ANILINE	62-53-3	0.005	-	0.032	2.27E-09
ANTHRACENE	120-12-7	0.05	0.0038	0.005	3.55E-10
BUTYL BENZYL PHTHALATE	85-68-7	0.05	-	0.0084	5.96E-10
2-CHLOROPHENOL ¹	95-57-8	0.001	-	0.014	9.94E-10
1,2-DICHLOROBENZENE	95-50-1	0.003	0.005	0.037	2.63E-09
1,3-DICHLOROBENZENE	541-73-1	0.003	0.005	0.026	1.85E-09
1,4-DICHLOROBENZENE	106-46-7	0.003	0.005	0.035	2.48E-09
DIETHYLPHTHALATE	84-66-2	0.05	-	0.0058	4.12E-10
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	0.005	0.0006	0.014	9.94E-10
FLUORANTHENE	206-44-0	0.05	0.00054	0.016	1.14E-09
NAPHTHALENE	91-20-3	0.013	0.013	0.005	3.55E-10
1-NAPHTHYLAMINE	134-32-7	NA	-	0.03	2.13E-09
NITROBENZENE	98-95-3	0.0004	-	0.014	9.94E-10
PYRENE	129-00-0	0.05	0.0046	0.05	3.55E-09
O+P-TOLUIDINE	95-53-4/106-49-0	0.0006	-	0.02	1.42E-09
1,2,4-TRICHLOROBENZENE	120-82-1	0.005	0.005	1.7	1.21E-07

TABLE 12
BUFFALO COLOR CORPORATION
ESTIMATED CONCENTRATIONS IN THE BUFFALO RIVER
FROM AREAS B AND C

Analytes	CAS Number	TOGS HW(S) CRITERIA	TOGS A(C) CRITERIA (mg/L)	Maximum Shallow Groundwater Concentrations (mg/L)	Estimated Resultant Buffalo River Concentrations (mg/L)
Metals					
ALUMINUM	7429-90-5	0.1	0.1	25.6	1.82E-06
ANTIMONY	7440-36-0	0.003	-	0.1	7.10E-09
ARSENIC	7440-38-2	0.05	0.15	0.0869	6.17E-09
BARIUM	7440-39-3	1	-	0.192	1.36E-08
CHLORIDE	16887-00-6	250	-	6010	4.27E-04
CHROMIUM	7440-47-3	0.05	-	1.2	8.52E-08
CHROMIUM (VI)	18450-29-9	0.05	0.011	0.0422	3.00E-09
COBALT	7440-48-4	0.005	0.005	0.05	3.55E-09
COPPER	7440-50-8	0.2	-	0.133	9.44E-09
CYANIDE-TOTAL	57-12-5	0.2	0.0052	0.0351	2.49E-09
IRON	7439-89-6	0.3	0.3	44.4	3.15E-06
LEAD	7439-92-1	0.05	-	0.162	1.15E-08
MANGANESE	7439-96-5	0.3	-	6.76	4.80E-07
MERCURY	7439-97-6	0.0007	0.00077	0.000523	3.71E-11
NICKEL	7440-02-0	0.1	-	0.907	6.44E-08
NO ₃ -N	7697-37-2	10	-	0.5	3.55E-08
NO ₃ /NO ₂ -N		10	-	0.5	3.55E-08
NO ₂ -N	14797-65-0	10	0.02	0.5	3.55E-08
PHOSPHORUS	7723-14-0	0.02	-	4.49	3.19E-07
SELENIUM	7782-49-2	0.01	0.0046	0.0581	4.12E-09
SULFIDE	18496-25-8	0.002	0.002	4	2.84E-07
VANADIUM	7440-62-2	0.014	0.0014	0.0774	5.49E-09
ZINC	7440-66-6	2	-	0.592	4.20E-08
PCBs					
AROCOR 1016	12674-11-2	0.0009	-	0.00053	3.76E-11
AROCOR 1221	11104-28-2	0.0009	-	0.00053	3.76E-11
AROCOR 1232	11141-16-5	0.0009	-	0.00053	3.76E-11
AROCOR 1242	53469-21-9	0.0009	-	0.00053	3.76E-11
AROCOR 1248	12672-29-6	0.0009	-	0.00053	3.76E-11
AROCOR 1254	11097-69-1	0.0009	-	0.00053	3.76E-11
AROCOR 1260	11096-82-5	0.0009	-	0.00053	3.76E-11

NOTES:

TOGS: TECHNICAL AND OPERATIONAL GUIDANCE SERIES (1.1.1)

H(WS): HEALTH WATER SOURCE - DRINKING WATER OR

A(C) FISH PROPAGATION(FRESH WATER) IF H(WS) NOT AVAILABLE

1: VALUE FOR TOTAL PHENOLCI COMPOUNDS USED

TABLE 13
BUFFALO COLOR CORPORATION
ESTIMATED CONCENTRATIONS IN THE BUFFALO RIVER
FROM AREAS E AND C

Analytes	CAS Number	TOGS HW(S) CRITERIA (mg/L)	TOGS A(C) CRITERIA (mg/L)	Maximum Shallow Groundwater Concentrations (mg/L)	Estimated Resultant Buffalo River Concentrations (mg/L)
Organic Compounds					
Volatile					
ACETONE	67-64-1	0.05	-	1	1.14E-07
BENZENE	71-43-2	0.001	0.21	0.5	5.71E-08
CHLOROBENZENE	108-90-7	0.005	0.005	10	1.14E-06
CHLOROFORM	67-66-3	0.007	-	0.5	5.71E-08
1,1-DICHLOROETHANE	75-34-3	0.005	-	0.5	5.71E-08
CIS-1,2-DICHLOROETHENE	156-59-2	0.005	-	0.5	5.71E-08
TRANS-1,2-DICHLOROETHENE	156-60-5	0.005	-	0.5	5.71E-08
ETHYLBENZENE	100-41-4	0.005	0.017	0.5	5.71E-08
METHYLENE CHLORIDE	75-09-2	0.005	-	0.5	5.71E-08
TETRACHLOROETHENE	127-18-4	0.0007	-	0.5	5.71E-08
TOLUENE	108-88-3	0.005	0.1	0.5	5.71E-08
1,1,1-TRICHLOROETHANE	71-55-6	0.005	-	0.5	5.71E-08
M+P-XYLENE	108-38-3/106-42-3	0.01	0.065	0.5	5.71E-08
O-XYLENE	95-47-6	0.005	0.065	0.5	5.71E-08
Semi-Volatile					
Organic Compounds					
ACENAPHTHENE	83-32-9	-	0.0053	0.096	1.10E-08
ANILINE	62-53-3	0.005	-	0.096	1.10E-08
ANTHRACENE	120-12-7	0.05	0.0038	0.096	1.10E-08
BUTYL BENZYL PHTHALATE	85-68-7	0.05	-	0.096	1.10E-08
2-CHLOROPHENOL ¹	95-57-8	0.001	-	0.096	1.10E-08
1,2-DICHLOROBENZENE	95-50-1	0.003	0.005	0.096	1.10E-08
1,3-DICHLOROBENZENE	541-73-1	0.003	0.005	0.096	1.10E-08
1,4-DICHLOROBENZENE	106-46-7	0.003	0.005	0.096	1.10E-08
DIETHYLPHTHALATE	84-66-2	0.05	-	0.096	1.10E-08
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	0.005	0.0006	0.096	1.10E-08
FLUORANTHENE	206-44-0	0.05	0.00054	0.096	1.10E-08
NAPHTHALENE	91-20-3	0.013	0.013	0.096	1.10E-08
1-NAPHTHYLAMINE	134-32-7	-	-	0.096	1.10E-08
NITROBENZENE	98-95-3	0.0004	-	0.096	1.10E-08
PYRENE	129-00-0	0.05	0.0046	0.096	1.10E-08
O+P-TOLUIDINE	95-53-4/106-49-0	0.0006	-	0.096	1.10E-08
1,2,4-TRICHLOROBENZENE	120-82-1	0.005	0.005	1.7	1.94E-07

TABLE 13
BUFFALO COLOR CORPORATION
ESTIMATED CONCENTRATIONS IN THE BUFFALO RIVER
FROM AREAS E AND C

Analytes	CAS Number	TOGS HW(S) CRITERIA (mg/L)	TOGS A(C) CRITERIA (mg/L)	Maximum Shallow Groundwater Concentrations (mg/L)	Estimated Resultant Buffalo River Concentrations (mg/L)
Metals					
ALUMINUM	7429-90-5	-	0.1	756	8.63E-05
ANTIMONY	7440-36-0	0.003	-	0.1	1.14E-08
ARSENIC	7440-38-2	0.05	0.15	0.816	9.32E-08
BARIUM	7440-39-3	1	-	4.99	5.70E-07
CHLORIDE	16887-00-6	250	-	6010	6.86E-04
CHROMIUM	7440-47-3	0.05	-	1.93	2.20E-07
CHROMIUM (VI)	18450-29-9	0.05	0.011	0.02	2.28E-09
COBALT	7440-48-4	0.005	0.005	0.48	5.48E-08
COPPER	7440-50-8	0.2	-	5.29	6.04E-07
CYANIDE-TOTAL	57-12-5	0.2	0.0052	0.19	2.17E-08
IRON	7439-89-6	0.3	0.3	1880	2.15E-04
LEAD	7439-92-1	0.05	-	2.51	2.87E-07
MANGANESE	7439-96-5	0.3	-	81.1	9.26E-06
MERCURY	7439-97-6	0.0007	0.00077	0.00155	1.77E-10
NICKEL	7440-02-0	0.1	-	1.57	1.79E-07
NO ₃ -N	7697-37-2	10	-	3.13	3.57E-07
NO ₃ /NO ₂ -N		10	-	3.13	3.57E-07
NO ₂ -N	14797-65-0	10	0.02	0.5	5.71E-08
PHOSPHORUS	7723-14-0	0.02	-	2.42	2.76E-07
SELENIUM	7782-49-2	0.01	0.0046	1.02	1.16E-07
SULFIDE A(C)	18496-25-8	0.002	0.002	5.2	5.94E-07
VANADIUM A(C)	7440-62-2	-	0.0014	1.8	2.05E-07
ZINC	7440-66-6	2	-	26.8	3.06E-06
PCBs					
AROCLOR 1016	12674-11-2	0.00009	-	0.005	5.71E-10
AROCLOR 1221	11104-28-2	0.00009	-	0.005	5.71E-10
AROCLOR 1232	11141-16-5	0.00009	-	0.005	5.71E-10
AROCLOR 1242	53469-21-9	0.00009	-	0.005	5.71E-10
AROCLOR 1248	12672-29-6	0.00009	-	0.005	5.71E-10
AROCLOR 1254	11097-69-1	0.00009	-	0.005	5.71E-10
AROCLOR 1260	11096-82-5	0.00009	-	0.005	5.71E-10

NOTES:

TOGS: TECHNICAL AND OPERATIONAL GUIDANCE SERIES (1.1.1)

H(WS): HEALTH WATER SOURCE - DRINKING WATER OR

A(C) FISH PROPAGATION(FRESH WATER) IF H(WS) NOT AVAILABLE

1: VALUE FOR TOTAL PHENOLIC COMPOUNDS USED

TABLE 14
BUFFALO COLOR CORPORATION
CALCULATED RISK OF INTAKE
OF BUFFALO RIVER WATER

Compound	CW (mg/L)	Intake (mg/kg-day) Non-Cancer	RfD (mg/kg-d)	SF	Hazard Quotient	HQ > 1	Cancer Risk	Risk > 10 ⁻⁶
VOCs								
Benzene	0.5	4.79E-05	2.05E-05	3.00E-03	2.90E-02		5.96E-07	
Chlorobenzene	10	9.59E-04	2.00E-02	2.00E-02	4.79E-02			
Chloroform	0.5	4.79E-05	2.05E-05	1.00E-02	6.10E-03		1.25E-07	
Ethylbenzene	0.5	4.79E-05	1.00E-01	2.00E-01	4.79E-04			
Toluene	0.5	4.79E-05	2.00E-01	2.00E-01	2.40E-04			
Xylenes (Total)	0.5	4.79E-05	2.00E+00		2.40E-05			
SVOCs								
Acenaphthene	0.096	9.21E-06	6.00E-02		1.53E-04			
Aniline	0.096	9.21E-06	7.00E-03	5.70E-03	1.32E-03		2.25E-08	
2-Chlorophenol	0.096	9.21E-06	5.00E-03		1.84E-03			
Nitrobenzene	0.005	4.79E-07	5.00E-04		9.59E-04			
Pyrene	0.0002	1.92E-08	3.00E-02		6.39E-07			
1,2,4-Trichlorobenzene	0.005	4.79E-07	1.00E-02		4.79E-05			
INORGANICS								
Aluminum	756	7.25E-02	1.00E+00		7.25E-02			
Arsenic	0.816	7.82E-05	3.35E-05	3.00E-04	2.61E-01		5.03E-05	YES
Chromium (VI)	0.0422	4.05E-06	5.00E-03		8.09E-04			
Cyanide	0.19	1.82E-05	2.00E-02		9.11E-04			
Nickel	1.57	1.51E-04	2.00E-02		7.53E-03			
PCBs								
Aroclor 1016	0.005	4.79E-07	2.05E-07	7.00E-05	6.85E-03			

NOTES:

CW Chemical Concentration (mg/L)

CR chemical specific

Contact Rate (L/hr)

0.050 l/hr

ET Exposure Time (hr/event)

3 hr/event

EF Exposure Frequency (events/yr)

7 events/yr

ED Exposure Duration (years)

70 yr

BW Body Weight (kg)

70 kg

AT Averaging Time (days)

10950 d (carcinogen)

25550 d (non-carcinogen)

HQ Hazard Quotient

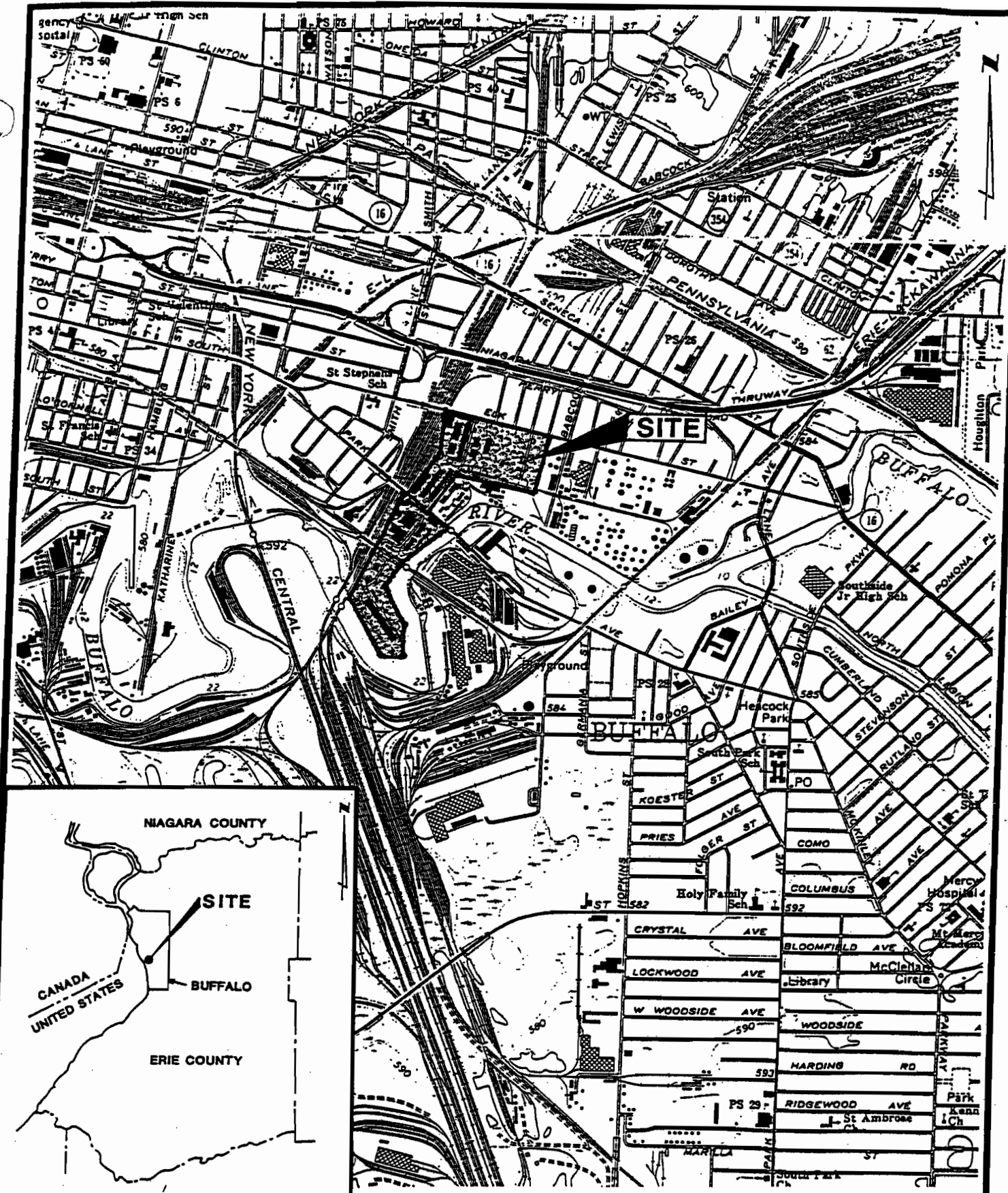
SF Slope factor

* Lowest RfD for all tested PCBs

EQUATIONS:

$$\text{Intake (mg/kg-d)} = \frac{\text{CW} \times \text{CR} \times \text{ET} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT}}$$

$$\text{HQ} = \frac{\text{Intake}}{\text{RfD}} \quad \text{Cancer Risk} = \frac{\text{Intake}}{\text{SF}}$$



Golder Associates

Buffalo, New York

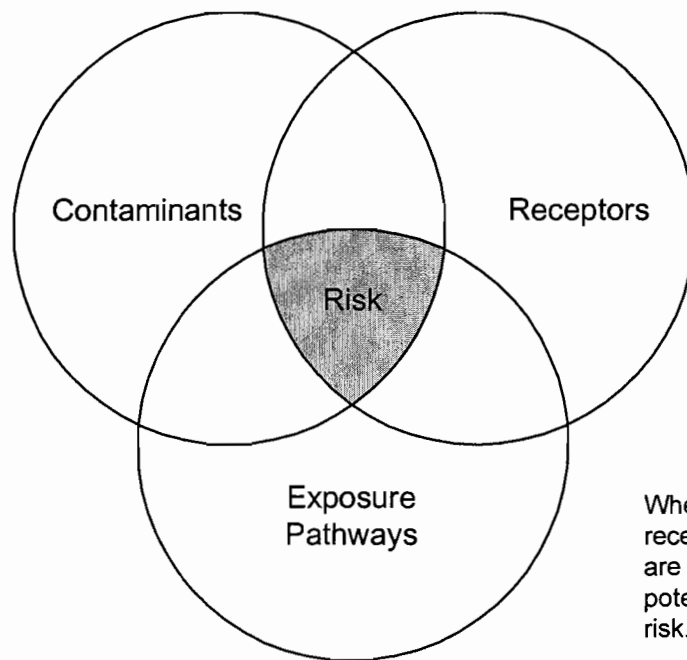
CLIENT/PROJECT



buffalo
COLOR CORPORATION

SITE LOCATION MAP

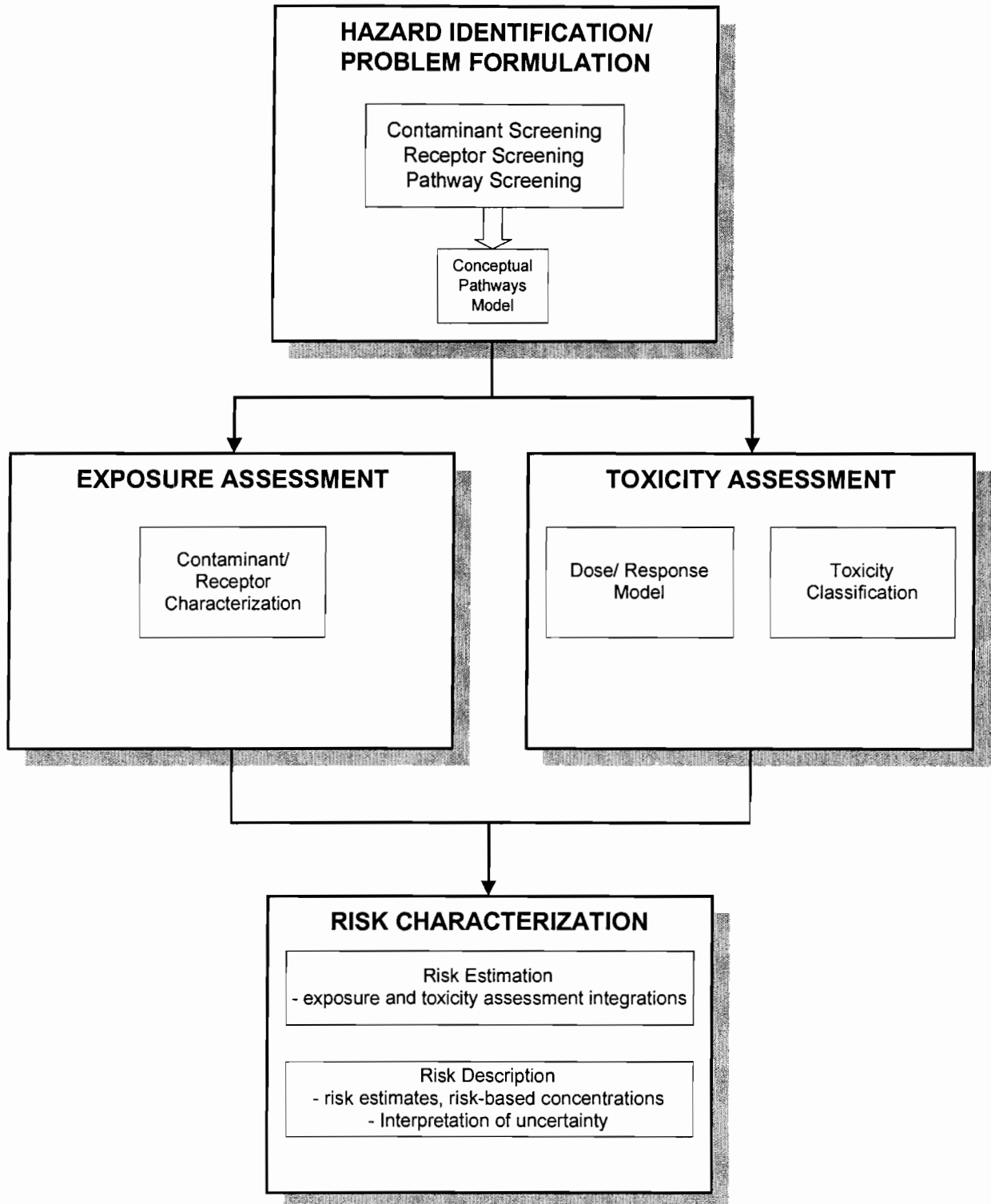
DRAWN	BEC	DATE	2/7/95	JOB NO.	993-9206
CHECKED	CPP	SCALE	N.T.S.	DWG NO./REV. NO.	6
REVIEWED	CPP	FILE NO.	933-9058	PICTURE NO.	1



When contaminants, receptors, and pathways are present, there is a potential environmental risk.

GENERAL RISK ASSESSMENT FRAMEWORK

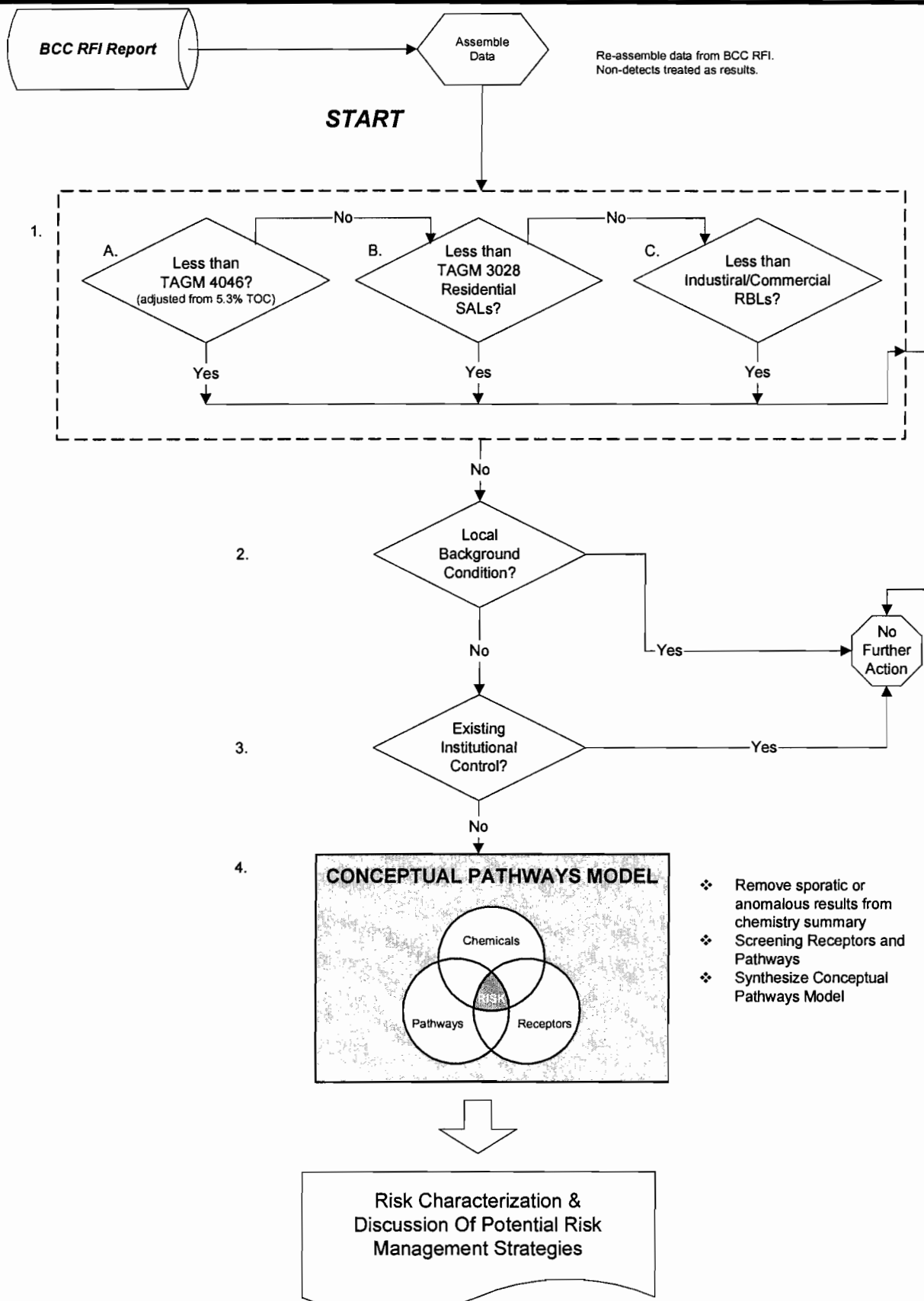
FIGURE 3



After U.S. EPA, 1989a

**RISK SCREENING PROCESS FOR SOIL CHEMISTRY
AND INSTITUTIONAL CONTROLS
AREA ABCE, BUFFALO COLOR CORPORATION,
BUFFALO, NY**

FIGURE 4

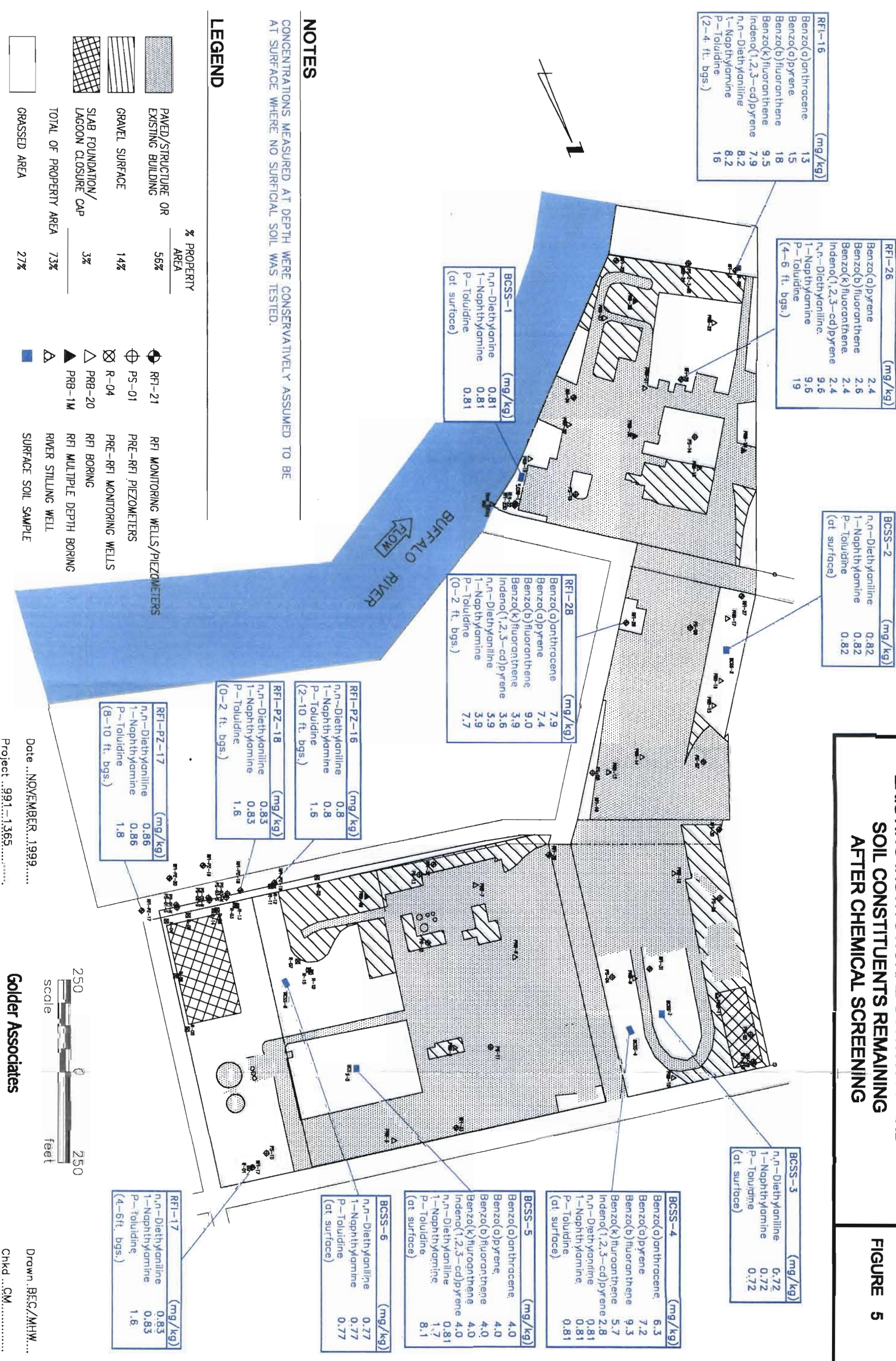


Chemical Screening Stages

Risk Assessment Stages

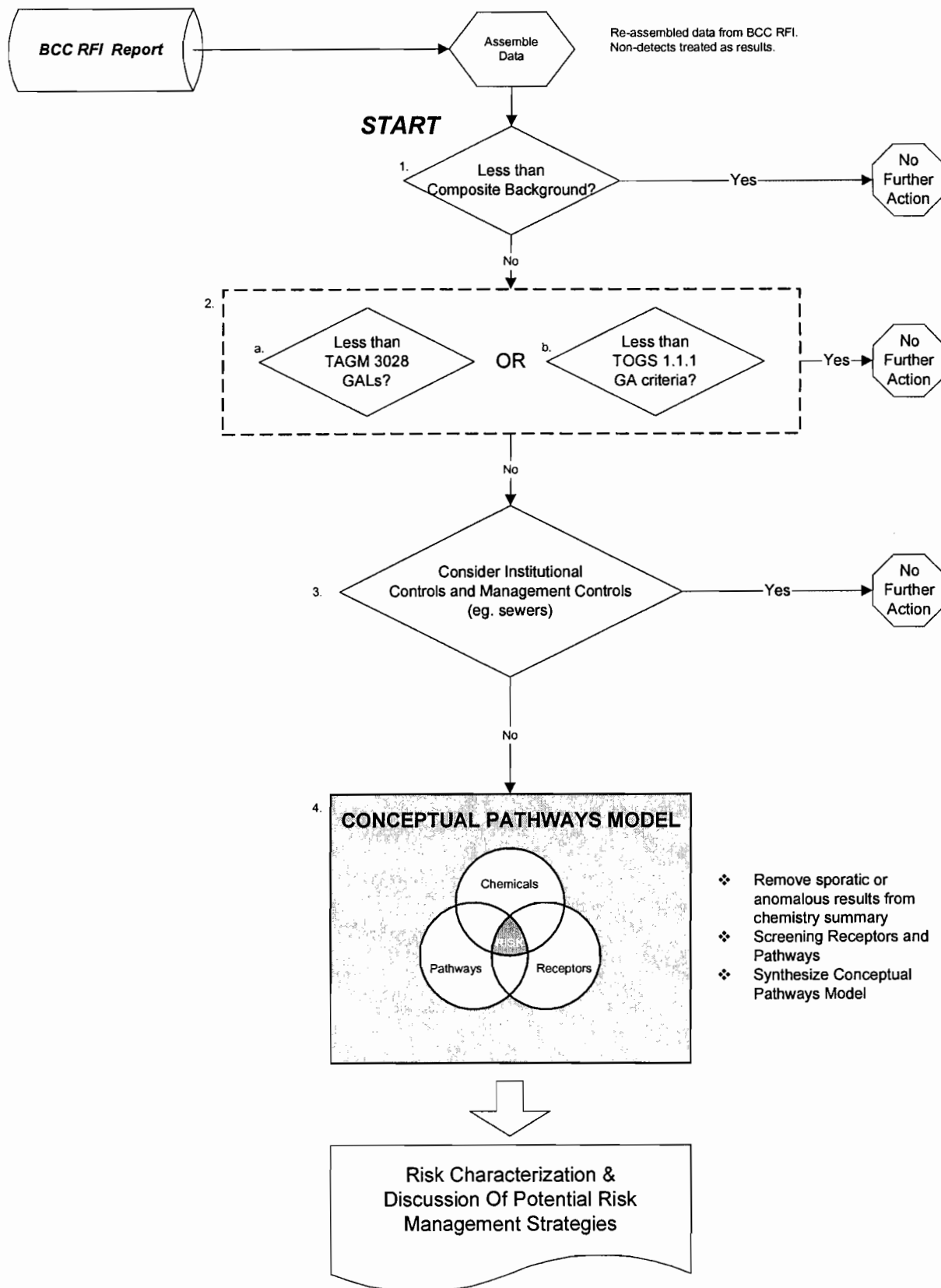
EXISTING INSTITUTIONAL CONTROLS AND
SOIL CONSTITUENTS REMAINING
AFTER CHEMICAL SCREENING

FIGURE 5



RISK SCREENING PROCESS FOR GROUNDWATER CHEMISTRY AND INSTITUTIONAL CONTROLS AREAS B,C,E, BUFFALO COLOR CORPORATION, BUFFALO, NY

FIGURE 6

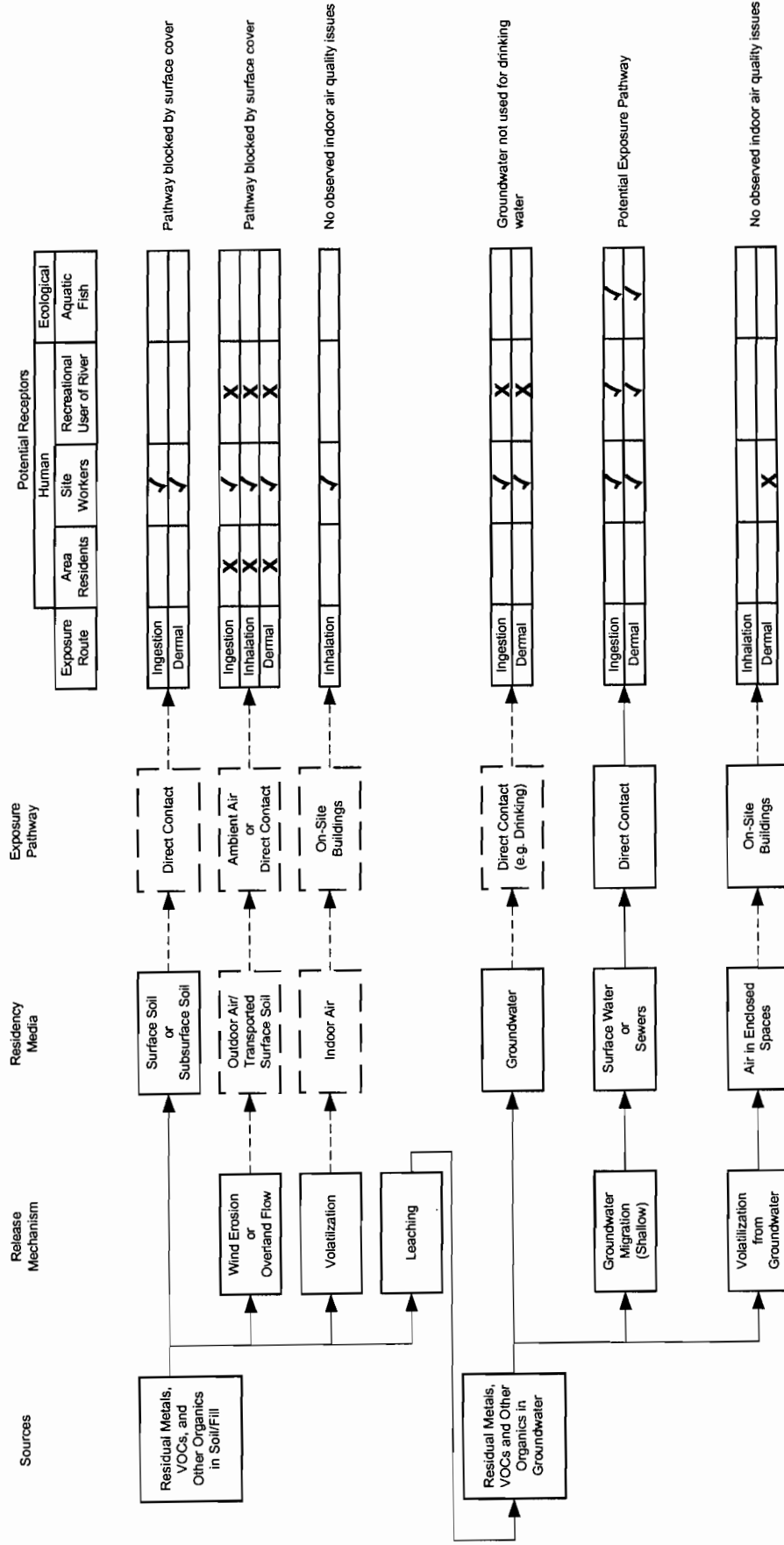


Chemical Screening Stages

Risk Assessment Stages

CONCEPTUAL PATHWAYS MODEL FOR BUFFALO COLOR CORPORATION, BUFFALO, NY

FIGURE 7



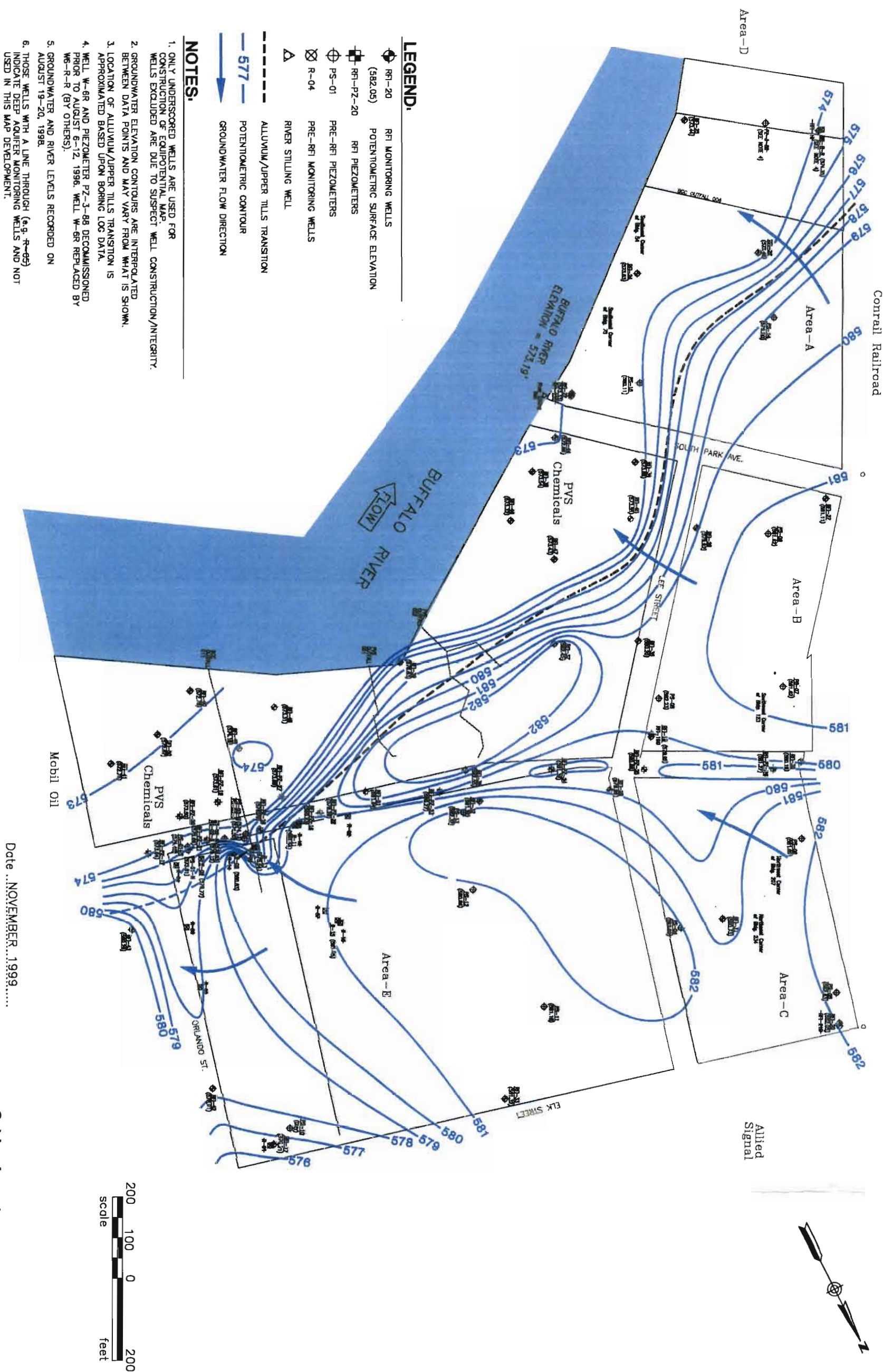
Legend

- Possible Pathway Model Component
- Blocked or managed Pathway Model Component
- Receptor considered applicable, but blocked to exposure
- Receptor considered applicable and at potential exposure
- Possible pathway of contact
- Blocked or managed pathway

Proj. No.: 993-9206 / 991-1365
Date: November 1999

INFERRED SHALLOW AQUIFER POTENTIOMETRIC SURFACE (AUGUST 1998)

FIGURE 8



TWO-DIMENSIONAL GROUNDWATER
FLOW MODELLING OF
BCC INVESTIGATION AREAS

FIGURE 9



APPENDIX B

**GROUNDWATER MODELING OF
REMEDIAL ALTERNATIVES – AREA A**

TABLE B-1
 BUFFALO COLOR CORPORATION
 SUMMARY OF GROUNDWATER ELEVATIONS
 AUGUST 19-20, 1998 MONITORING EVENT

WELL NAME	TOP OF RISER ELEVATION (FT. MSL)	WATER LEVEL (FT. BTOR)	WATER LEVEL ELEVATION (FT. MSL)
BCC PRE-RFI MONITORING WELLS			
R-01	585.10	8.95	576.15
R-02	586.36	8.87	577.49
R-03	587.44	10.57	576.87
R-04	587.21	12.39	574.82
R-05	587.56	12.52	575.04
R-06	586.75	11.84	574.91
R-07	588.48	11.20	577.28
R-08	589.97	9.14	580.83
R-09	589.39	12.62	576.77
R-10	589.26	8.73	580.53
R-11	586.82	6.28	580.54
R-12	586.84	9.27	577.57
R-13	587.54	12.00	575.54
R-14	589.40	15.40	574.00
R-15	588.87	7.82	581.05
BCC PRE-RFI PIEZOMETERS			
PS-01-S	587.33	12.87	574.46
PS-01-N	585.92	12.11	573.81
PS-02-S	586.61	11.49	575.12
PS-02-N	587.38	13.55	573.83
PS-03-S	586.60	11.80	574.80
PS-03-N	586.93	12.76	574.17
PS-04	588.21	6.12	582.09
PS-05	587.86	5.23	582.63
PS-06	588.18	6.58	581.60
PS-07	587.47	5.85	581.62
PS-08	588.27	6.04	582.23
PS-09	588.33	6.71	581.62
PS-10	585.56	DRY	DRY
PS-11	586.17	4.99	581.18
PS-12	586.63	5.77	580.86
PS-13	586.39	4.07	582.32
PS-14	586.00	6.80	579.20
PS-15	587.76	7.65	580.11
W-6R-R	589.04	14.69	574.35

TABLE B-1
 BUFFALO COLOR CORPORATION
 SUMMARY OF GROUNDWATER ELEVATIONS
 AUGUST 19-20, 1998 MONITORING EVENT

WELL NAME	TOP OF RISER ELEVATION (FT. MSL)	WATER LEVEL (FT. BTOR)	WATER LEVEL ELEVATION (FT. MSL)
BCC RFI MONITORING WELLS			
RFI-16	586.34	12.24	574.10
RFI-17	586.24	10.03	576.21
RFI-18	588.64	8.72	579.92
RFI-19D	588.78	14.76	574.02
RFI-20	588.03	5.98	582.05
RFI-21D	588.34	14.46	573.88
RFI-22	590.62	17.29	573.33
RFI-23D	590.88	17.18	573.70
RFI-24	584.11	10.48	573.63
RFI-25	586.76	13.32	573.44
RFI-26	587.84	14.36	573.48
RFI-27	587.52	6.41	581.11
RFI-28	588.60	8.68	579.92
RFI-29	586.33	6.34	579.99
RFI-30	588.04	7.85	580.19
RFI-31	588.37	7.64	580.73
RFI-32	586.95	5.73	581.22
RFI-33	583.04	1.72	581.32
RFI-34	586.17	12.49	573.68
RFI-35	584.77	4.57	580.20
RFI-36	587.90	5.35	582.55
RFI-37	583.84	1.42	582.42
RFI-38	582.76	9.22	573.54
RFI-39	585.29	8.66	576.63
RFI-40	585.78	13.00	572.78
RFI-41	585.40	12.65	572.75
RFI-42	582.89	4.88	578.01
RFI-43	587.01	6.72	580.29
RFI-44	583.27	10.38	572.89
RFI-45	583.18	9.63	573.55
RFI-46	582.72	9.40	573.32
RFI-47	582.88	9.45	573.43
RFI-48	583.00	9.69	573.31
RFI-49	586.17	11.98	574.19
RFI-50	581.82	8.95	572.87
RFI-51	587.41	5.77	581.64

TABLE B-1
 BUFFALO COLOR CORPORATION
 SUMMARY OF GROUNDWATER ELEVATIONS
 AUGUST 19-20, 1998 MONITORING EVENT

WELL NAME	TOP OF RISER ELEVATION (FT. MSL)	WATER LEVEL (FT. BTOR)	WATER LEVEL ELEVATION (FT. MSL)
BCC RFI PIEZOMETERS			
RFI-PZ-16	587.22	6.99	580.23
RFI-PZ-17	586.48	12.64	573.84
RFI-PZ-18	587.83	11.04	576.79
RFI-PZ-19	586.30	12.69	573.61
RFI-PZ-20	586.14	12.64	573.50
RFI-PZ-21	587.01	11.35	575.66
RFI-PZ-22	587.36	8.07	579.29
RFI-PZ-23	587.29	7.02	580.27
RFI-PZ-24	584.85	3.49	581.36
RFI-PZ-25	583.86	3.05	580.81
RFI-PZ-26	585.24	3.97	581.27
RFI-PZ-27	585.29	11.60	573.69
BCC RFI BUFFALO RIVER			
STILLING WELL	584.04	10.85	573.19

NOTES:

BTOR = Below top of riser.

DRY = No water present in well at time of measurement.

MSL = Mean sea level.

**STATISTICAL SUMMARY FOR AUGUST 1998 CALIBRATION
CORRECTIVE MEASURES STUDY
BUFFALO COLOR CORPORATION**

WELL I.D.	MEASURED HEAD [ft MSL]	SIMULATED HEAD [ft MSL]	RESIDUAL [ft]
RFI-25	573.24	573.45	-0.21
W6-R-R	574.15	573.96	0.19
RFI-26	573.63	573.85	-0.22
RFI-22	573.45	573.47	-0.02
PS-14	579.2	578.50	0.70
RFI-44	573.36	573.49	-0.13
RFI-38	573.7	573.49	0.21
RFI-46	573.65	573.50	0.15
RFI-45	573.55	573.72	-0.17
RFI-34	574.03	573.66	0.37
RFI-27	581.25	580.88	0.37
RFI-34	574.03	573.67	0.36

Residual Mean	0.14	Min. Residual	-0.22
Res. Std. Dev.	0.28	Max. Residual	0.70
Sum of Squares	1.14	Head Range	8.01
Abs. Res. Mean	0.26	Head Range/Std	0.03

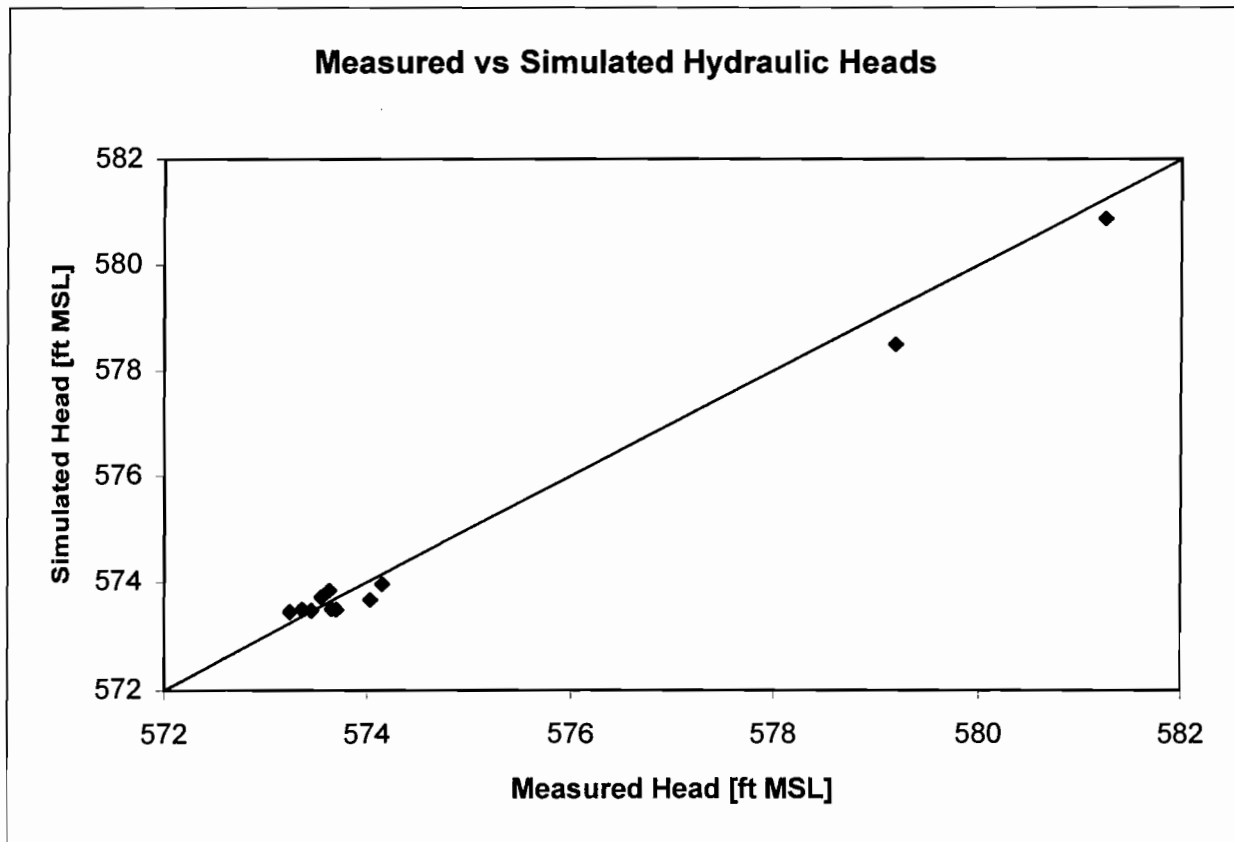


TABLE B-3

**EXTRACTION WELL PUMPING RATES FOR FIVE WELL SYSTEM
CORRECTIVE MEASURES STUDY
BUFFALO COLOR CORPORATION**

Modeling Layer	EXTRACTION WELLS				
	EW-1	EW-2	EW-3	EW-4	EW-5
Extraction Wells					
WELL LOCATIONS					
	Row/Col.	Row/Col.	Row/Col.	Row/Col.	Row/Col.
	60/17	62/33	66/53	69/69	78/90
MODELING LAYER ELEVATION					
	[ft]	[ft]	[ft]	[ft]	[ft]
WL	573.20	573.20	573.20	573.20	573.20
L1	570.20	569.60	566.20	568.60	569.40
L2	563.20	562.40	560.00	560.60	563.60
L3	555.40	554.00	553.00	553.40	555.20
HYDRAULIC CONDUCTIVITY					
	[ft/day]	[ft/day]	[ft/day]	[ft/day]	[ft/day]
L1	3.40	3.40	3.40	3.40	3.40
L2	59.30	36.43	36.43	36.43	36.43
L3	59.30	36.43	36.43	36.43	36.43
WELL SCREEN (1 if present; 0 if not present)					
L1	1	1	1	1	1
L2	1	1	1	1	1
L3	1	1	1	1	1
TRANSMISSIVITY OF THE SCREENED LAYER					
	[ft ² /day]	[ft ² /day]	[ft ² /day]	[ft ² /day]	[ft ² /day]
L1	10.20	12.24	23.80	15.64	12.92
L2	415.10	262.30	225.87	291.44	211.29
L3	462.54	306.01	255.01	262.30	306.01
PUMPING RATE					
	EW-1	EW-2	EW-3	EW-4	EW-5
TOTAL FLOW RATE PER WELL					
	[ft ³ /day]	[ft ³ /day]	[ft ³ /day]	[ft ³ /day]	[ft ³ /day]
578	578	578	578	770	578
	[gpm]	[gpm]	[gpm]	[gpm]	[gpm]
3.0	3.0	3.0	3.0	4.0	3.0
INDIVIDUAL FLOW RATE PER MODELING LAYER					
L1	6.63	12.18	27.23	21.15	14.07
L2	270.00	260.92	258.46	394.13	230.13
L3	300.86	304.41	291.81	354.72	333.30

TOTAL PUMPING RATE:

16.0

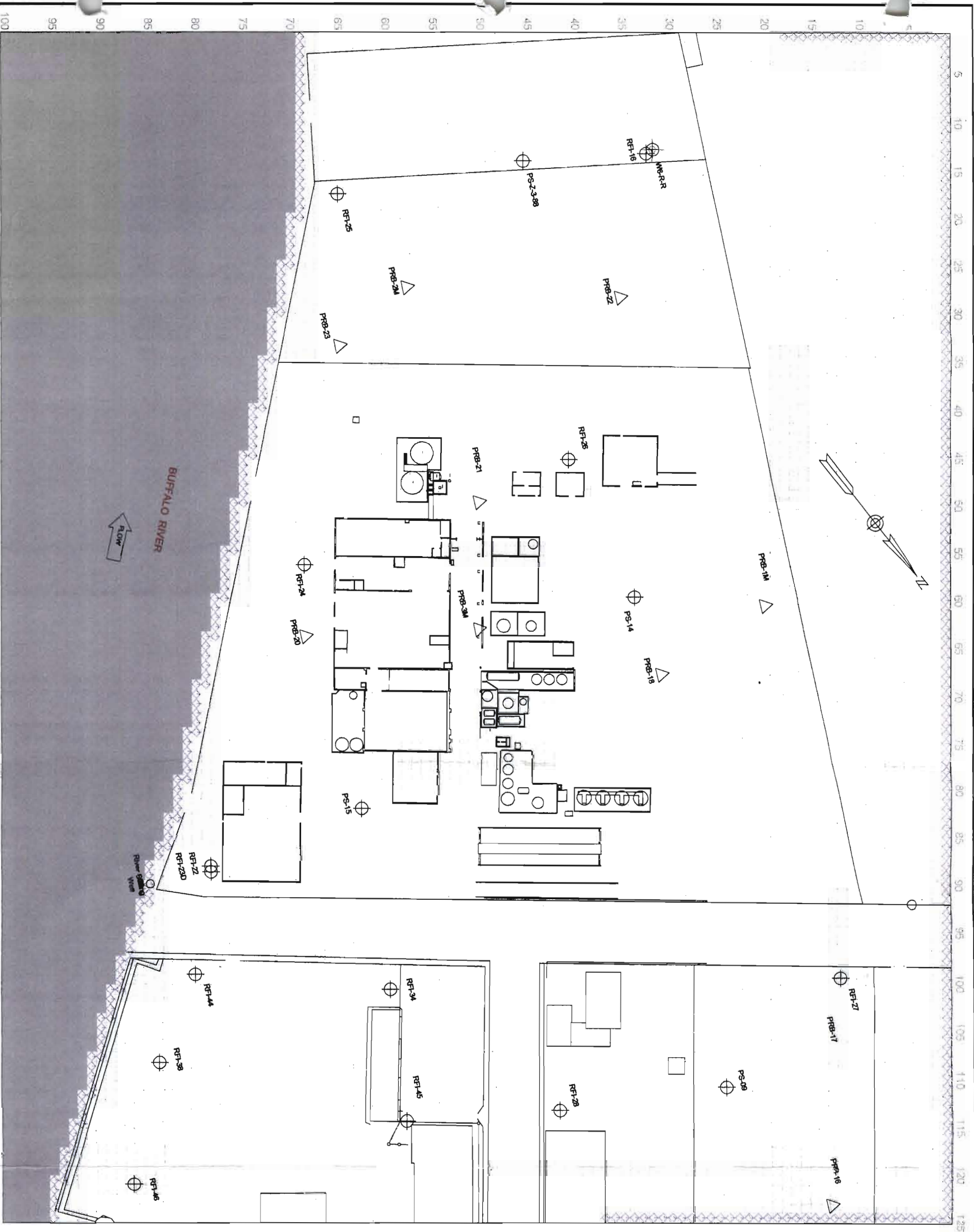
TABLE B-4

**EXTRACTION WELL PUMPING RATES FOR FOUR WELL SYSTEM
WITH GROUT BARRIER
CORRECTIVE MEASURES STUDY
BUFFALO COLOR CORPORATION**

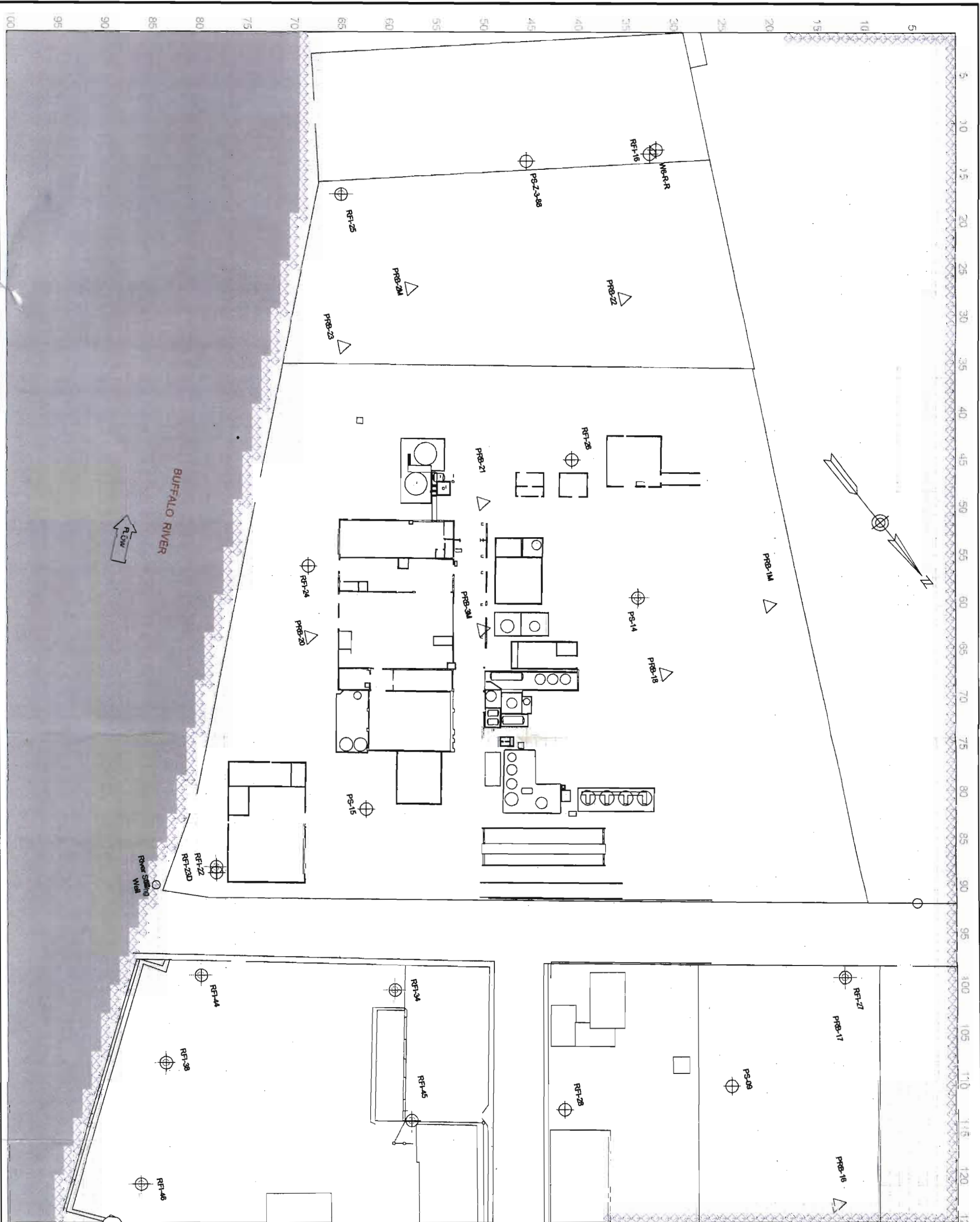
Modeling Layer	EXTRACTION WELLS			
	Extraction Wells			
	EW-1	EW-2	EW-3	EW-4
	WELL LOCATIONS			
	Row/Col.	Row/Col.	Row/Col.	Row/Col.
	60/15	63/42	68/60	77/77
	MODELING LAYER ELEVATION			
	[ft]	[ft]	[ft]	[ft]
WL	573.20	573.20	573.20	573.20
L1	570.20	568.20	566.60	568.60
L2	563.20	560.40	560.00	562.40
L3	555.60	553.20	553.20	554.60
	HYDRAULIC CONDUCTIVITY			
	[ft/day]	[ft/day]	[ft/day]	[ft/day]
L1	3.40	3.40	3.40	3.40
L2	59.30	36.43	36.43	36.43
L3	59.30	36.43	36.43	36.43
	WELL SCREEN (1 if present; 0 if not present)			
L1	1	1	1	1
L2	1	1	1	1
L3	1	1	1	1
	TRANSMISSIVITY OF THE SCREENED LAYER			
	[ft ² /day]	[ft ² /day]	[ft ² /day]	[ft ² /day]
L1	10.20	17.00	22.44	15.64
L2	415.10	284.15	240.44	225.87
L3	450.68	262.30	247.72	284.15
	PUMPING RATE			
	EW-1	EW-2	EW-3	EW-4
	TOTAL FLOW RATE PER WELL			
	[ft ³ /day]	[ft ³ /day]	[ft ³ /day]	[ft ³ /day]
	578	385	193	385
	INDIVIDUAL FLOW RATE PER MODELING LAYER			
	[gpm]	[gpm]	[gpm]	[gpm]
	3.0	2.0	1.0	2.0
L1	6.72	11.62	8.46	11.45
L2	273.66	194.16	90.55	165.43
L3	297.12	179.22	93.39	208.12

TOTAL PUMPING RATE:

8.0



Corrective Measures Study
Buffalo Color Corporation
Golder Associates



Legend

Constant Head
No Flow

Figure B-2

**Finite Difference Grid
and Boundary Conditions**

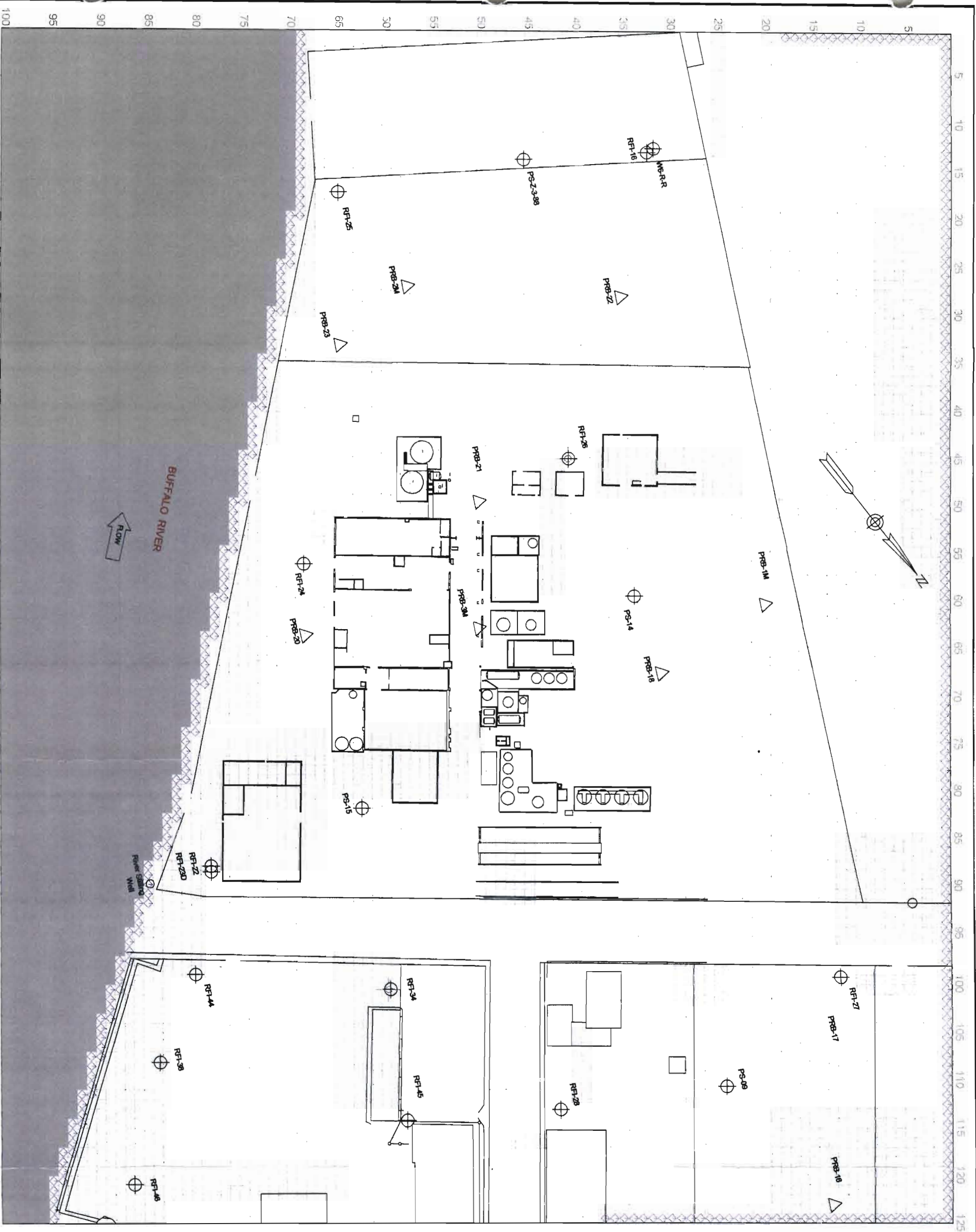
Layer 2

Run BCC12

100 feet

**Corrective Measures Study
Buffalo Color Corporation**

Golder Associates



Legend
◊ Constant Head
▴ No Flow

Figure B-3

**Finite Difference Grid
and Boundary Conditions**

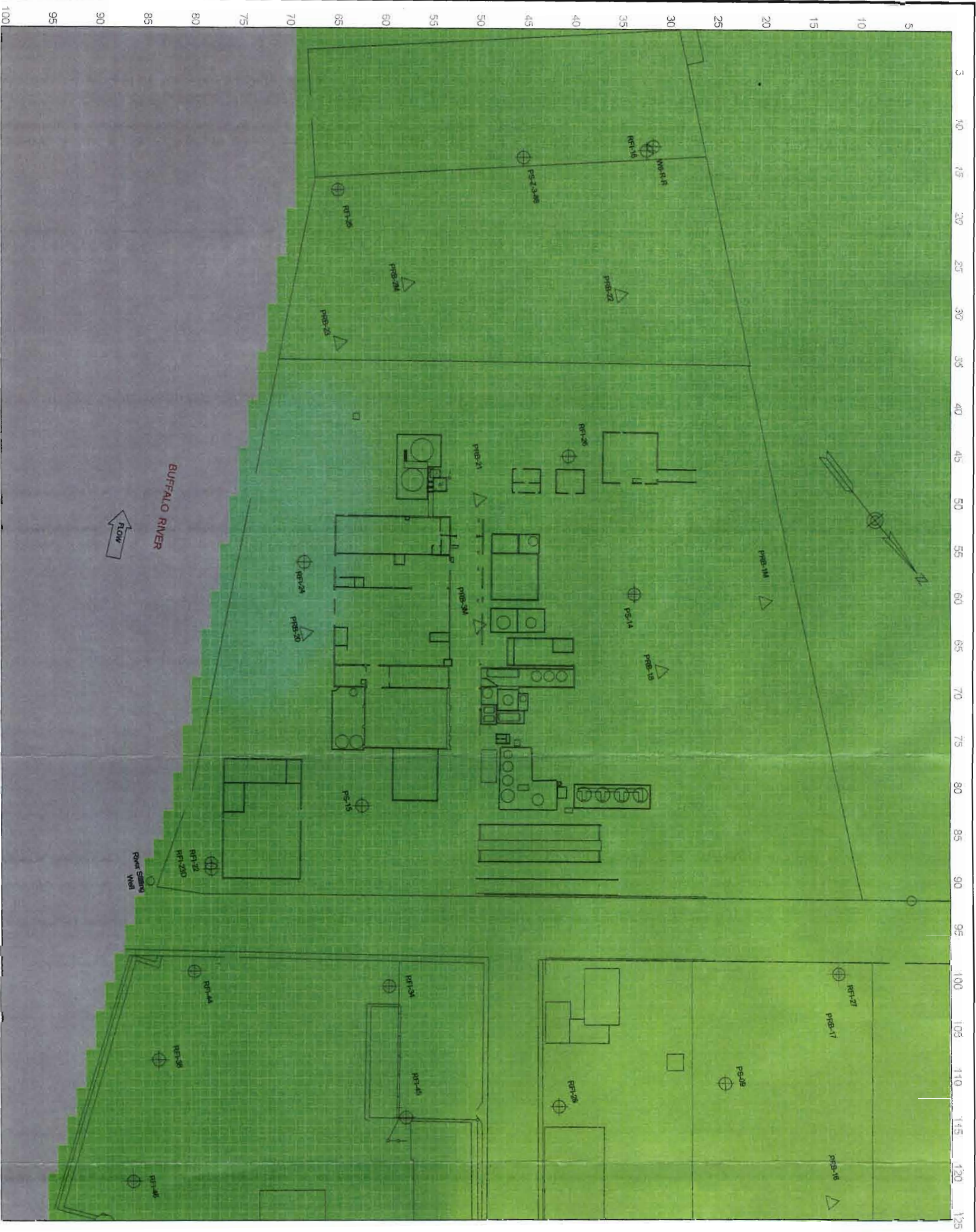
Layer 3

Run BCC12

100 feet

**Corrective Measures Study
Buffalo Color Corporation**

Golder Associates



Legend

Bottom Elevation
Zone Value
124 574.6

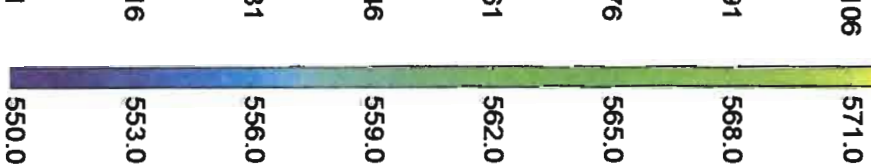


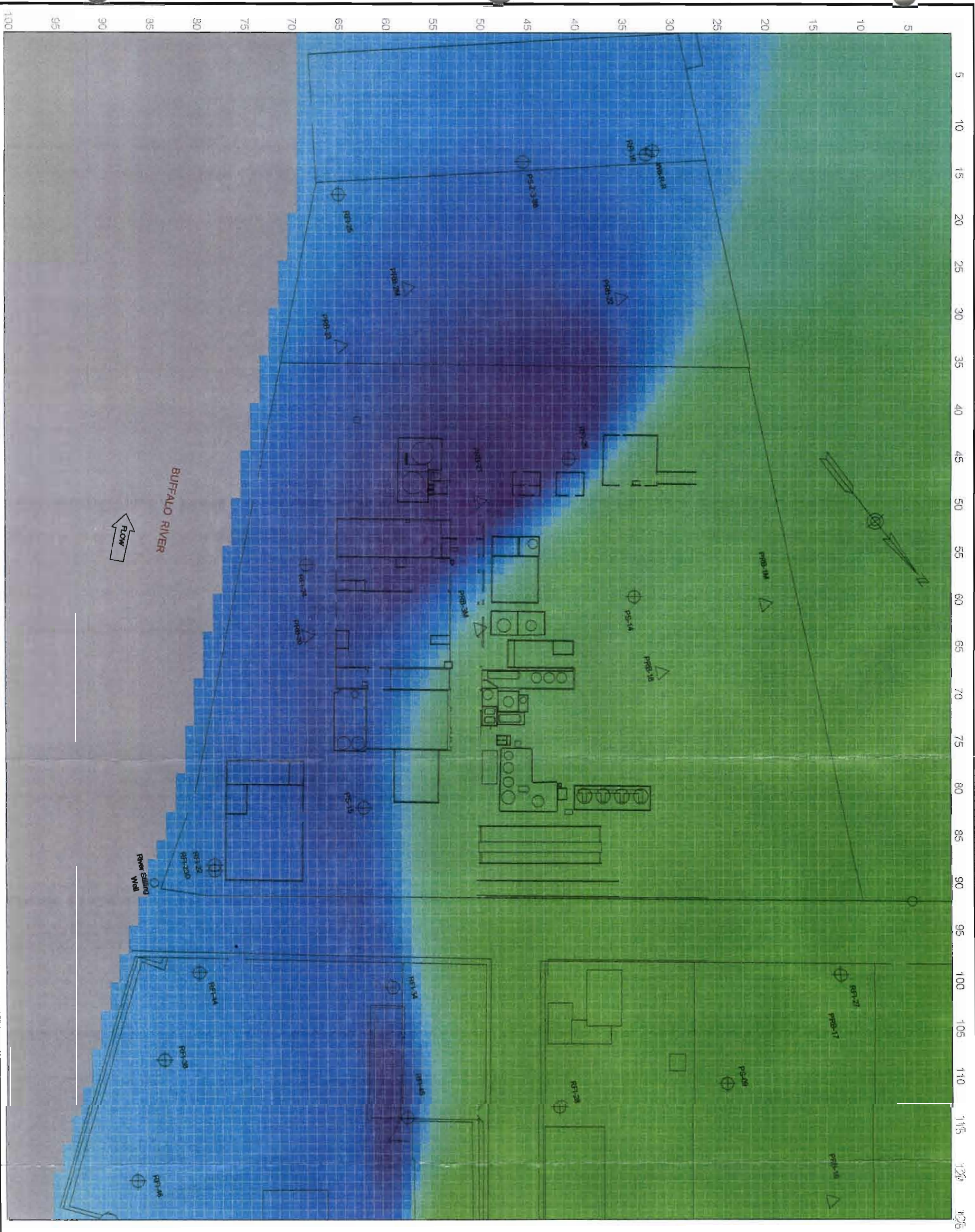
Figure B-5

Bottom Elevation Layer 2

Run BCC12
100 feet

Corrective Measures Study
Buffalo Color Corporation

Golder Associates



Legend

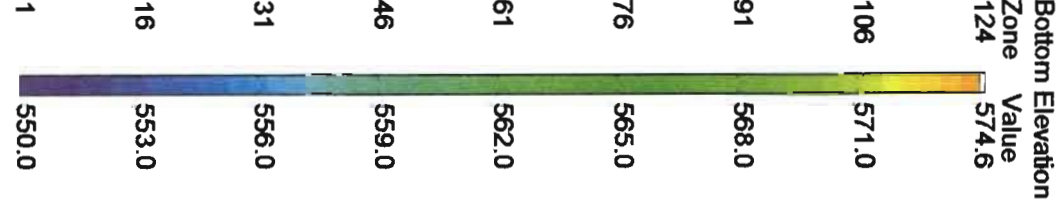


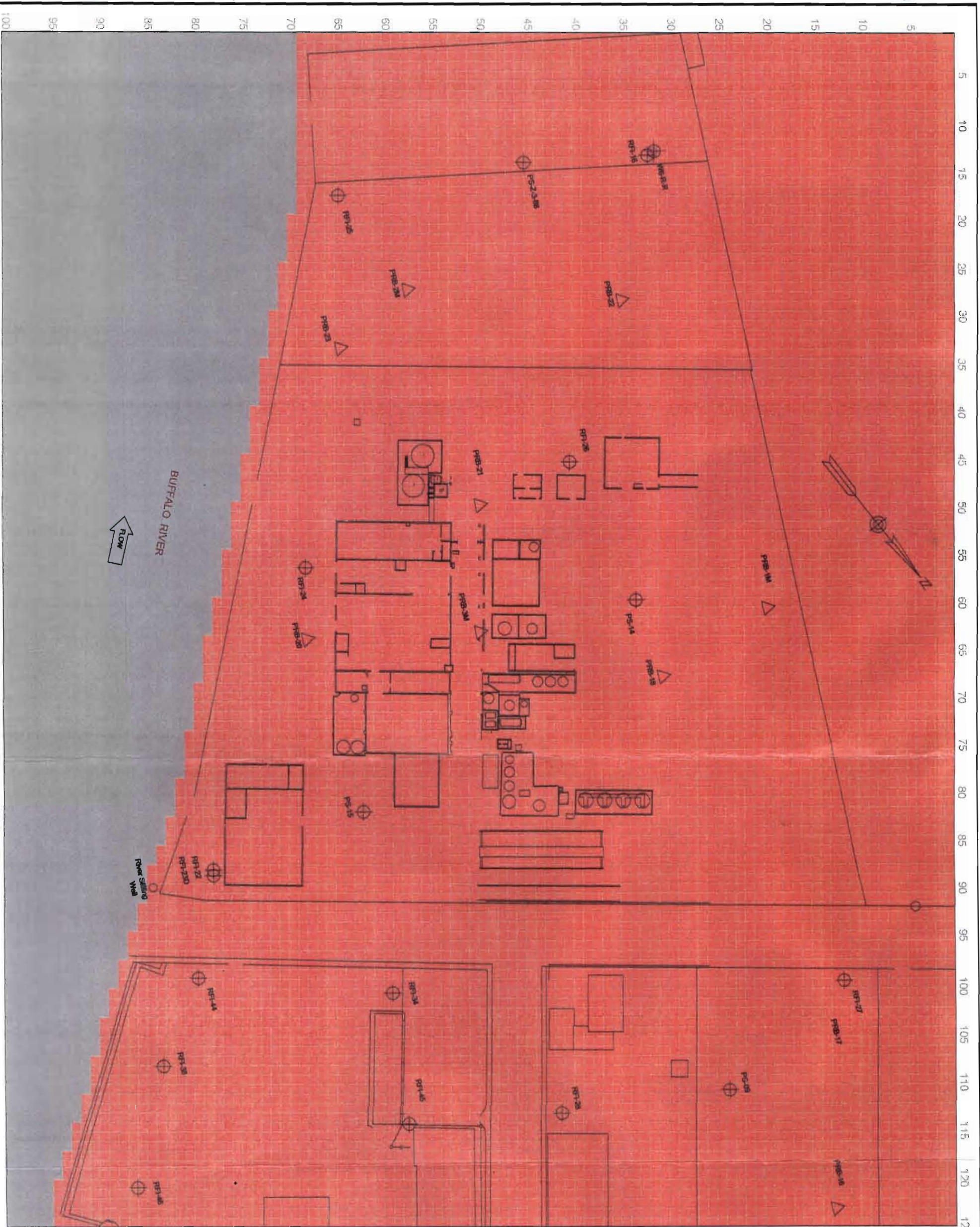
Figure B-6

Bottom Elevation Layer 3

Run BCC12
100 feet

Corrective Measures Study
Buffalo Color Corporation

Golder Associates



Legend

Hydraulic Conductivity
Zone Value

6 3.400

5 2.800e-002

4 9.920e-006

3 59.30

2 20.00

1 36.43

Figure B-7

Hydraulic Conductivity

Layer 1

Run BCC12

100 feet

Corrective Measures Study
Buffalo Color Corporation

Golder Associates



Legend

Hydraulic Conductivity
Zone Value

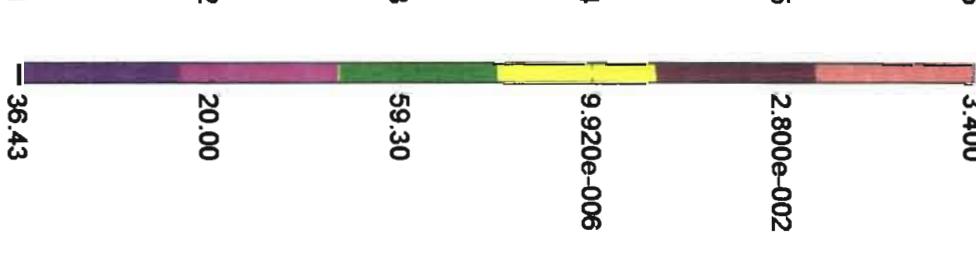


Figure B-8

Hydraulic Conductivity

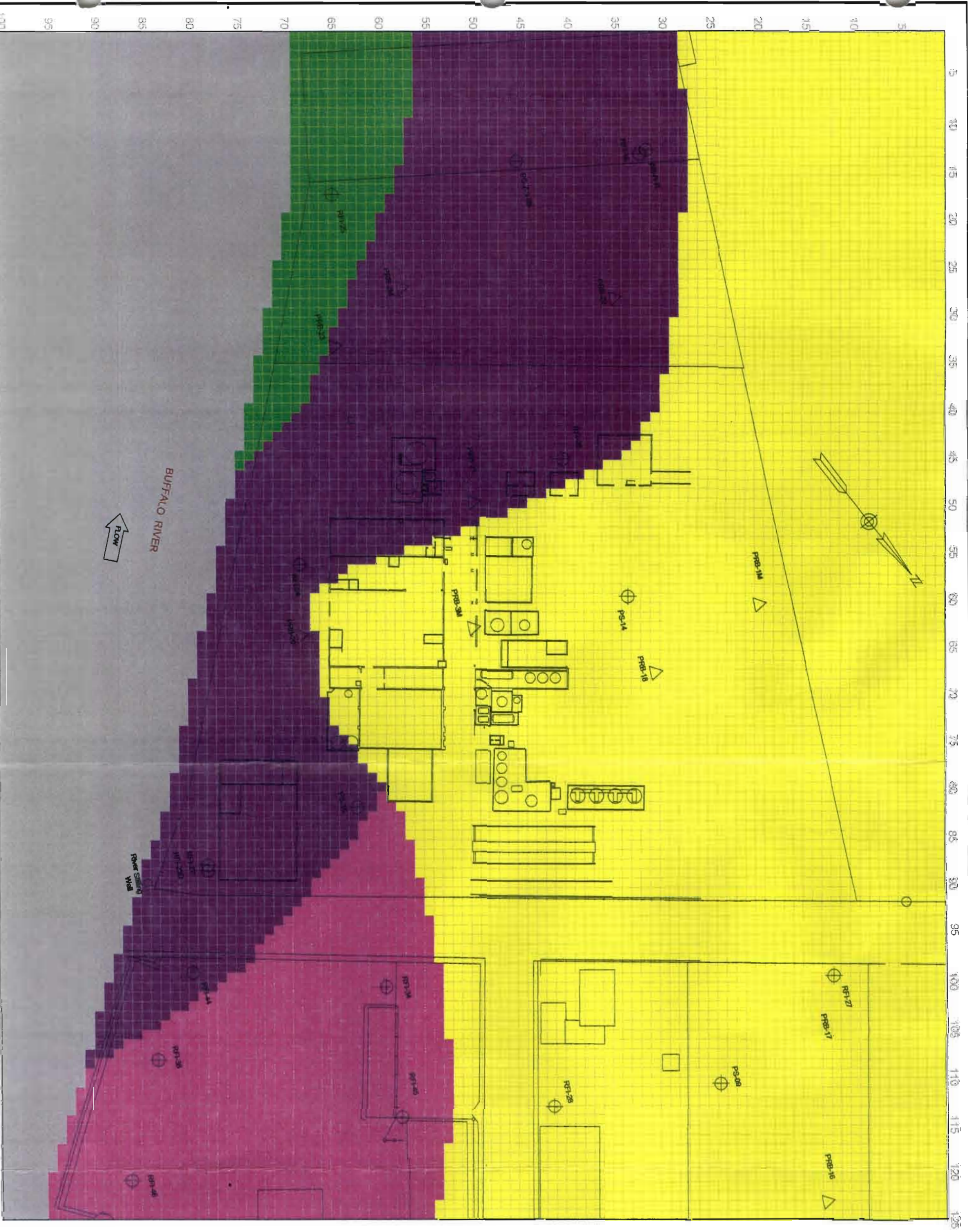
Layer 2

Run BCC12

100 feet

Corrective Measures Study
Buffalo Color Corporation

Golder Associates



Legend

Hydraulic Conductivity
Zone Value

6 3.400

5 2.800e-002

4 9.920e-006

3 59.30

2 20.00

1 36.43

Figure B-9

Hydraulic Conductivity

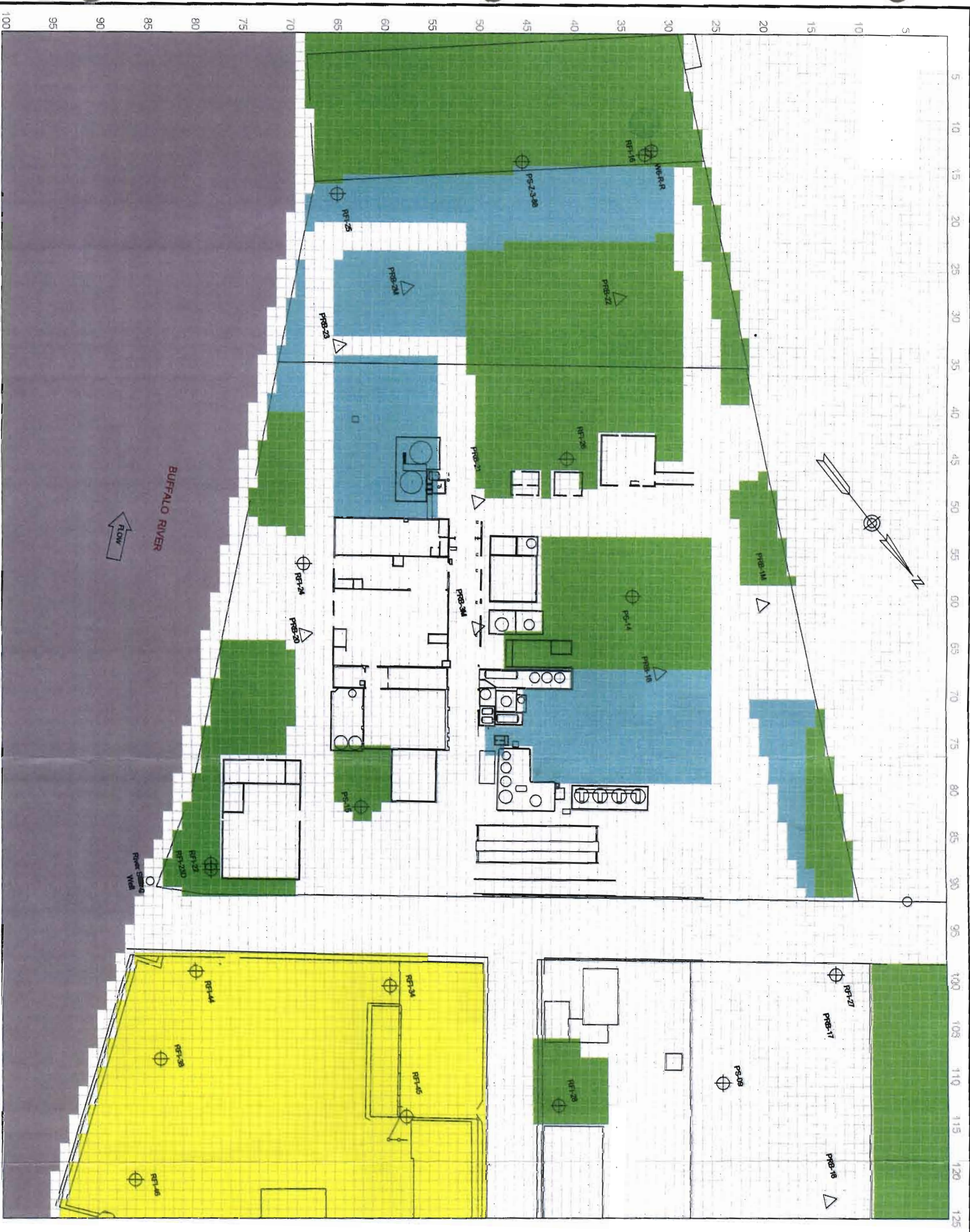
Layer 3

Run BCC12

100 feet

Corrective Measures Study
Buffalo Color Corporation

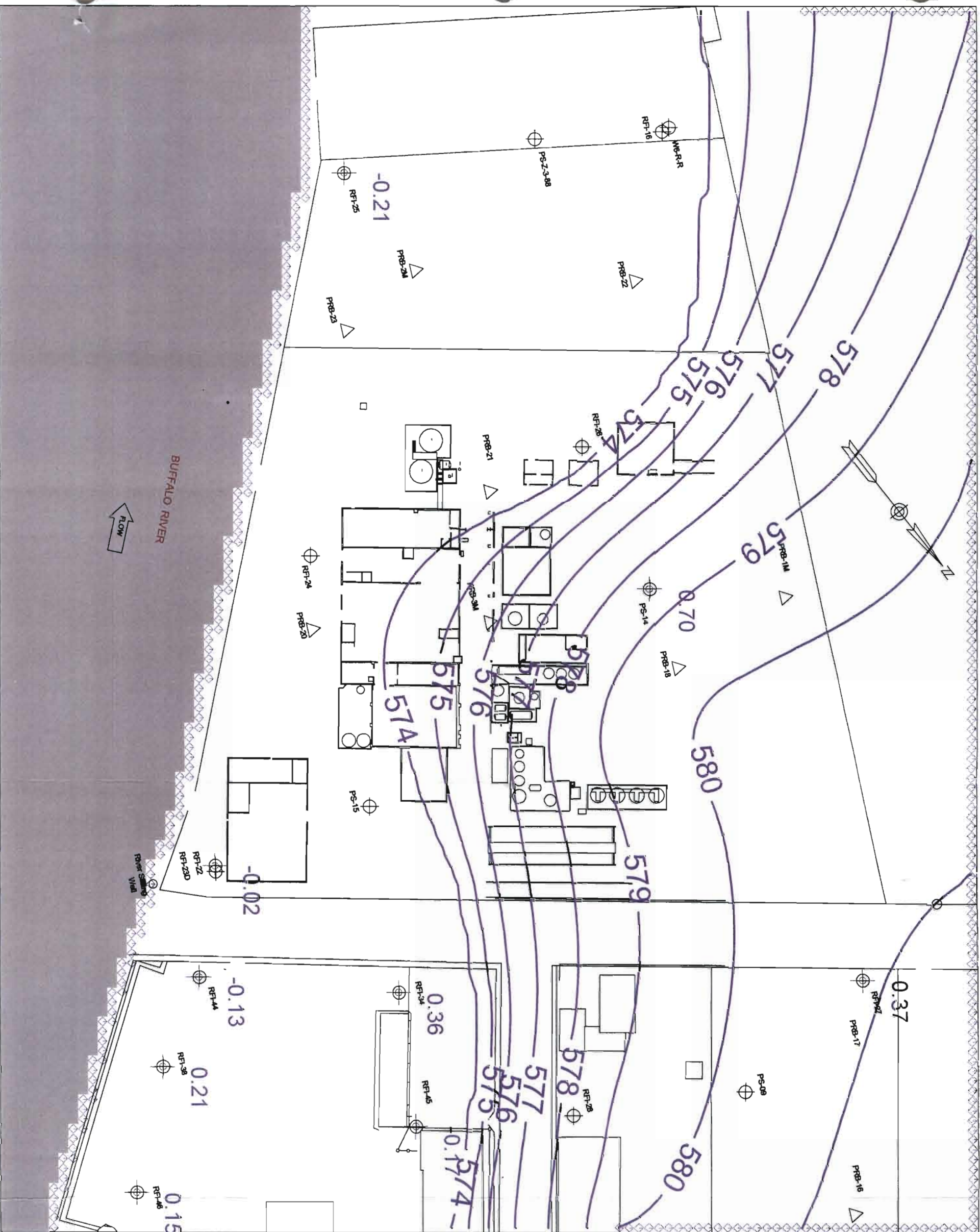
Golder Associates



Legend
 Recharge
 Zone Value
 4 0.000
 3 2.280e-003
 2 3.430e-003
 1 0.000

Figure B-10
Distribution of Recharge
Layer 1
 Run BCC12
 100 feet

Corrective Measures Study
Buffalo Color Corporation
Golder Associates



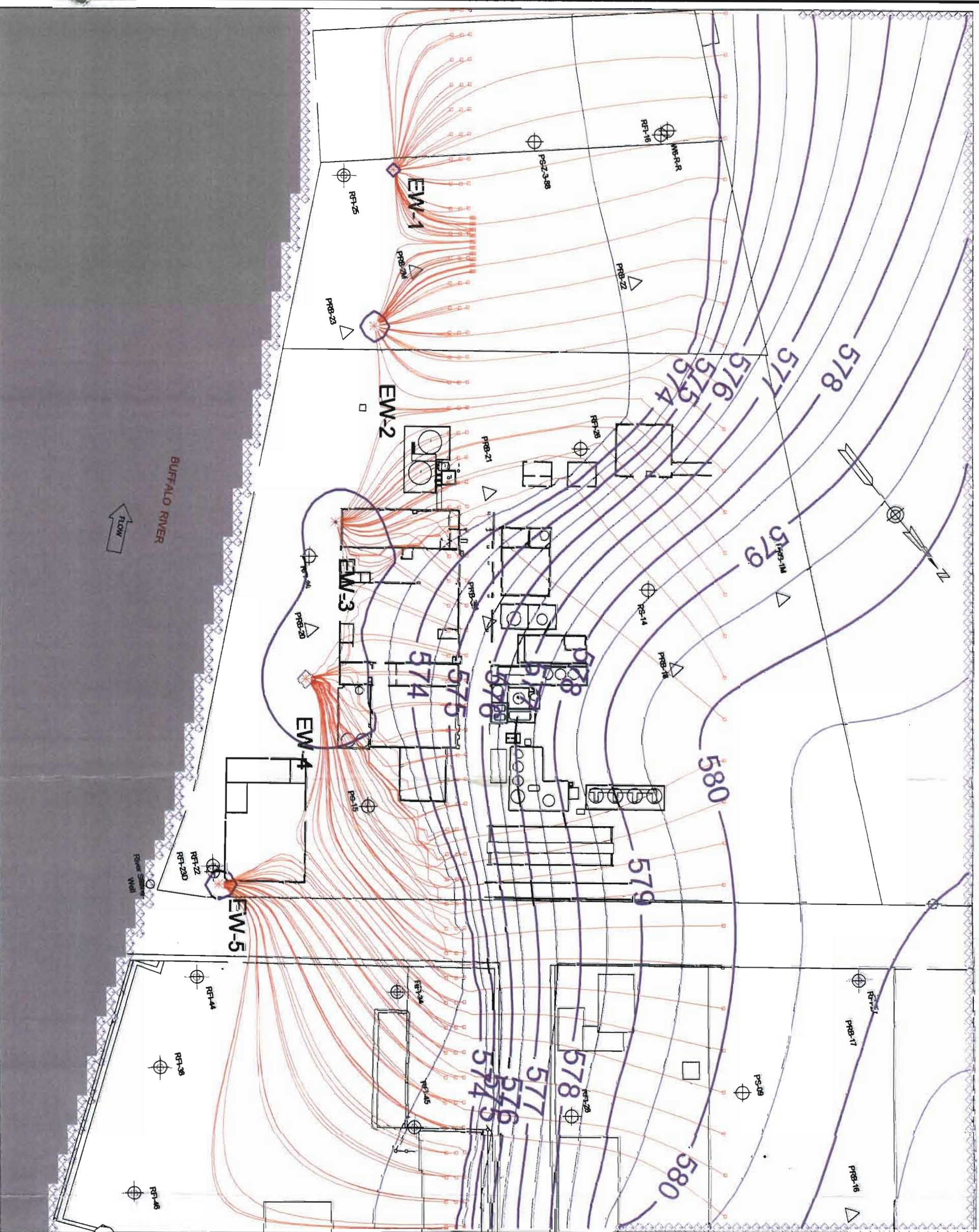


Figure B-12

**Simulated Hydraulic Heads and
Pathlines - Five wells (16gpm)**

Layer 2

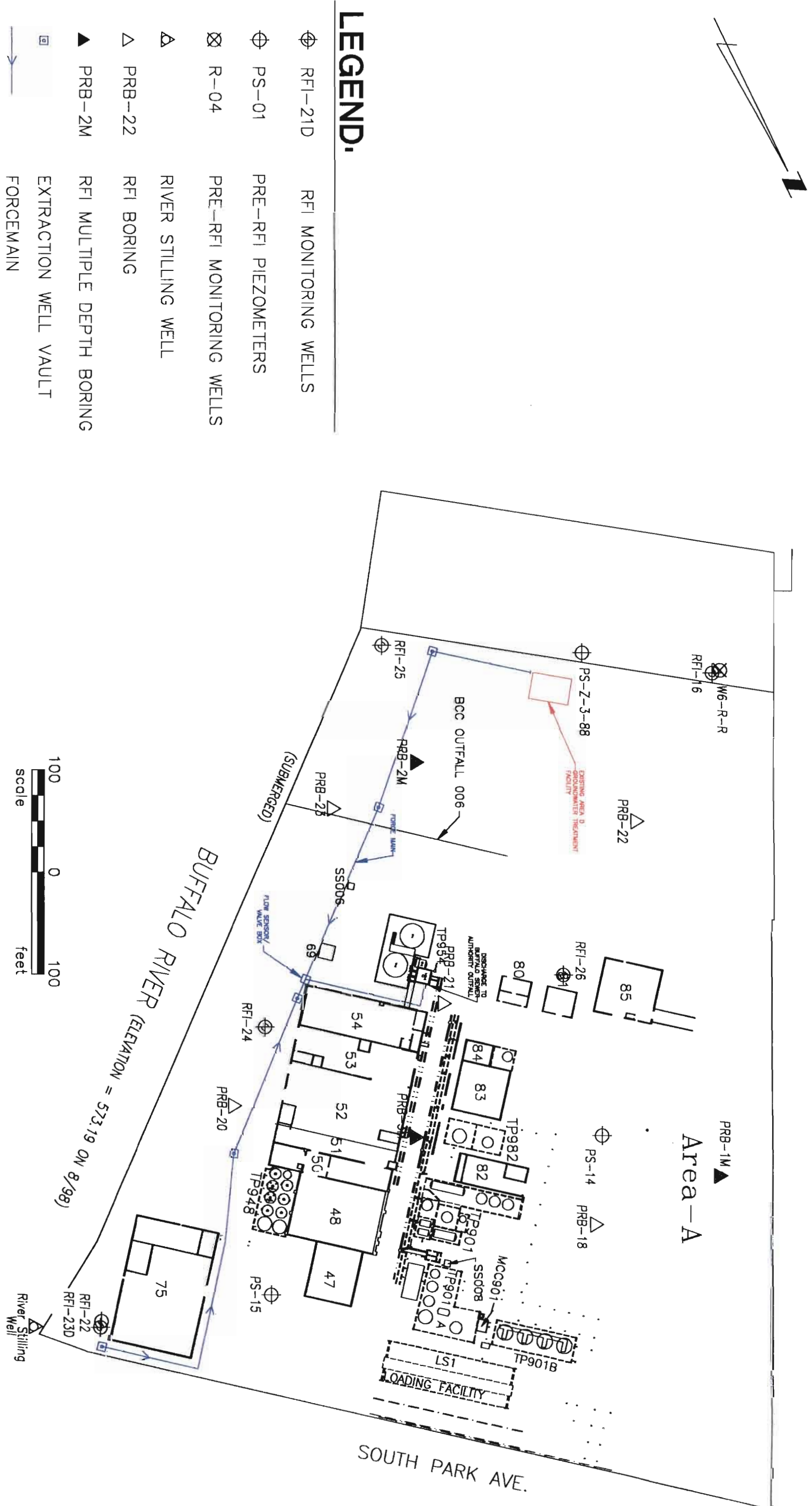
Run BCC24

100 feet

**Corrective Measures Study
Buffalo Color Corporation**

Golder Associates

Conrail Railroad



LEGEND.

- RFI-21D RFI MONITORING WELLS
- PS-01 PRE-RFI PIEZOMETERS
- R-04 PRE-RFI MONITORING WELLS
- PRB-22 RIVER STILLING WELL
- PRB-2M RFI BORING
- PRB-2M RFI MULTIPLE DEPTH BORING
- EXTRACTION WELL VAULT
- FORCEMAIN

 Golder Associates		Buffalo, New York	
CLIENT/PROJECT		TITLE	
AREA A - ALTERNATIVE 1		CONCEPTUAL LAYOUT	
GROUNDWATER CONTAMINANT SYSTEM		EXTRACTION WELLS	
DATE	11/18/99	JOB NO.	993-9206
SCALE	AS SHOWN	DWG. NO.	BCC-040
FILE NO.	993-9206	FIGURE NO.	B-13
CHECKED	DCW	DATE	11/18/99
REVIEWED	DJM	DATE	11/18/99

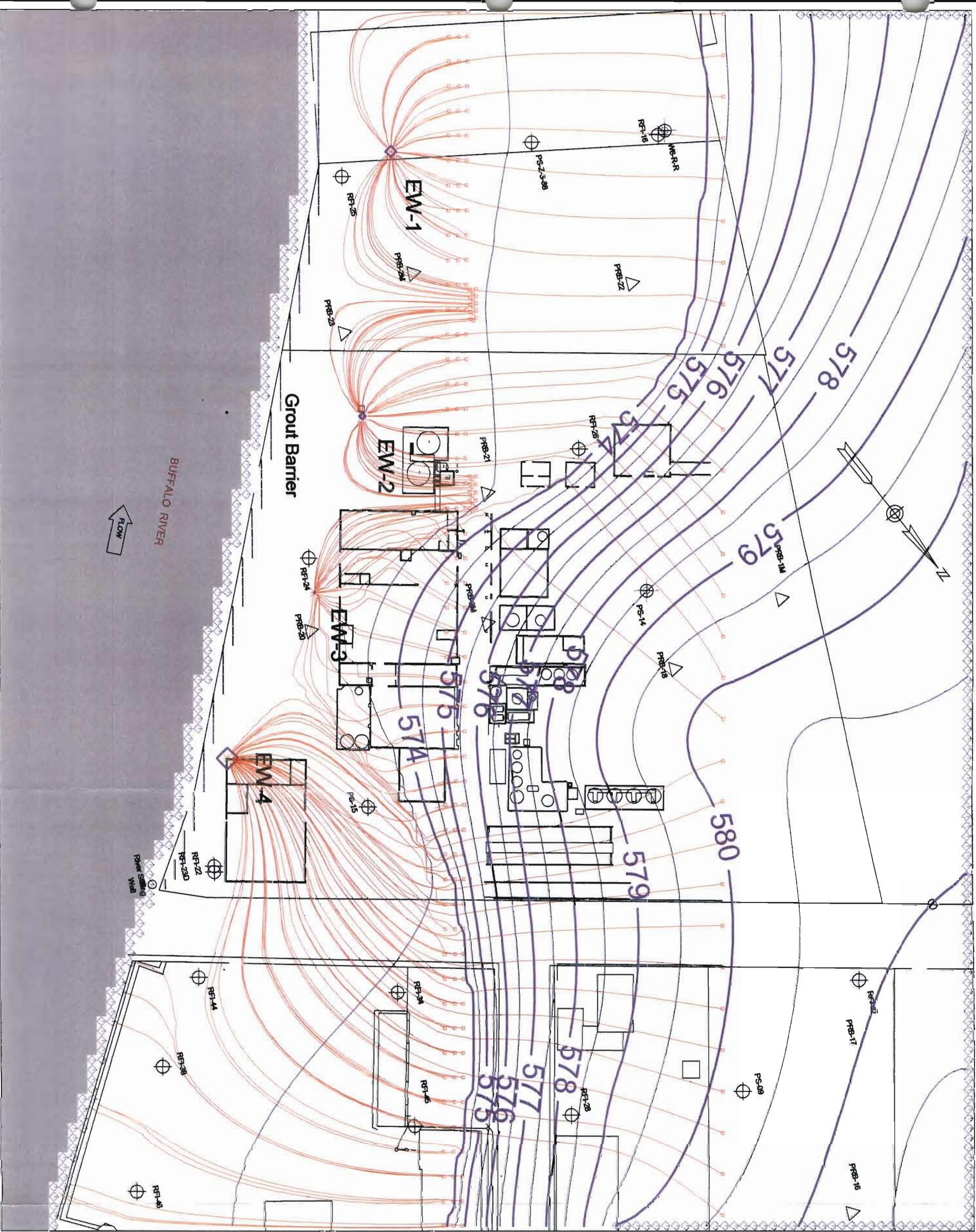


Figure B-14

**Simulated Hydraulic Heads and
Pathlines - Four wells (8gpm)
and Grout Barrier**

Layer 1

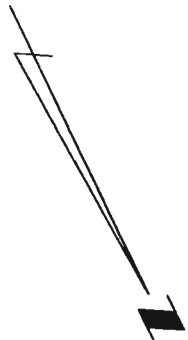
Run BCC27

100 feet

**Corrective Measures Study
Buffalo Color Corporation**

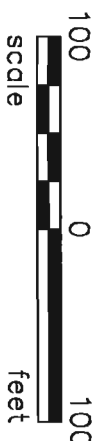
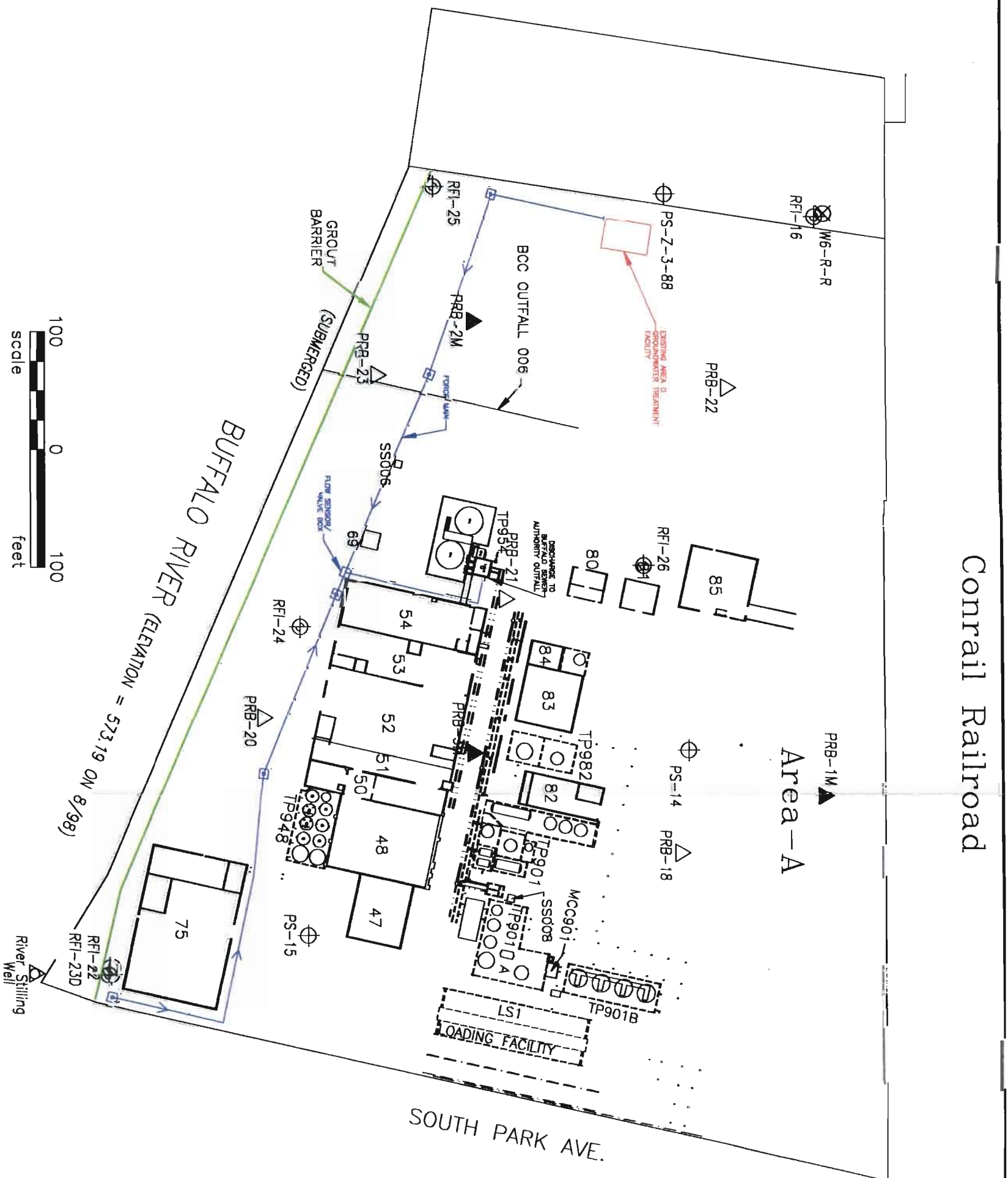
Golder Associates

Conrail Railroad



LEGEND.

- ⊕ RFI-21D RFI MONITORING WELLS
- ⊕ PS-01 PRE-RFI PIEZOMETERS
- ⊗ R-04 PRE-RFI MONITORING WELLS
- △ RIVER STILLING WELL
- △ PRB-22 RFI BORING
- ▲ PRB-2M RFI MULTIPLE DEPTH BORING
- ▣ EXTRACTION WELL VAULT
- FORCEMAIN
- GROUT BARRIER



CLIENT/PROJECT		TITLE	
 Golder Associates Buffalo, New York		CONCEPTUAL LAYOUT AREA A - ALTERNATIVE 1B EXTRACTION WELLS/GROUT BARRIER GROUNDWATER CONTAINMENT SYSTEM	
DRAWN	DATE	JOB NO.	993-9206
LPG	11/19/99		
CHECKED	SCALE	DWG. NO.	BCC-042
DCW	AS SHOWN		
REVIEWED	FILE NO.	FIGURE NO.	B-15
DJM	993-9206		

APPENDIX C

**GROUNDWATER MODELING OF
REMEDIAL ALTERNATIVES – AREA BCE**

TABLE C-1
HYDRAULIC CONDUCTIVITY SUMMARY
AREA BCE MODELING

WELL ID	HYDRAULIC CONDUCTIVITY (CM/SEC)	SCREENED UNIT
RFI-17	4.03×10^{-6}	UPPER TILLS
RFI-18	7.23×10^{-7}	UPPER TILLS
RFI-20	1.82×10^{-5}	UPPER TILLS
RFI-27	1.04×10^{-6}	UPPER TILLS
RFI-28	8.88×10^{-6}	FILL/UPPER TILLS
RFI-30	1.10×10^{-6}	UPPER TILLS
RFI-31	9.89×10^{-7}	UPPER TILLS
RFI-32	4.29×10^{-6}	UPPER TILLS
RFI-33	2.28×10^{-6}	UPPER TILLS
RFI-35	7.91×10^{-7}	UPPER TILLS
RFI-36	8.70×10^{-5}	UPPER TILLS
RFI-37	1.16×10^{-6}	UPPER TILLS
RFI-43	1.32×10^{-6}	UPPER TILLS

HYDRAULIC CONDUCTIVITY RANGE (CM/SEC)	HYDRAULIC CONDUCTIVITY GEOMETRIC MEAN (CM/SEC)	GEOLOGIC UNIT
8.70×10^{-5} to 7.23×10^{-7}	2.76×10^{-6}	UPPER TILLS

TABLE C-2
BUFFALO COLOR CORPORATION
SUMMARY OF GROUNDWATER ELEVATIONS
AUGUST 19-20, 1998 MONITORING EVENT

WELL NAME	TOP OF RISER ELEVATION (FT. MSL)	WATER LEVEL (FT. BTOR)	WATER LEVEL ELEVATION (FT. MSL)
BCC PRE-RFI MONITORING WELLS			
R-01	585.10	8.95	576.15
R-02	586.36	8.87	577.49
R-03	587.44	10.57	576.87
R-04	587.21	12.39	574.82
R-05	587.56	12.52	575.04
R-06	586.75	11.84	574.91
R-07	588.48	11.20	577.28
R-08	589.97	9.14	580.83
R-09	589.39	12.62	576.77
R-10	589.26	8.73	580.53
R-11	586.82	6.28	580.54
R-12	586.84	9.27	577.57
R-13	587.54	12.00	575.54
R-14	589.40	15.40	574.00
R-15	588.87	7.82	581.05
BCC PRE-RFI PIEZOMETERS			
PS-01-S	587.33	12.87	574.46
PS-01-N	585.92	12.11	573.81
PS-02-S	586.61	11.49	575.12
PS-02-N	587.38	13.55	573.83
PS-03-S	586.60	11.80	574.80
PS-03-N	586.93	12.76	574.17
PS-04	588.21	6.12	582.09
PS-05	587.86	5.23	582.63
PS-06	588.18	6.58	581.60
PS-07	587.47	5.85	581.62
PS-08	588.27	6.04	582.23
PS-09	588.33	6.71	581.62
PS-10	585.56	DRY	DRY
PS-11	586.17	4.99	581.18
PS-12	586.63	5.77	580.86
PS-13	586.39	4.07	582.32
PS-14	586.00	6.80	579.20
PS-15	587.76	7.65	580.11
W-6R-R	589.04	14.69	574.35

TABLE C-2
BUFFALO COLOR CORPORATION
SUMMARY OF GROUNDWATER ELEVATIONS
AUGUST 19-20, 1998 MONITORING EVENT

WELL NAME	TOP OF RISER ELEVATION (FT. MSL)	WATER LEVEL (FT. BTOR)	WATER LEVEL ELEVATION (FT. MSL)
BCC RFI MONITORING WELLS			
RFI-16	586.34	12.24	574.10
RFI-17	586.24	10.03	576.21
RFI-18	588.64	8.72	579.92
RFI-19D	588.78	14.76	574.02
RFI-20	588.03	5.98	582.05
RFI-21D	588.34	14.46	573.88
RFI-22	590.62	17.29	573.33
RFI-23D	590.88	17.18	573.70
RFI-24	584.11	10.48	573.63
RFI-25	586.76	13.32	573.44
RFI-26	587.84	14.36	573.48
RFI-27	587.52	6.41	581.11
RFI-28	588.60	8.68	579.92
RFI-29	586.33	6.34	579.99
RFI-30	588.04	7.85	580.19
RFI-31	588.37	7.64	580.73
RFI-32	586.95	5.73	581.22
RFI-33	583.04	1.72	581.32
RFI-34	586.17	12.49	573.68
RFI-35	584.77	4.57	580.20
RFI-36	587.90	5.35	582.55
RFI-37	583.84	1.42	582.42
RFI-38	582.76	9.22	573.54
RFI-39	585.29	8.66	576.63
RFI-40	585.78	13.00	572.78
RFI-41	585.40	12.65	572.75
RFI-42	582.89	4.88	578.01
RFI-43	587.01	6.72	580.29
RFI-44	583.27	10.38	572.89
RFI-45	583.18	9.63	573.55
RFI-46	582.72	9.40	573.32
RFI-47	582.88	9.45	573.43
RFI-48	583.00	9.69	573.31
RFI-49	586.17	11.98	574.19
RFI-50	581.82	8.95	572.87
RFI-51	587.41	5.77	581.64

TABLE C-2
 BUFFALO COLOR CORPORATION
 SUMMARY OF GROUNDWATER ELEVATIONS
 AUGUST 19-20, 1998 MONITORING EVENT

WELL NAME	TOP OF RISER ELEVATION (FT. MSL)	WATER LEVEL (FT. BTOR)	WATER LEVEL ELEVATION (FT. MSL)
BCC RFI PIEZOMETERS			
RFI-PZ-16	587.22	6.99	580.23
RFI-PZ-17	586.48	12.64	573.84
RFI-PZ-18	587.83	11.04	576.79
RFI-PZ-19	586.30	12.69	573.61
RFI-PZ-20	586.14	12.64	573.50
RFI-PZ-21	587.01	11.35	575.66
RFI-PZ-22	587.36	8.07	579.29
RFI-PZ-23	587.29	7.02	580.27
RFI-PZ-24	584.85	3.49	581.36
RFI-PZ-25	583.86	3.05	580.81
RFI-PZ-26	585.24	3.97	581.27
RFI-PZ-27	585.29	11.60	573.69
BCC RFI BUFFALO RIVER			
STILLING WELL	584.04	10.85	573.19

NOTES:

BTOR = Below top of riser.

DRY = No water present in well at time of measurement.

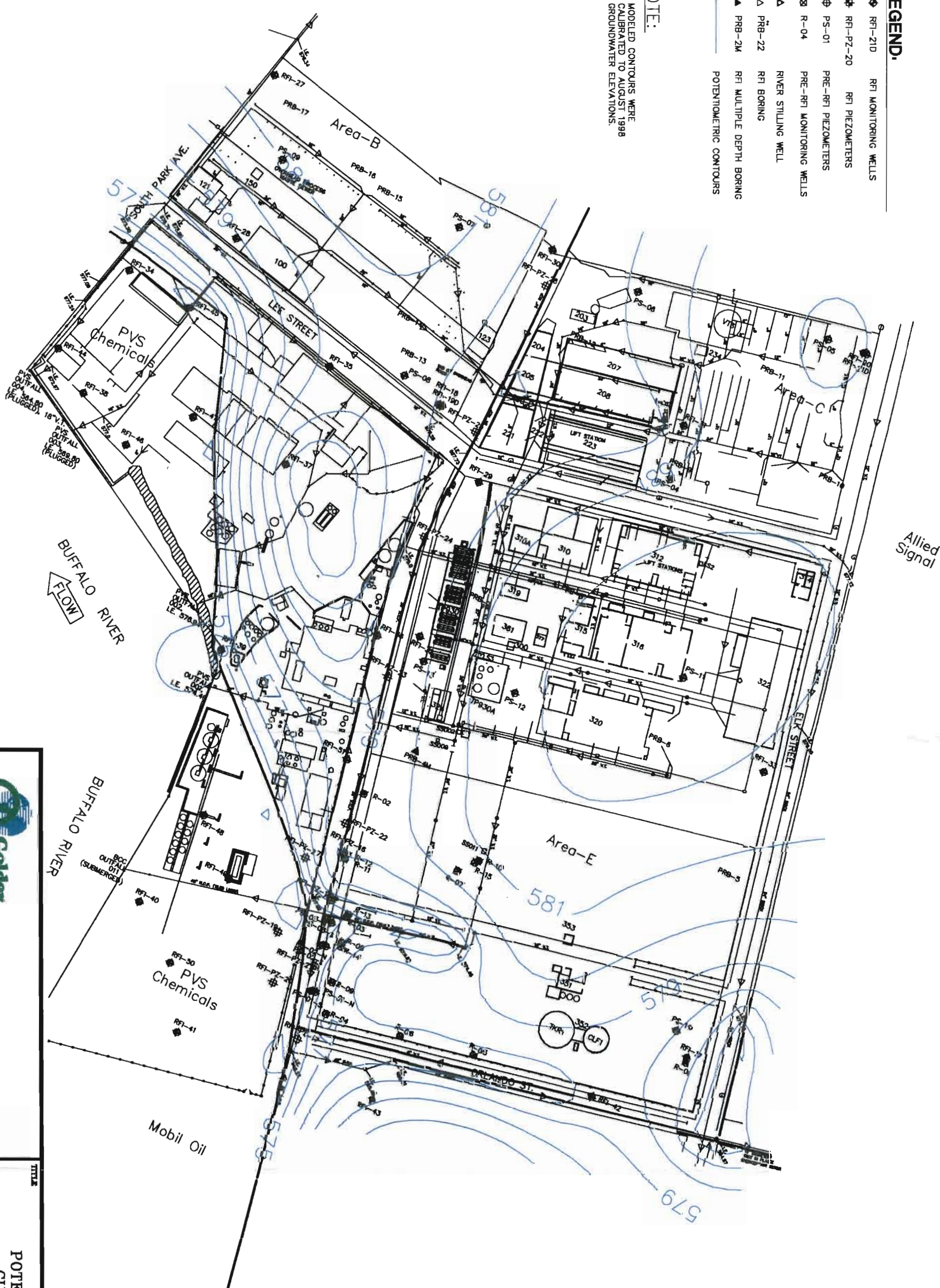
MSL = Mean sea level.

LEGEND.

- RFI-210 RFI MONITORING WELLS
- RFI-PZ-20 RFI PIEZOMETERS
- PS-01 PRE-RFI PIEZOMETERS
- R-04 PRE-RFI MONITORING WELLS
- RIVER STILLING WELL
- PRB-22 RFI BORING
- PRB-2M RFI MULTIPLE DEPTH BORING
- POTENTIOMETRIC CONTOURS

NOTE:

MODELED CONTOURS WERE
CALIBRATED TO AUGUST 1998
GROUNDWATER ELEVATIONS.



Buffalo, New York



MODELED

POTENTIOMETRIC SURFACE

CURRENT CONDITIONS

AREA B, C, E.

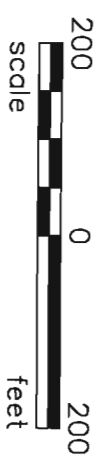
DESIGN	BEC	DATE	11/17/99	JOB NO.	993-9206
CHECKED	DCW	SCALE	AS SHOWN	DWG. NO.	BCC-031B
REVIEWED	DJM	FILE NO.	993-9206	FIGURE NO.	C-1

LEGEND.

- RFI-210 RFI MONITORING WELLS
- RFI-PZ-20 RFI PIEZOMETERS
- PS-01 PRE-RFI PIEZOMETERS
- R-04 PRE-RFI MONITORING WELLS
- RFI MONITORING WELLS
- RIVER STILLING WELL
- RFI BORING
- RFI MULTIPLE DEPTH BORING
- POTENTIOMETRIC CONTOURS
- PARTICLE PATHWAYS

NOTE:

MODELED CONTOURS WERE
CALIBRATED TO AUGUST 1998
GROUNDWATER ELEVATIONS.





Buffalo, New York

buffalo
CORPORATION

CLIENT/PROJECT

DESIGN	BEC	DATE	8/25/99	JOB NO.	993-9206
CHECKED	DCW	SCALE	AS SHOWN	DWG. NO.	BCC-031A
REVIEWED	DJM	FILE NO.	993-9206	FIGURE NO.	C-2

TITLE

**PARTICLE CAPTURE
CURRENT CONDITIONS
AREA B, C, E.**

Conrail Railroad

Area-D

Area-A

Area-B

Area-C

Area-E

BUFFALO RIVER (RANDOM = 372.18 ON 6/7/89)

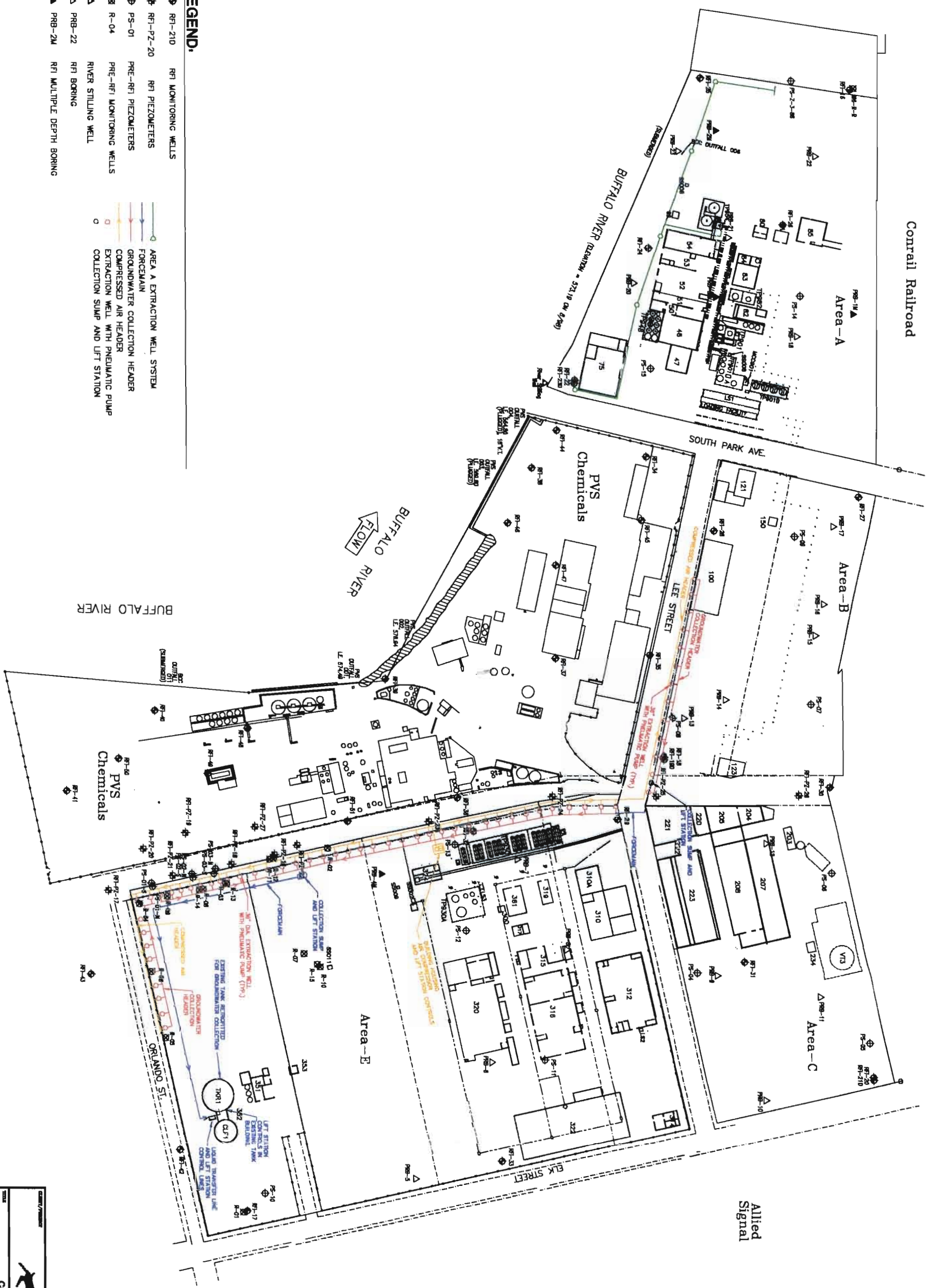
BUFFALO RIVER

BUFFALO RIVER

Mobil Oil

Allied Signal

- LEGEND.**
- RFI-210 RFI MONITORING WELLS
 - RFI-PZ-20 RFI PIEZOMETERS
 - PS-01 PRE-RFI PIEZOMETERS
 - R-04 PRE-RFI MONITORING WELLS
 - PRB-22 RIVER STILLING WELL
 - PRB-2M RFI BORING
 - PRB-2M RFI MULTIPLE DEPTH BORING
- AREA A EXTRACTION WELL SYSTEM
 - FORCEMAIN
 - GROUNDWATER COLLECTION HEADER
 - COMPRESSED AIR HEADER
 - EXTRACTION WELL WITH PNEUMATIC PUMP
 - COLLECTION SUMP AND LIFT STATION



REF.	DATE	DESCRIPTION	DR.	BY	APP.	ST.

buffalo
BLUE CORPORATION

CONCEPTUAL LAYOUT
AREA B, C, E - ALTERNATIVE 2A EXTRACTION WELLS
GROUNDWATER CONTAMINANT SYSTEM

Buffalo, New York

DATE: 8/28/89
DRAWN: A.S. BROWN
CHECKED: D.M.
PROJECT: C-3
SHEET NO.: 003-0304

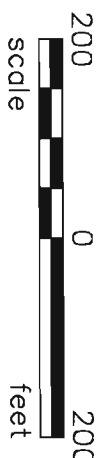
Golder Associates

LEGEND.

- RFI-21D RFI MONITORING WELLS
- RFI-PZ-20 RFI PIEZOMETERS
- PS-01 PRE-RFI PIEZOMETERS
- R-04 PRE-RFI MONITORING WELLS
- PRB-22 RIVER STILLING WELL
- PRB-2M RFI BORING
- PRB-2M RFI MULTIPLE DEPTH BORING
- POTENTIOMETRIC CONTOURS
- PARTICLE PATHWAYS
- EXTRACTION WELLS



DISCHARGE SUMMARY	
LEE ST.	PRENATT ST.
13 wells	47 wells
0.7 ft ³ /day	3.5 ft ³ /day
5.2 gal/day	26.2 gal/day
Total	
60 wells	
total well flow = 4.2 ft ³ /day or 31.4 gal/day	
Apply Factor of Safety of 3 to account for secondary porosity features, utility bedding drainage, surface infiltration and general aquifer heterogeneities that may possibly be encountered.	
∴ 3 x 31.4 gal/day ≈ 94.2 gal/day	



**Colter Associates**

**buffalo**
CHEMICAL CORPORATION

Buffalo, New York

TITLE	PARTICLE CAPTURE
AREA B, C, E. - ALTERNATIVE 2A	
EXTRACTION WELLS GROUNDWATER	
CONTAINMENT SYSTEM	
DRAWN	LPG
CHECKED	DCW
REVIEWED	DJM
DATE	11/16/99
SCALE	AS SHOWN
FILE NO.	993-9206
JOB NO.	993-9206
DWG. NO.	BCC-032B
FIGURE NO.	C-4

Area--D

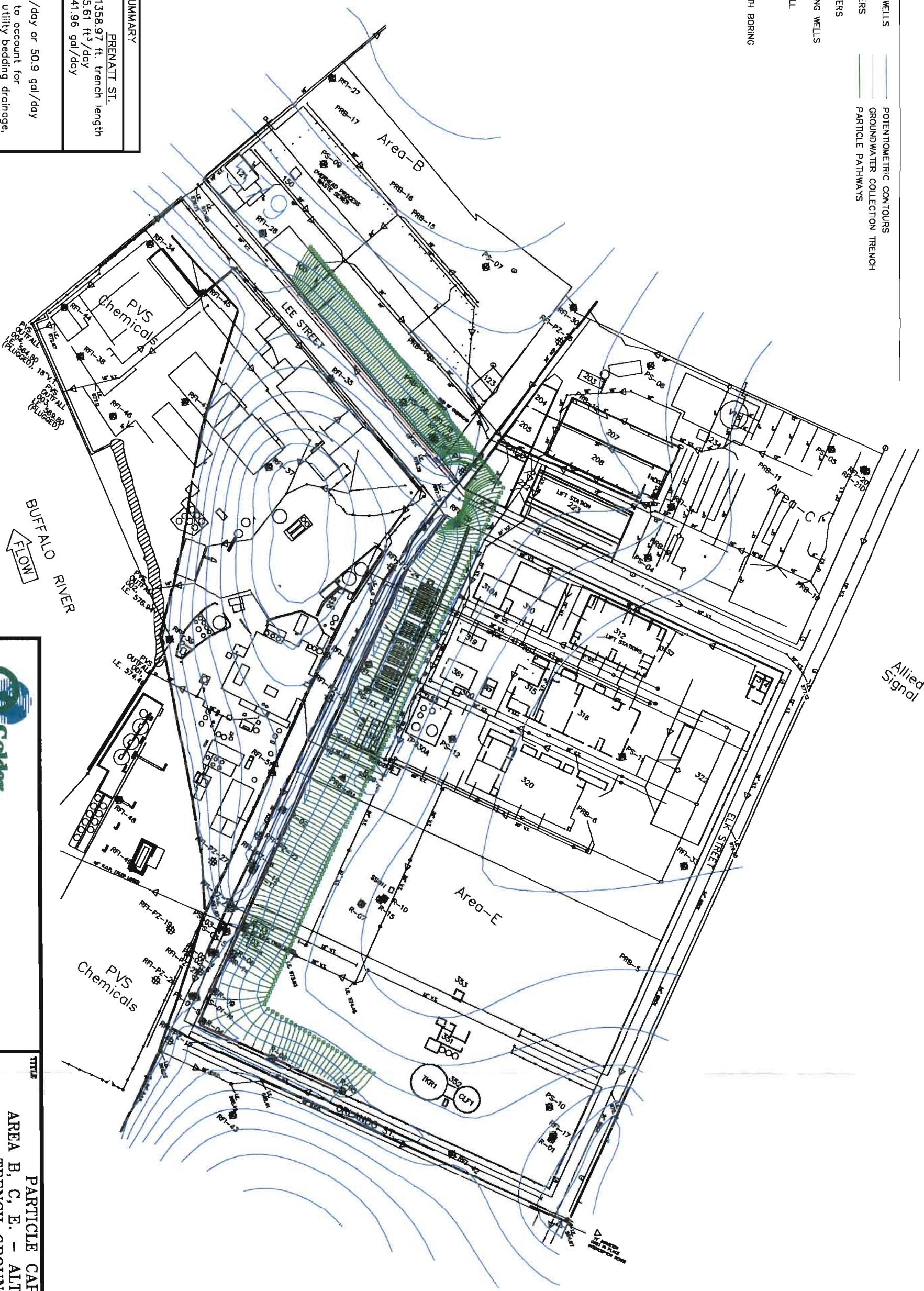


◆ RFI-21D	RFI MONITORING WELLS	○ COLLECTION SLUMP AND LIFT STATION
◆ RFI-PZ-20	RFI PIEZOMETERS	→ FORCEMAIN
◆ PS-01	PRE-RFI PIEZOMETERS	→ GROUNDWATER COLLECTION TRENCH
■ R-04	PRE-RFI MONITORING WELLS	→ AREA A EXTRACTION WELL SYSTEM
▲	RIVER STILLING WELL	
▲ PRB-22	RFI BORING	
▲ PRB-2M	RFI MULTIPLE DEPTH BORING	

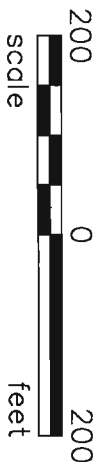
[illegible]

LEGEND.

- RFI-21D RFI MONITORING WELLS
- RFI-PZ-20 RFI PIEZOMETERS
- PS-01 PRE-RFI PIEZOMETERS
- R-04 PRE-RFI MONITORING WELLS
- PRB-22 RFI BORING
- PRB-2M RFI MULTIPLE DEPTH BORING
- POTENTIOMETRIC CONTOURS
- GROUNDWATER COLLECTION TRENCH
- PARTICLE PATHWAYS
- RIVER STILLING WELL



DISCHARGE SUMMARY	
LEE ST.	PRENATT ST.
500 ft. trench length	1358.97 ft. trench length
1.2 ft ³ /day	5.61 ft ³ /day
9.0 gal/day	41.96 gal/day
Total	
Total Trench Flow = 6.8 ³ ft /day or 50.9 gal/day	
Apply Factor of Safety of 3 to account for secondary porosity features, utility bedding drainage, surface infiltration and general aquifer heterogeneities that may possibly be encountered.	
∴ 3 x 50.9 gal/day ≈ 153 gal/day	



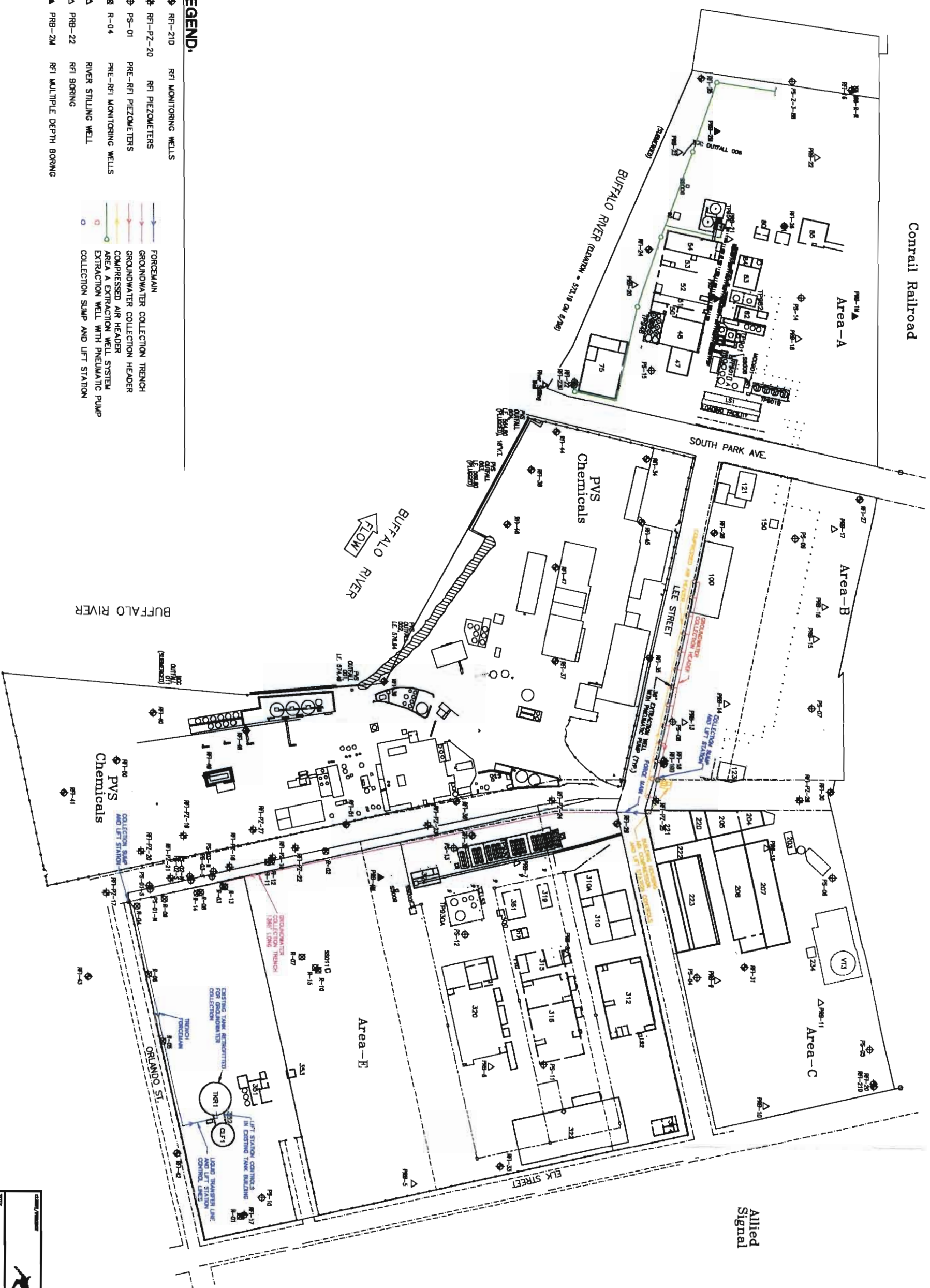
**Golden Associates**
Buffalo, New York

**buffalo**
COLOR CORPORATION

TITLE	PARTICLE CAPTURE AREA B, C, E. - ALTERNATIVE 2B TRENCH GROUNDWATER CONTAINMENT SYSTEM				
DRAWN	LPG	DATE	11/16/99	JOB NO.	993-9206
CHECKED	DCW	SCALE	AS SHOWN	DWG. NO.	BCC-033B
REVIEWED	DJM	FILE NO.	993-9206	FIGURE NO.	C-6

Conrail Railroad

Area-D



**Allied
Signal**



LEGEND:

◆ RFI-210	RFI MONITORING WELLS		FOREMAN
◆ RFI-PZ-20	RFI PIEZOMETERS		GROUNDWATER COLLECTION TRENCH
◆ PS-01	PRE-RFI PIEZOMETERS		GROUNDWATER COLLECTION HEADER
■ R-04	PRE-RFI MONITORING WELLS		COMPRESSED AIR HEADER
▲ PRB-22	RIVER STILING WELL		AREA A EXTRACTION WELL SYSTEM
▲ PRB-21	RIVER BORING		EXTRACTION WELL WITH PNEUMATIC PUMP
▲ PRB-2M	RFI MULTIPLE DEPTH BORING		COLLECTION SLUIC AND LIFT STATION

Mobil Oil

[illegible]

CONCEPTUAL LAYOUT

**AREA B, C, E - ALTERNATIVE 2C ENHANTIVE PERMEABILITY
EXTRACTION WELL AND TRENCH GROUNDWATER CONTAMINANT
SYSTEM**

Buffalo, New York

Golden Associates

DATE	REVISION	BY	DATE
	DCW	AS	8/25/05
	DLM	AS	8/25/05
	WMS, JR.	AS	8/25/05
DATE	BY	DATE	
8/25/05	WMS, JR.	8/25/05	

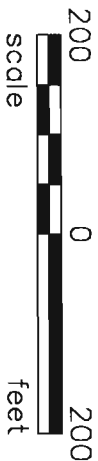
C-7

LEGEND.

- RFI-21D RFI MONITORING WELLS
- RFI-PZ-20 RFI PIEZOMETERS
- PS-01 PRE-RFI PIEZOMETERS
- R-04 PRE-RFI MONITORING WELLS
- R-04 RIVER STILLING WELL
- PRB-22 RFI BORING
- PRB-2M RFI MULTIPLE DEPTH BORING
- POTENTIOMETRIC CONTOURS
- GROUNDWATER COLLECTION TRENCH
- PARTICLE PATHWAYS
- EXTRACTION WELLS



DISCHARGE SUMMARY	
LEE ST.	PRENATT ST.
13 wells	1339.1 ft. trench length
0.7 ft ³ /day	5.5 ft ³ /day
5.2 gal/day	40.8 gal/day
Total	
Total Trench/Well Flow = 6.2 ft ³ /day or 46.4 gal/day	
Apply Factor of Safety of 3 to account for secondary porosity features, utility bedding drainage, surface infiltration and general aquifer heterogeneities that may possibly be encountered.	
∴ 3 x 46.4 gal/day ≈ 139 gal/day	





Gold
Associates



buffalo
COLOR CORPORATION

CLIENT /PROJECT

Buffalo, New York

TITLE	PARTICLE CAPTURE
AREA B, C, E, - ALTERNATIVE 2C	
EXTRACTION WELLS AND TRENCH	
GROUNDWATER CONTAINMENT SYSTEM	

DRAWN	IPG	DATE	11/16/99	JOB NO.	993-9206
CHECKED	DCW	SCALE	AS SHOWN	DWG. NO.	BCC-034B
REVIEWED	DJM	FILE NO.	993-9206	FIGURE NO.	C-8

APPENDIX C-1

**GROUNDWATER MODELING OF
REMEDIAL ALTERNATIVES – AREA BCE**

**Area BCE Existing Conditions
Modeling Summary**

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

=====
Date: 7/25/99
Time: 11:49:54.00

Input File: BCCPOND4.WFL
Map File : C:\WINFLOW\CURRENT\BCCCLEAN.MAP
=====

Model Entities

Number of Linesinks Defined by Infiltration Rate = 0

Number of Linesinks Defined by Head = 84

Line Sink #1

x1: 9455.809570 y1: 8852.379883
x2: 9532.019531 y2: 8919.309570

Discharge per length = 0.001135
Head in Center of Linesink = 573.999207
Total Linesink Discharge = 0.115082 [L3/T]

Line Sink #2

x1: 9758.330078 y1: 8921.110352
x2: 9856.000000 y2: 8920.000000
Discharge per length = 0.000290
Head in Center of Linesink = 573.999878
Total Linesink Discharge = 0.028352 [L3/T]

Line Sink #3

x1: 9933.679688 y1: 9097.740234
x2: 9962.000000 y2: 9176.000000
Discharge per length = 0.000749
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.062346 [L3/T]

Line Sink #4

x1: 10070.490234 y1: 9330.889648
x2: 10125.000000 y2: 9402.000000
Discharge per length = 0.001521
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.136244 [L3/T]

Line Sink #5

x1: 10243.269531 y1: 9391.910156
x2: 10352.000000 y2: 9380.000000
Discharge per length = 0.001576
Head in Center of Linesink = 573.999268
Total Linesink Discharge = 0.172409 [L3/T]

Line Sink #6

x1: 10466.790039 y1: 9379.070313
x2: 10570.000000 y2: 9384.000000
Discharge per length = 0.002030
Head in Center of Linesink = 573.999939
Total Linesink Discharge = 0.209740 [L3/T]

Line Sink #7

x1: 10676.169922 y1: 9380.349609
x2: 10766.000000 y2: 9374.000000
Discharge per length = 0.001045
Head in Center of Linesink = 573.999451
Total Linesink Discharge = 0.094093 [L3/T]

Line Sink #8

x1: 10958.150391 y1: 9452.929688
x2: 11058.000000 y2: 9493.280273
Discharge per length = 0.000877
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.094441 [L3/T]

Line Sink #9

x1: 11164.320313 y1: 9533.219727
x2: 11264.900391 y2: 9559.000000
Discharge per length = 0.001612
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.167339 [L3/T]

Line Sink #10

x1: 11274.799805 y1: 9557.620117

x2: 11375.000000 y2: 9548.629883
Discharge per length = 0.000221
Head in Center of Linesink = 573.999939
Total Linesink Discharge = 0.022231 [L3/T]

Line Sink #11

x1: 11798.269531 y1: 9458.070313
x2: 11910.019531 y2: 9429.009766
Discharge per length = 0.002059
Head in Center of Linesink = 573.999756
Total Linesink Discharge = 0.237769 [L3/T]

Line Sink #12

x1: 12250.440430 y1: 9339.889648
x2: 12379.919922 y2: 9307.370117
Discharge per length = 0.000616
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.082276 [L3/T]

Line Sink #13

x1: 12609.480469 y1: 9251.900391
x2: 12842.719727 y2: 9201.009766
Discharge per length = 0.000794
Head in Center of Linesink = 573.999878
Total Linesink Discharge = 0.189544 [L3/T]

Line Sink #14

x1: 9238.709961 y1: 8655.839844
x2: 9162.280273 y2: 8589.679688
Discharge per length = 0.000422
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.042667 [L3/T]

Line Sink #15

x1: 8799.389648 y1: 8269.179688
x2: 8743.000000 y2: 8212.000000
Discharge per length = 0.001376
Head in Center of Linesink = 573.999573
Total Linesink Discharge = 0.110474 [L3/T]

Line Sink #16

x1: 9305.000000 y1: 7620.000000
x2: 9499.110352 y2: 7798.709961
Discharge per length = 0.000560
Head in Center of Linesink = 573.999756
Total Linesink Discharge = 0.147634 [L3/T]

Line Sink #17

x1: 10618.910156 y1: 8563.019531
x2: 10893.000000 y2: 8655.000000
Discharge per length = 0.000072
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.020940 [L3/T]

Line Sink #18

x1: 11621.400391 y1: 8674.400391
x2: 11886.000000 y2: 8669.000000
Discharge per length = 0.000104
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.027532 [L3/T]

Line Sink #19

x1: 12429.190430 y1: 8627.009766
x2: 12836.000000 y2: 8598.000000
Discharge per length = 0.000463
Head in Center of Linesink = 573.999817
Total Linesink Discharge = 0.188829 [L3/T]

Line Sink #20

x1: 10298.349609 y1: 10053.889648
x2: 10275.230469 y2: 9945.990234
Discharge per length = 0.000324
Head in Center of Linesink = 579.000000
Total Linesink Discharge = 0.035753 [L3/T]

Line Sink #21

x1: 9915.799805 y1: 10113.259766
x2: 10032.509766 y2: 10055.139648
Discharge per length = 0.001336
Head in Center of Linesink = 578.999939
Total Linesink Discharge = 0.174251 [L3/T]

Line Sink #22

x1: 9803.790039 y1: 10170.790039
 x2: 9702.000000 y2: 10222.000000
 Discharge per length = 0.001938
 Head in Center of Linesink = 578.999878
 Total Linesink Discharge = 0.220827 [L3/T]
 Line Sink #23
 x1: 10341.650391 y1: 9900.759766
 x2: 10457.000000 y2: 9838.719727
 Discharge per length = 0.001092
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.143087 [L3/T]
 Line Sink #24
 x1: 10574.030273 y1: 9781.690430
 x2: 10679.879883 y2: 9750.730469
 Discharge per length = 0.002149
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.237053 [L3/T]
 Line Sink #25
 x1: 10795.110352 y1: 9720.509766
 x2: 10904.009766 y2: 9693.559570
 Discharge per length = 0.000925
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.103818 [L3/T]
 Line Sink #26
 x1: 11308.389648 y1: 9703.780273
 x2: 11284.879883 y2: 9601.769531
 Discharge per length = 0.001783
 Head in Center of Linesink = 575.399536
 Total Linesink Discharge = 0.186668 [L3/T]
 Line Sink #27
 x1: 11634.080078 y1: 10079.360352
 x2: 11606.690430 y2: 9965.889648
 Discharge per length = 0.002552
 Head in Center of Linesink = 576.999817
 Total Linesink Discharge = 0.297884 [L3/T]
 Line Sink #28
 x1: 11447.019531 y1: 10428.690430
 x2: 11581.000000 y2: 10397.530273
 Discharge per length = 0.002296
 Head in Center of Linesink = 575.000000
 Total Linesink Discharge = 0.315859 [L3/T]
 Line Sink #29
 x1: 11748.410156 y1: 10464.120117
 x2: 11704.809570 y2: 10284.269531
 Discharge per length = 0.001579
 Head in Center of Linesink = 574.999939
 Total Linesink Discharge = 0.292201 [L3/T]
 Line Sink #30
 x1: 11243.259766 y1: 9603.580078
 x2: 11342.610352 y2: 9578.759766
 Discharge per length = 0.000844
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.086401 [L3/T]
 Line Sink #31
 x1: 9013.269531 y1: 8457.370117
 x2: 9089.059570 y2: 8525.450195
 Discharge per length = 0.000394
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.040099 [L3/T]
 Line Sink #32
 x1: 9089.059570 y1: 8526.740234
 x2: 9159.709961 y2: 8588.400391
 Discharge per length = 0.000400
 Head in Center of Linesink = 573.999878
 Total Linesink Discharge = 0.037514 [L3/T]
 Line Sink #33
 x1: 9009.419922 y1: 8452.230469
 x2: 8938.759766 y2: 8398.280273
 Discharge per length = 0.000433
 Head in Center of Linesink = 573.999878
 Total Linesink Discharge = 0.038486 [L3/T]
 Line Sink #34
 x1: 8870.679688 y1: 8337.900391
 x2: 8936.190430 y2: 8394.419922
 Discharge per length = 0.000496
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.042891 [L3/T]
 Line Sink #35
 x1: 8801.959961 y1: 8269.179688
 x2: 8868.759766 y2: 8335.969727
 Discharge per length = 0.000600
 Head in Center of Linesink = 573.999817
 Total Linesink Discharge = 0.056633 [L3/T]
 Line Sink #36
 x1: 9242.559570 y1: 8657.120117
 x2: 9319.639648 y2: 8726.490234
 Discharge per length = 0.000465
 Head in Center of Linesink = 573.999817
 Total Linesink Discharge = 0.048245 [L3/T]
 Line Sink #37
 x1: 9322.209961 y1: 8727.780273
 x2: 9385.150391 y2: 8788.150391
 Discharge per length = 0.000556
 Head in Center of Linesink = 573.999817
 Total Linesink Discharge = 0.048462 [L3/T]
 Line Sink #38
 x1: 9386.440430 y1: 8789.440430
 x2: 9453.240234 y2: 8851.099609
 Discharge per length = 0.000707
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.064264 [L3/T]
 Line Sink #39
 x1: 9541.230469 y1: 8919.830078
 x2: 9636.290039 y2: 8921.110352
 Discharge per length = 0.001168

Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.111001 [L3/T]
 Line Sink #40
 x1: 9641.429688 y1: 8919.830078
 x2: 9753.190430 y2: 8919.830078
 Discharge per length = 0.000657
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.073400 [L3/T]
 Line Sink #41
 x1: 9857.879883 y1: 8917.900391
 x2: 9896.419922 y2: 9003.959961
 Discharge per length = 0.000236
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.022282 [L3/T]
 Line Sink #42
 x1: 9895.139648 y1: 9006.530273
 x2: 9931.110352 y2: 9093.889648
 Discharge per length = 0.000544
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.051366 [L3/T]
 Line Sink #43
 x1: 9961.299805 y1: 9176.740234
 x2: 10012.679688 y2: 9252.530273
 Discharge per length = 0.000919
 Head in Center of Linesink = 573.999756
 Total Linesink Discharge = 0.084139 [L3/T]
 Line Sink #44
 x1: 10013.959961 y1: 9252.530273
 x2: 10070.490234 y2: 9328.320313
 Discharge per length = 0.000969
 Head in Center of Linesink = 573.999878
 Total Linesink Discharge = 0.091637 [L3/T]
 Line Sink #45
 x1: 10128.290039 y1: 9404.110352
 x2: 10234.269531 y2: 9391.910156
 Discharge per length = 0.001604
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.171154 [L3/T]
 Line Sink #46
 x1: 10356.309570 y1: 9379.070313
 x2: 10459.080078 y2: 9379.070313
 Discharge per length = 0.001955
 Head in Center of Linesink = 574.000061
 Total Linesink Discharge = 0.200888 [L3/T]
 Line Sink #47
 x1: 10573.410156 y1: 9384.209961
 x2: 10671.040039 y2: 9381.639648
 Discharge per length = 0.001689
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.164937 [L3/T]
 Line Sink #48
 x1: 10768.030273 y1: 9375.860352
 x2: 10857.950195 y2: 9411.820313
 Discharge per length = 0.000873
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.084570 [L3/T]
 Line Sink #49
 x1: 10859.230469 y1: 9413.110352
 x2: 10954.290039 y2: 9450.360352
 Discharge per length = 0.000880
 Head in Center of Linesink = 573.999573
 Total Linesink Discharge = 0.089851 [L3/T]
 Line Sink #50
 x1: 11061.559570 y1: 9494.679688
 x2: 11160.469727 y2: 9530.650391
 Discharge per length = 0.001238
 Head in Center of Linesink = 573.999207
 Total Linesink Discharge = 0.130321 [L3/T]
 Line Sink #51
 x1: 11378.849609 y1: 9547.349609
 x2: 11468.769531 y2: 9534.500000
 Discharge per length = 0.000898
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.081567 [L3/T]
 Line Sink #52
 x1: 11471.339844 y1: 9533.219727
 x2: 11549.700195 y2: 9521.650391
 Discharge per length = 0.001216
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.096320 [L3/T]
 Line Sink #53
 x1: 11554.200195 y1: 9519.730469
 x2: 11667.240234 y2: 9492.750000
 Discharge per length = 0.001320
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.153403 [L3/T]
 Line Sink #54
 x1: 11671.089844 y1: 9490.190430
 x2: 11793.129883 y2: 9459.360352
 Discharge per length = 0.001958
 Head in Center of Linesink = 573.999023
 Total Linesink Discharge = 0.246500 [L3/T]
 Line Sink #55
 x1: 11913.879883 y1: 9427.250000
 x2: 12014.080078 y2: 9400.269531
 Discharge per length = 0.001595
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.165544 [L3/T]
 Line Sink #56
 x1: 12019.200195 y1: 9398.980469
 x2: 12124.530273 y2: 9370.719727
 Discharge per length = 0.001143
 Head in Center of Linesink = 573.999878
 Total Linesink Discharge = 0.124682 [L3/T]
 Line Sink #57

x1: 12129.690430 y1: 9369.440430
 x2: 12244.019531 y2: 9342.459961
 Discharge per length = 0.000829
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.097418 [L3/T]
 Line Sink #58
 x1: 12383.389648 y1: 9304.559570
 x2: 12605.629883 y2: 9253.179688
 Discharge per length = 0.000465
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.106119 [L3/T]
 Line Sink #59
 x1: 9501.480469 y1: 7801.080078
 x2: 9698.190430 y2: 7983.569824
 Discharge per length = 0.000191
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.051245 [L3/T]
 Line Sink #60
 x1: 9702.929688 y1: 7988.310059
 x2: 9885.410156 y2: 8158.950195
 Discharge per length = 0.000132
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.032922 [L3/T]
 Line Sink #61
 x1: 9892.519531 y1: 8163.689941
 x2: 10103.450195 y2: 8334.320313
 Discharge per length = 0.000094
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.025610 [L3/T]
 Line Sink #62
 x1: 10111.750000 y1: 8335.509766
 x2: 10365.330078 y2: 8463.480469
 Discharge per length = 0.000081
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.022907 [L3/T]
 Line Sink #63
 x1: 10370.070313 y1: 8461.110352
 x2: 10611.799805 y2: 8560.650391
 Discharge per length = 0.000080
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.020964 [L3/T]
 Line Sink #64
 x1: 10896.200195 y1: 8655.440430
 x2: 11206.660156 y2: 8672.030273
 Discharge per length = 0.000076
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.023504 [L3/T]
 Line Sink #65
 x1: 11216.139648 y1: 8669.660156
 x2: 11607.179688 y2: 8676.769531
 Discharge per length = 0.000093
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.036397 [L3/T]
 Line Sink #66
 x1: 11891.209961 y1: 8667.299805
 x2: 12412.599609 y2: 8627.009766
 Discharge per length = 0.000138
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.071974 [L3/T]
 Line Sink #67
 x1: 9805.070313 y1: 10169.500000
 x2: 9914.259766 y2: 10116.830078
 Discharge per length = 0.001321
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.160115 [L3/T]
 Line Sink #68
 x1: 10035.009766 y1: 10050.040039
 x2: 10145.490234 y2: 9997.370117
 Discharge per length = 0.001123
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.137429 [L3/T]
 Line Sink #69
 x1: 10148.059570 y1: 9996.089844
 x2: 10254.679688 y2: 9944.700195
 Discharge per length = 0.000693
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.082062 [L3/T]
 Line Sink #70
 x1: 10298.349609 y1: 10057.750000
 x2: 10320.190430 y2: 10156.660156
 Discharge per length = 0.000815
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.082534 [L3/T]
 Line Sink #71
 x1: 10342.030273 y1: 10256.860352
 x2: 10320.190430 y2: 10157.950195
 Discharge per length = 0.002291
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.232024 [L3/T]
 Line Sink #72
 x1: 10257.250000 y1: 9940.849609
 x2: 10336.889648 y2: 9902.309570
 Discharge per length = 0.000644
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.056937 [L3/T]
 Line Sink #73
 x1: 10458.290039 y1: 9836.150391
 x2: 10571.330078 y2: 9783.490234
 Discharge per length = 0.001730
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.215740 [L3/T]
 Line Sink #74
 x1: 10681.169922 y1: 9749.440430
 x2: 10792.929688 y2: 9721.179688
 Discharge per length = 0.001757

Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.202498 [L3/T]
 Line Sink #75
 x1: 10906.580078 y1: 9692.280273
 x2: 11014.490234 y2: 9664.019531
 Discharge per length = 0.000114
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.012729 [L3/T]
 Line Sink #76
 x1: 11017.059570 y1: 9661.450195
 x2: 11126.250000 y2: 9635.759766
 Discharge per length = -0.000461
 Head in Center of Linesink = 579.000122
 Total Linesink Discharge = -0.051662 [L3/T]
 Line Sink #77
 x1: 11130.099609 y1: 9633.190430
 x2: 11240.580078 y2: 9604.929688
 Discharge per length = -0.002730
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.311310 [L3/T]
 Line Sink #78
 x1: 11309.309570 y1: 9705.769531
 x2: 11327.290039 y2: 9787.980469
 Discharge per length = 0.003132
 Head in Center of Linesink = 575.499939
 Total Linesink Discharge = 0.263570 [L3/T]
 Line Sink #79
 x1: 11327.290039 y1: 9791.839844
 x2: 11347.839844 y2: 9871.480469
 Discharge per length = 0.004784
 Head in Center of Linesink = 575.499451
 Total Linesink Discharge = 0.393460 [L3/T]
 Line Sink #80
 x1: 11502.000000 y1: 9540.059570
 x2: 11527.690430 y2: 9636.400391
 Discharge per length = -0.000775
 Head in Center of Linesink = 577.000061
 Total Linesink Discharge = -0.077275 [L3/T]
 Line Sink #81
 x1: 11526.410156 y1: 9640.250000
 x2: 11549.530273 y2: 9735.309570
 Discharge per length = 0.001870
 Head in Center of Linesink = 577.000000
 Total Linesink Discharge = 0.182899 [L3/T]
 Line Sink #82
 x1: 11550.809570 y1: 9737.879883
 x2: 11576.500000 y2: 9841.929688
 Discharge per length = 0.002533
 Head in Center of Linesink = 576.999939
 Total Linesink Discharge = 0.271448 [L3/T]
 Line Sink #83
 x1: 11577.139648 y1: 9846.429688
 x2: 11606.690430 y2: 9962.040039
 Discharge per length = 0.002651
 Head in Center of Linesink = 576.999817
 Total Linesink Discharge = 0.316371 [L3/T]
 Line Sink #84
 x1: 11586.139648 y1: 10396.240234
 x2: 11710.740234 y2: 10365.410156
 Discharge per length = 0.001029
 Head in Center of Linesink = 574.999878
 Total Linesink Discharge = 0.132130 [L3/T]

Number of Ponds = 10

Pond #1
 Center of Pond -- x: 9863.690430 y: 9771.309570
 Radius = 357.489990
 Infiltration Rate = 0.000002
 Head at Center of Pond = 581.600098
 Total Pond Flux = 0.987672 [L3/T]
 Pond #2
 Center of Pond -- x: 10779.519531 y: 10159.440430
 Radius = 330.489990
 Infiltration Rate = 0.000003
 Head at Center of Pond = 582.422241
 Total Pond Flux = 0.936762 [L3/T]
 Pond #3
 Center of Pond -- x: 11295.660156 y: 9892.900391
 Radius = 240.630005
 Infiltration Rate = 0.000005
 Head at Center of Pond = 579.467957
 Total Pond Flux = 0.993212 [L3/T]
 Pond #4
 Center of Pond -- x: 9461.429688 y: 9236.889648
 Radius = 292.000000
 Infiltration Rate = 0.000002
 Head at Center of Pond = 580.845703
 Total Pond Flux = 0.658947 [L3/T]
 Pond #5
 Center of Pond -- x: 10127.879883 y: 10456.309570
 Radius = 196.600006
 Infiltration Rate = 0.000003
 Head at Center of Pond = 581.804138
 Total Pond Flux = 0.331497 [L3/T]
 Pond #6
 Center of Pond -- x: 11860.480469 y: 9758.450195
 Radius = 254.770004
 Infiltration Rate = 0.000011
 Head at Center of Pond = 583.102844
 Total Pond Flux = 2.222660 [L3/T]
 Pond #7
 Center of Pond -- x: 10427.480469 y: 9572.870117
 Radius = 70.000000

Infiltration Rate = 0.000055
Head at Center of Pond = 582.839233
Total Pond Flux = 0.840502 [L3/T]
Pond #8
Center of Pond -- x: 10600.910156 y: 9607.610352
Radius = 70.000000
Infiltration Rate = 0.000041
Head at Center of Pond = 582.300720
Total Pond Flux = 0.629607 [L3/T]
Pond #9
Center of Pond -- x: 10761.839844 y: 9620.469727
Radius = 40.000000
Infiltration Rate = 0.000041
Head at Center of Pond = 580.448120
Total Pond Flux = 0.206088 [L3/T]
Pond #10
Center of Pond -- x: 11421.280273 y: 9700.990234
Radius = 64.430000
Infiltration Rate = 0.000027
Head at Center of Pond = 578.759521
Total Pond Flux = 0.356032 [L3/T]

Number of Wells = 0

Reference Head = 582.000000 Defined at -- x: 10200.940430 y: 10653.509766

Permeability.....= 0.007820 [L/T]
Porosity.....= 0.100000
Elevation of Aquifer Top....= 585.000000
Elevation of Aquifer Bottom..= 572.800000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000
Recharge.....= 0.000000

Contour Matrix

Number of nodes in the X-direction = 100
Number of nodes in the Y-direction = 100

Minimum X Coordinate = 9025.477979
Minimum Y Coordinate = 8203.024170

Maximum X Coordinate = 11901.302297
Maximum Y Coordinate = 10901.187749

Minimum Head = 573.732653
Maximum Head = 583.359229

Calibration Targets

Target Head	Computed Head	Residual	Well Name
576.21	577.32	-1.1122	RFI-17
578.01	578.35	-0.3424	RFI-42
580.29	579.87	0.4216	RFI-43
581.32	581.77	-0.4507	RFI-33
581.18	582.57	-1.3941	PS-11
580.86	581.67	-0.8134	PS-12
581.22	579.62	1.5988	RFI-32
582.32	579.86	2.4640	PS-13
581.05	580.72	0.3262	R-15
582.55	579.67	2.8801	RFI-36
580.27	579.10	1.1747	RFI-PZ23
581.64	578.57	3.0707	RFI-51
579.29	578.89	0.4021	RFI-PZ22
580.54	579.04	1.5000	R-11
580.23	579.24	0.9855	RFI-PZ16
573.69	576.09	-2.3954	RFI-PZ27
576.79	576.27	0.5197	RFI-PZ18
575.54	575.82	-0.2780	R-13
580.83	576.01	4.8155	R-08
576.77	576.69	0.0817	R-09
573.84	574.96	-1.1171	RFI-PZ17
575.66	575.31	0.3528	RFI-PZ21
573.61	574.05	-0.4351	RFI-PZ19
573.50	574.06	-0.5602	RFI-PZ20
582.05	582.01	0.0443	RFI-20
582.63	582.05	0.5792	PS-05
581.60	580.15	1.4471	PS-06
582.09	581.11	0.9787	PS-04
580.73	580.66	0.0725	RFI-31
580.19	579.46	0.7262	RFI-30
581.27	579.14	2.1301	RFI-PZ26
580.81	579.09	1.7230	RFI-PZ25
579.99	579.45	0.5450	RFI-29
579.92	579.92	0.0034	RFI-18
582.23	580.45	1.7770	PS-08
581.36	579.17	2.1930	RFI-PZ24
580.20	580.25	-0.0460	RFI-35
581.62	581.13	0.4945	PS-07
581.11	581.53	-0.4166	RFI-27
581.62	580.99	0.6306	PS-09
579.92	578.86	1.0640	RFI-28
573.68	574.03	-0.3462	RFI-34
573.55	574.02	-0.4671	RFI-45
582.42	581.70	0.7195	RFI-37

Number of Targets = 44
Residual Mean = 0.580627
Residual Standard Deviation = 1.300208
Residual Sum of Squares = 89.217466
Absolute Residual Mean = 1.043112
Minimum Residual = -2.395449
Maximum Residual = 4.815483
Observed Range in Head = 9.130000
Resid. Std./Range in Head = 0.142411

Aquifer Properties

CONTOUR GRID -----

Row 1

575.380566	575.353314	575.321163	575.284586	575.244003
575.199810	575.152389	575.102125	575.049409	574.994650
574.938270	574.880704	574.822397	574.763797	574.705344
574.647461	574.590550	574.534977	574.481070	574.429111
574.379327	574.331886	574.286891	574.244403	574.204470
574.167218	574.132977	574.102500	574.077244	574.059119
574.046768	574.034637	574.104519	574.250312	574.380051
574.496839	574.602742	574.699252	574.787607	574.868946
574.944318	575.014615	575.080550	575.142676	575.201428
575.257152	575.310135	575.360615	575.408800	575.454867
575.498971	575.541247	575.581810	575.620761	575.658187
575.694167	575.728772	575.762065	575.794109	575.824960
575.854674	575.883303	575.910899	575.937512	575.963191
575.987985	576.011942	576.035109	576.057534	576.079261
576.100338	576.120809	576.140719	576.160112	576.179030
576.197517	576.215611	576.233354	576.250783	576.267934
576.284844	576.301545	576.318069	576.334447	576.350710
576.366886	576.383005	576.399096	576.415189	576.431315
576.447508	576.463802	576.480233	576.496841	576.513666
576.530752	576.548146	576.565896	576.584056	576.602678

Row 2

575.237817	575.223360	575.202448	575.175950	575.144573
575.108912	575.069500	575.026826	574.981359	574.933555
574.883866	574.832739	574.780619	574.727943	574.675133
574.622596	574.570710	574.519825	574.470255	574.422272
574.376105	574.331937	574.289911	574.250144	574.212762
574.177954	574.146039	574.117536	574.093109	574.073082
574.056413	574.040903	574.024794	574.063665	574.209807
574.339199	574.454996	574.559208	574.653461	574.739379
574.818486	574.892000	574.960809	575.025552	575.086706
575.144645	575.199672	575.252045	575.301986	575.349688
575.395319	575.439022	575.480918	575.521114	575.559698
575.596750	575.632342	575.666541	575.699408	575.731004
575.761386	575.790609	575.818727	575.845794	575.871861
575.896981	575.921203	575.944579	575.967157	575.988989
576.010123	576.030607	576.050490	576.069817	576.088635
576.106988	576.124921	576.142474	576.159688	576.176602
576.193251	576.209671	576.225894	576.241949	576.257868
576.273678	576.289408	576.305086	576.320741	576.336405
576.352108	576.367887	576.383777	576.399817	576.416050
576.432520	576.449275	576.466366	576.483845	576.501768

Row 3

575.093183	575.091889	575.082490	575.066269	575.044223
575.017159	574.985763	574.950637	574.912329	574.871352
574.828194	574.783321	574.737187	574.690224	574.642851
574.595458	574.548415	574.502057	574.456689	574.412580
574.369961	574.329029	574.289949	574.252874	574.217959
574.185395	574.155428	574.128355	574.104413	574.083516
574.064960	574.047549	574.030036	574.011296	574.019250
574.167226	574.296895	574.411284	574.512633	574.603626
574.686795	574.763861	574.835891	574.903589	574.967460
575.027895	575.085214	575.139697	575.191587	575.241097
575.288414	575.333692	575.377060	575.418628	575.458486
575.496717	575.533391	575.568577	575.602340	575.634742
575.665843	575.695702	575.724378	575.751925	575.778399
575.803856	575.828349	575.851933	575.874662	575.896588
575.917765	575.938245	575.958079	575.977317	575.996009
576.014202	576.031943	576.049277	576.066247	576.082893
576.099252	576.115361	576.131251	576.146953	576.162496
576.177907	576.193213	576.208441	576.223619	576.238776
576.253944	576.269157	576.284451	576.299866	576.315444
576.331231	576.347276	576.363631	576.380351	576.397493

.... Steady-State Flow Model

Row 4

574.947963	574.959916	574.962109	574.956221	574.943532
574.925055	574.901629	574.873971	574.842711	574.808421
574.771629	574.732829	574.692487	574.651041	574.608907
574.566473	574.524097	574.482110	574.440812	574.400467
574.361312	574.323550	574.287364	574.252918	574.220376
574.189907	574.161688	574.135878	574.112532	574.091482
574.072242	574.054065	574.036107	574.017521	573.997419
573.974653	574.125328	574.254283	574.363996	574.460172
574.547704	574.628812	574.704598	574.775760	574.842803
574.906129	574.966079	575.022957	575.077043	575.128583
575.177788	575.224830	575.269847	575.312950	575.354233
575.393775	575.431650	575.467927	575.502673	575.535956
575.567840	575.598388	575.627662	575.655722	575.682628
575.708438	575.733211	575.757005	575.779878	575.801889
575.823094	575.843550	575.863312	575.882435	575.900972
575.918975	575.936493	575.953576	575.970268	575.986613
576.002650	576.018415	576.033941	576.049258	576.064394
576.079372	576.094219	576.108959	576.123618	576.138224
576.152807	576.167400	576.182039	576.196765	576.211620
576.226651	576.241908	576.257445	576.273319	576.289589

Row 5

574.803353	574.828404	574.842110	574.846492	574.843092
574.833122	574.817569	574.797260	574.772908	574.745146
574.714548	574.681636	574.646894	574.610772	574.573689
574.536030	574.498153	574.460384	574.423019	574.386323
574.350534	574.315862	574.282496	574.250605	574.220350
574.191880	574.165325	574.140773	574.118218	574.097506
574.078306	574.060140	574.042466	574.024750	574.006491
573.987165	573.965780	574.089001	574.206097	574.306229
574.398720	574.484803	574.565248	574.640670	574.711568
574.778353	574.841396	574.901049	574.957649	575.011501
575.062855	575.111906	575.158801	575.203651	575.246551
575.287576	575.326800	575.364296	575.400136	575.434392
575.467136	575.498437	575.528362	575.556976	575.584343
575.610526	575.635589	575.659596	575.682610	575.704694
575.725911	575.746322	575.765988	575.784967	575.803318
575.821096	575.838355	575.855150	575.871528	575.887537
575.903217	575.918605	575.933735	575.948635	575.963329
575.977842	575.992194	576.006407	576.020504	576.034511
576.048456	576.062371	576.076292	576.090260	576.104317
576.118511	576.132895	576.147523	576.162455	576.177753

Row 6

574.660293	574.698196	574.723245	574.737745	574.743491
574.741887	574.734060	574.720942	574.703329	574.681917
574.657324	574.630106	574.600770	574.569779	574.537557
574.504495	574.470949	574.437243	574.403673	574.370504
574.337975	574.306299	574.275669	574.246255	574.218214
574.191681	574.166761	574.143514	574.121928	574.101891
574.083190	574.065536	574.048620	574.032188	574.016145
574.000771	573.987567	573.987699	574.030258	574.135880
574.235743	574.328757	574.415431	574.496393	574.572186
574.643265	574.710048	574.772973	574.832494	574.889021
574.942866	574.994250	575.043327	575.090206	575.134972
575.177700	575.218463	575.257337	575.294405	575.329748
575.363448	575.395581	575.426221	575.455440	575.483306
575.509888	575.535256	575.559480	575.582630	575.604776
575.625987	575.646330	575.665871	575.684674	575.702802
575.720316	575.737277	575.753742	575.769766	575.785399
575.800684	575.815660	575.830360	575.844810	575.859032
575.873045	575.886866	575.900513	575.914004	575.927362
575.940613	575.953787	575.966921	575.980054	575.993231
576.006500	576.019914	576.033532	576.047414	576.061627

Row 7

574.519294	574.569997	574.606204	574.630602	574.645292
574.651867	574.651578	574.645459	574.634387	574.619120
574.600326	574.578597	574.554463	574.528404	574.500854
574.472208	574.442823	574.413025	574.383108	574.353338
574.323955	574.295173	574.267188	574.240172	574.214278
574.189634	574.166339	574.144449	574.123966	574.104827
574.086912	574.070065	574.054145	574.039097	574.025074
574.012673	574.003475	573.999983	573.999063	573.998296
574.052243	574.155939	574.251562	574.340150	574.422478
574.499118	574.570562	574.637407	574.700361	574.760036
574.816833	574.870993	574.922666	574.971949	575.018917
575.063635	575.106179	575.146633	575.185095	575.221664
575.256435	575.289499	575.320935	575.350823	575.379236
575.406249	575.431941	575.456388	575.479671	575.501866
575.523051	575.543300	575.562685	575.581274	575.599138
575.616344	575.632959	575.649047	575.664670	575.679883
575.694733	575.709260	575.723496	575.737464	575.751182
575.764664	575.777919	575.790961	575.803800	575.816456
575.828952	575.841317	575.853586	575.865800	575.878004
575.890248	575.902586	575.915077	575.927788	575.940789

Row 8

574.380540	574.444561	574.491627	574.525623	574.549028
574.563566	574.570597	574.571249	574.566487	574.557135
574.543914	574.527452	574.508307	574.486976	574.463902
574.439488	574.414092	574.388042	574.361632	574.335128
574.308770	574.282775	574.257339	574.232637	574.208822

574.186023	574.164341	574.143842	574.124550	574.106447
574.089481	574.073590	574.058739	574.044976	574.032512
574.021827	574.013679	574.008526	574.005485	574.003499
574.002146	574.000878	574.067871	574.167652	574.259235
574.343496	574.420976	574.492533	574.559539	574.623011
574.683419	574.740983	574.795830	574.848038	574.897662
574.944753	574.989388	575.031672	575.071733	575.109698
575.145687	575.179804	575.212140	575.242777	575.271799
575.299285	575.325324	575.350003	575.373414	575.395645
575.416782	575.436908	575.456100	575.474434	575.491987
575.508832	575.525045	575.540701	575.555868	575.570610
575.584980	575.599018	575.612755	575.626211	575.639397
575.652318	575.664976	575.677374	575.689516	575.701414
575.713089	575.724568	575.735886	575.747086	575.758214
575.769318	575.780456	575.791690	575.803089	575.814729

Row 9

574.246371	574.323051	574.379981	574.423256	574.455192
574.477486	574.491590	574.498751	574.500032	574.496335
574.488437	574.477004	574.462622	574.445803	574.427006
574.406634	574.385053	574.362589	574.339535	574.316158
574.292699	574.269376	574.246386	574.223908	574.202100
574.181096	574.161005	574.141907	574.123850	574.106855
574.090920	574.076042	574.062242	574.049601	574.038299
574.028622	574.020883	574.015155	574.011067	574.008069
574.005695	574.003496	574.001009	573.997760	574.077264
574.172906	574.258729	574.335640	574.407149	574.475708
574.540745	574.602643	574.661500	574.717373	574.770287
574.820269	574.867399	574.911824	574.953732	574.993303
575.030692	575.066020	575.099388	575.130884	575.160593
575.188606	575.215020	575.239941	575.263475	575.285726
575.306791	575.326761	575.345722	575.363753	575.380938
575.397359	575.413104	575.428258	575.442905	575.457118
575.470956	575.484464	575.497669	575.510585	575.523215
575.535551	575.547584	575.559302	575.570699	575.581780
575.592560	575.603067	575.613337	575.623414	575.633346
575.643182	575.652979	575.662800	575.672720	575.682825

Row 10

574.130637	574.205164	574.271039	574.323816	574.364291
574.394149	574.415043	574.428400	574.435414	574.437079
574.434228	574.427567	574.417707	574.405179	574.390449
574.373928	574.355983	574.336938	574.317087	574.296694
574.276001	574.255227	574.234574	574.214224	574.194341
574.175069	574.156530	574.138819	574.122008	574.106147
574.091269	574.077407	574.064608	574.052952	574.042563
574.033596	574.026172	574.020273	574.015682	574.012068
574.009075	574.006360	574.003590	574.000461	573.996674
573.991772	574.081986	574.161532	574.239639	574.314731
574.386079	574.453740	574.517847	574.578473	574.635600
574.689194	574.739340	574.786285	574.830340	574.871778
574.910801	574.947549	574.982128	575.014626	575.045128
575.073735	575.100561	575.125734	575.149383	575.171635
575.192601	575.212382	575.231068	575.248744	575.265495
575.281416	575.296606	575.311173	575.325218	575.338831
575.352081	575.365014	575.377655	575.390010	575.402067
575.413803	575.425190	575.436198	575.446806	575.457005
575.466806	575.476238	575.485345	575.494173	575.502772
575.511190	575.519480	575.527705	575.535945	575.544300

Row 11

574.198477	574.084316	574.164008	574.227819	574.276977
574.314149	574.341464	574.360625	574.373010	574.379707
574.381601	574.379435	574.373844	574.365374	574.354499
574.341633	574.327141	574.311347	574.294541	574.276986
574.258920	574.240567	574.222130	574.203800	574.185750
574.168134	574.151090	574.134729	574.119146	574.104412
574.090586	574.077719	574.065868	574.055099	574.045494
574.037129	574.030041	574.024186	574.019413	574.015501
574.012199	574.009262	574.006480	574.003716	574.001017
573.999044	574.001992	574.004611	57	

574.949077	574.968383	574.986395	575.003182	575.018823					
575.033425	575.047137	575.060144	575.072633	575.084756	576.360454	576.140425	575.897779	575.625566	575.312544
575.096617	575.108263	575.119703	575.130908	575.141826	574.937835	574.459306	574.041368	574.066012	574.087980
575.152380	575.162481	575.172030	575.180938	575.189149	574.111897	574.130941	574.145287	574.156002	574.163704
575.196663	575.203536	575.209857	575.215705	575.221134	574.168762	574.171427	574.171861	574.170170	574.166467
575.226170	575.230827	575.235141	575.239194	575.243135	574.160924	574.153789	574.145366	574.135986	574.125979

Row 13

575.121241	574.732817	574.229643	574.051997	574.116531	574.115655	574.105301	574.095176	574.085502	574.076457
574.167210	574.205274	574.234322	574.256179	574.271838	574.068162	574.060677	574.054007	574.048119	574.042953
574.282217	574.288139	574.290281	574.289203	574.285382	574.038438	574.034501	574.031075	574.028094	574.025503
574.279230	574.271100	574.261303	574.250110	574.237773	574.023249	574.021291	574.019594	574.018130	574.016874
574.224525	574.210590	574.196185	574.181521	574.166797	574.015798	574.014871	574.014063	574.013354	574.012755
574.152200	574.137901	574.124051	574.110780	574.098196	574.012306	574.012083	574.012173	574.012597	574.013120
574.086384	574.075415	574.065341	574.056202	574.048024	574.013114	574.012016	574.009749	574.006333	574.001647
574.040814	574.034552	574.029181	574.024612	574.020729	573.995469	573.987505	573.977338	573.989138	574.041727
574.017405	574.014538	574.012021	574.009874	574.008175	574.075186	574.099768	574.123575	574.146565	574.168499
574.007084	574.006581	574.006133	574.005284	574.004096	574.189177	574.208417	574.226014	574.241675	574.254750
574.002716	574.001229	573.999719	574.084813	574.168609	574.262653	574.261660	574.260395	574.262924	574.262823
574.242861	574.305525	574.362409	574.415480	574.465158	574.275416	574.283784	574.292924	574.302522	574.312336
574.511621	574.554959	574.595192	574.632307	574.666314	574.322171	574.331858	574.341182	574.349375	574.352400
574.697327	574.725607	574.751506	574.775369	574.797464	574.344805	574.334428	574.325942	574.318856	574.312173
574.817975	574.837017	574.854652	574.870918	574.885858	574.304948	574.296157	574.284375	574.266736	574.237879

Row 18

576.618298	576.420690	576.204892	575.965956	575.696647					
575.385816	575.015347	574.551767	573.999601	574.044224	576.618298	576.420690	576.204892	575.965956	575.696647
574.076679	574.098344	574.114462	574.127387	574.137481	575.385816	575.015347	574.551767	573.999601	574.044224
574.144989	574.150122	574.152941	574.153414	574.151546	574.076679	574.098344	574.114462	574.127387	574.137481
574.147472	574.141473	574.133933	574.125260	574.115851	574.144989	574.150122	574.152941	574.153414	574.151546
574.106064	574.096225	574.086632	574.077548	574.069180	574.147472	574.141473	574.133933	574.125260	574.115851
574.061662	574.055039	574.049283	574.044316	574.040035	574.106064	574.096225	574.086632	574.077548	574.069180
574.036340	574.033138	574.030354	574.027924	574.025797	574.061662	574.055039	574.049283	574.044316	574.040035
574.023932	574.022295	574.020853	574.019599	574.018495	574.036340	574.033138	574.030354	574.027924	574.025797
574.017526	574.016670	574.015908	574.015231	574.014641	574.023932	574.022295	574.020853	574.019599	574.018495
574.014159	574.013811	574.013605	574.013480	574.013241	574.017526	574.016670	574.015908	574.015231	574.014641
574.012563	574.011148	574.008844	574.005578	574.001269	574.014159	574.013811	574.013605	574.013480	574.013241
573.995810	573.989096	573.981080	573.971981	573.963692	574.012563	574.011148	574.008844	574.005578	574.001269
573.959890	573.965101	573.973936	573.983670	573.993299	573.995810	573.989096	573.981080	573.971981	573.963692
574.002281	574.010247	574.023967	574.041197	574.056828	573.959890	573.965101	573.973936	573.983670	573.993299
574.073853	574.045086	574.034898	574.034596	574.038754	574.002281	574.010247	574.023967	574.041197	574.056828
574.045515	574.053927	574.063406	574.073558	574.084109	574.073853	574.045086	574.034898	574.034596	574.038754
574.094896	574.105902	574.117448	574.130990	574.147849	574.045515	574.053927	574.063406	574.073558	574.084109
574.113641	574.091049	574.076870	574.065853	574.058777	574.094896	574.105902	574.117448	574.130990	574.147849
574.045566	574.033663	574.018692	573.999077	573.932061	574.113641	574.091049	574.076870	574.065853	574.058777

Row 19

576.864004	576.685983	576.492917	576.281062	576.045280					
575.778247	575.468777	575.096335	574.612270	574.010364	576.864004	576.685983	576.492917	576.281062	576.045280
574.050477	574.068921	574.085417	574.100628	574.112995	575.778247	575.468777	575.096335	574.612270	574.010364
574.122864	574.130520	574.135850	574.138556	574.138439	574.050477	574.068921	574.085417	574.100628	574.112995
574.135589	574.130386	574.123356	574.115040	574.105912	574.122864	574.130520	574.135850	574.138556	574.138439
574.096378	574.086797	574.077512	574.068844	574.061053	574.135589	574.130386	574.123356	574.115040	574.105912
574.054290	574.048576	574.043822	574.039879	574.036585	574.096378	574.086797	574.077512	574.068844	574.061053
574.033797	574.031402	574.029317	574.027484	574.025860	574.054290	574.048576	574.043822	574.039879	574.036585
574.024413	574.023121	574.021965	574.020928	574.019995	574.033797	574.031402	574.029317	574.027484	574.025860
574.019152	574.018384	574.017679	574.017029	574.016432	574.024413	574.023121	574.021965	574.020928	574.019995
574.015890	574.015402	574.014943	574.014439	574.013751	574.019152	574.018384	574.017679	574.017029	574.016432
574.012688	574.011071	574.008775	574.005729	574.001887	574.015890	574.015402	574.014943	574.014439	574.013751
573.997234	573.991814	573.985828	573.979846	573.975173	574.012688	574.011071	574.008775	574.005729	574.001887
573.973608	573.976166	573.981673	573.988549	573.995793	573.997234	573.991814	573.985828	573.979846	573.975173
574.002787	574.009110	574.014461	574.018669	574.021866	573.973608	573.976166	573.981673	573.988549	573.995793
574.0023750	574.014719	574.040419	573.998556	573.996819	574.002787	574.009110	574.014461	574.018669	574.021866
573.997572	574.000032	574.003676	574.008139	574.013172	574.0023750	574.014719	574.040419	573.998556	573.996819
574.018641	574.024591	574.031468	574.040858	574.052941	573.997572	574.000032	574.003676	574.008139	574.013172
574.039591	574.024647	574.015713	574.009791	574.005075	574.018641	574.024591	574.031468	574.040858	574.052941
574.000334	573.994538	573.986718	573.975952	573.959416	574.039591	574.024647	574.015713	574.009791	574.005075

Row 20

577.099776	576.939376	576.766321	576.577625	576.369320					
576.135957	575.869573	575.557404	575.177427	574.687593	577.099776	576.939376	576.766321	576.577625	576.369320
574.050080	574.035120	574.057288	574.075980	574.090145	576.135957	575.869573	575.557404	575.177427	574.687593
574.102229	574.112648	574.120882	574.126087	574.127671	574.050080	574.035120	574.057288	574.075980	574.090145
574.125700	574.120798	574.113785	574.105395	574.096191	574.102229	574.112648	574.120882	574.126087	574.127671
574.086595	574.076973	574.067715	574.059238	574.051904	574.125700	574.120798	574.113785	574.105395	574.096191
574.045903	574.041202	574.037605	574.034846	574.032676	574.086595	574.076973	574.067715	574.059238	574.051904
574.030901	574.029389	574.028058	574.026860	574.025765	574.045903	574.041202	574.037605	574.034846	574.032676
574.024758	574.023827	574.022964	574.022163	574.021414	574.030901	574.029389	574.028058	574.026860	574.025765
574.020710	574.020041	574.019400	574.018778	574.018170	574.024758	574.023827	574.022964	574.022163	574.021414
574.017569	574.016960	574.016308	574.015551	574.014592	574.020710	574.020041	574.019400	574.018778	574.018170
574.013310	574.011596	574.009365	574.006574	574.003214	574.017569	574.016960	574.016308	574.015551	574.014592
573.999329	573.995044	573.990631	573.986605	573.983765	574.013310	574.011596	574.009365	574.006574	574.003214
573.982964	573.984584	573.988221	573.993094	573.998489	573.999329	573.995044	573.990631	573.986605	573.983765
574.003865	574.008817	574.013038	574.016281	574.018231	573.982964	573.984584	573.988221	573.993094	573.998489
574.017922	574.014045	574.008850	574.005238	574.003787	574.003865	574.008817	574.013038	574.016281	574.018231
574.004183	574.006006	574.008890	574.012548	574.016764	574.017922	574.014045	574.008850	574.005238	574.003787
574.021398	574.026400	574.031787	574.037256	574.044094	574.004183	574.006006	574.008890	574.012548	574.016764
574.036834	574.028201	574.021528	574.016264	574.011784	574.021398	574.026400	574.031787	574.037256	

574.025034 574.024471 574.023909 574.023349 574.022792
574.022235 574.021673 574.021100 574.020511 574.019898
574.019250 574.018548 574.017760 574.016837 574.015714
574.014316 574.012577 574.010449 574.007917 574.005002
574.001779 573.998395 573.995106 573.992295 573.990445
573.989995 573.991126 573.993657 573.997169 574.001192
574.005306 574.009160 574.012465 574.014954 574.016315
574.016143 574.014357 574.011865 574.009901 574.009092
574.009518 574.011026 574.013406 574.016450 574.019975
574.023823 574.027837 574.031764 574.034975 574.036150
574.034261 574.030305 574.025970 574.021999 574.018391
574.014879 574.011172 574.007097 574.002767 573.998909

Row 22

577.547504 577.418531 577.280474 577.131227 576.968078
576.787472 576.584630 576.352910 576.082662 575.758600
575.352969 574.808704 574.040159 574.032845 574.045132
574.062937 574.081068 574.099204 574.112268 574.116921
574.114194 574.107030 574.097791 574.087702 574.077295
574.066705 574.055944 574.045410 574.036115 574.029158
574.024976 574.023152 574.022849 574.023286 574.023948
574.024564 574.025027 574.025314 574.025439 574.025430
574.025313 574.025114 574.024850 574.024532 574.024168
574.023761 574.023310 574.022812 574.022263 574.021654
574.020974 574.020206 574.019325 574.018296 574.017077
574.015623 574.013900 574.011889 574.009596 574.007062
574.004371 574.001666 573.999153 573.997106 573.995822
573.995545 573.996369 573.998196 574.000779 574.003808
574.006970 574.009983 574.012598 574.014594 574.015767
574.015978 574.015330 574.014287 574.013457 574.013265
574.013872 574.015260 574.017321 574.019914 574.022887
574.026078 574.029292 574.032239 574.034449 574.035328
574.034567 574.032540 574.029965 574.027348 574.024867
574.022511 574.020233 574.018077 574.016305 574.015506

Row 23

577.761458 577.646940 577.524807 577.393247 577.249942
577.091901 576.915185 576.714493 576.482426 576.208099
575.874371 575.451561 574.872577 573.973053 574.022424
574.042277 574.064295 574.094629 574.115796 574.120534
574.113778 574.102670 574.090841 574.079174 574.067905
574.056762 574.044923 574.032471 574.021389 574.014124
574.011426 574.012108 574.014421 574.017102 574.019529
574.021496 574.022995 574.024088 574.024852 574.025359
574.025665 574.025813 574.025836 574.025753 574.025580
574.025324 574.024986 574.024567 574.024063 574.023468
574.022771 574.021961 574.021017 574.019919 574.018643
574.017167 574.015477 574.013576 574.011486 574.009258
574.006976 574.004762 574.002780 574.001220 574.000271
574.000076 574.000687 574.002042 574.003983 574.006298
574.008760 574.011151 574.013274 574.014964 574.016096
574.016630 574.016671 574.016483 574.016401 574.016697
574.017515 574.018883 574.020752 574.023027 574.025588
574.028288 574.030947 574.033327 574.035129 574.036068
574.036035 574.035206 574.033928 574.032525 574.031193
574.030038 574.029146 574.028669 574.028892 574.030266

Row 24

577.969646 577.869012 577.762130 577.647434 577.522933
577.386073 577.233545 577.060988 576.862526 576.629972
576.351371 576.007869 575.565396 574.952828 574.030288
574.012572 574.035721 574.099904 574.135445 574.134352
574.116451 574.098437 574.083598 574.070078 574.058113
574.047405 574.034578 574.018144 574.002713 573.994494
573.994648 573.999601 574.005700 574.011162 574.015521
574.018839 574.021316 574.023147 574.024490 574.025463
574.026153 574.026621 574.026912 574.027053 574.027064
574.026955 574.026731 574.026394 574.025941 574.025367
574.024666 574.023827 574.022841 574.021697 574.020383
574.018896 574.017239 574.015427 574.013496 574.011499
574.009515 574.007649 574.006024 574.004775 574.004027
574.003868 574.004323 574.005351 574.006843 574.008652
574.010610 574.012553 574.014334 574.015832 574.016972
574.017742 574.018222 574.018571 574.018988 574.019646
574.020653 574.022048 574.023809 574.025875 574.028151
574.030518 574.032831 574.034917 574.036592 574.037710
574.038229 574.038249 574.037969 574.037602 574.037328
574.037295 574.037650 574.038584 574.040367 574.043351

Row 25

578.172416 578.085212 577.993069 577.894645 577.788228
577.671629 577.542040 577.395818 577.228180 577.032721
576.800593 576.518959 576.167869 575.712917 575.075905
573.781968 573.974906 574.136809 574.189974 574.161480
574.116552 574.090609 574.075623 574.059326 574.046351
574.040066 574.028311 574.002796 573.976205 573.966232
573.973437 573.986229 573.997629 574.006215 574.012422
574.016911 574.020196 574.022629 574.024447 574.025812
574.026833 574.027584 574.028117 574.028465 574.028649
574.028683 574.028573 574.028320 574.027922 574.027376
574.026677 574.025820 574.024802 574.023619 574.022273
574.020773 574.019133 574.017382 574.015560 574.013725
574.011947 574.010315 574.008925 574.007874 574.007246
574.007096 574.007438 574.008236 574.009415 574.010866
574.012469 574.014098 574.015646 574.017024 574.018183
574.019121 574.019891 574.020592 574.021348 574.022269
574.023433 574.024875 574.026586 574.028524 574.030620

574.032784 574.034906 574.036868 574.038557 574.039896
574.040871 574.041552 574.042066 574.042570 574.043222
574.044177 574.045601 574.047692 574.050692 574.054890

Row 26

578.369933 578.295776 578.217961 578.135354 578.046498
577.949526 577.842045 577.720985 577.582384 577.421094
577.230312 577.000811 576.719448 576.365643 575.900535
575.233456 574.094075 574.268473 574.316834 574.194662
574.091131 574.073275 574.071956 574.045065 574.025099
574.038224 574.037761 573.988316 573.930289 573.919662
573.947957 573.974598 573.992117 574.003318 574.010785
574.016008 574.019803 574.022638 574.024796 574.026459
574.027746 574.028736 574.029481 574.030017 574.030365
574.030536 574.030537 574.030369 574.030029 574.029515
574.028823 574.027952 574.026903 574.025681 574.024297
574.022768 574.021122 574.019395 574.017633 574.015895
574.014246 574.012762 574.011520 574.010590 574.010031
574.009879 574.010136 574.010775 574.011738 574.012943
574.014300 574.015715 574.017107 574.018412 574.019595
574.020653 574.021620 574.022561 574.023551 574.024665
574.025957 574.027453 574.029150 574.031022 574.033020
574.035076 574.037115 574.039058 574.040836 574.042407
574.043776 574.044994 574.046157 574.047388 574.048825
574.050615 574.052924 574.055940 574.059881 574.064990

Row 27

578.562213 578.500752 578.436903 578.369734 578.298029
578.220213 578.134260 578.037567 577.926804 577.797730
577.644935 577.461482 577.238291 576.962962 576.617559
576.176270 575.601600 574.793658 574.567121 574.179214
573.957257 574.060007 574.097819 574.023525 573.960132
574.051649 574.098558 573.980716 573.824454 573.832401
573.928740 573.971309 573.991862 574.003489 574.011010
574.016305 574.020226 574.023224 574.025569 574.027429
574.028914 574.030098 574.031027 574.031732 574.032231
574.032535 574.032647 574.032565 574.032286 574.031806
574.031123 574.030236 574.029152 574.027881 574.026443
574.024864 574.023179 574.021435 574.019682 574.017980
574.016394 574.014990 574.013830 574.012970 574.012449
574.012290 574.012489 574.013022 574.013841 574.014882
574.016077 574.017352 574.018646 574.019911 574.021118
574.022265 574.023373 574.024481 574.025639 574.026896
574.028291 574.029842 574.031551 574.033401 574.035358
574.037376 574.039404 574.041390 574.043295 574.045098
574.046811 574.048478 574.050176 574.052008 574.054092
574.056566 574.059584 574.063320 574.067970 574.073745

Row 28

578.749145 578.700029 578.649794 578.597709 578.542793
578.483753 578.418889 578.345998 578.262246 578.164041
578.046897 577.905311 577.732665 577.521231 577.262558
576.949082 576.578070 576.164412 575.759980 575.426081
575.206570 575.126114 575.064002 574.949050 574.832906
574.757760 574.656469 574.471271 574.215398 573.835384
573.950571 573.984293 573.998331 574.006880 574.013048
574.017748 574.021428 574.024369 574.026758 574.028721
574.030343 574.031679 574.032765 574.033623 574.034267
574.034700 574.034922 574.034930 574.034715 574.034272
574.033597 574.032690 574.031561 574.030225 574.028709
574.027047 574.025285 574.023476 574.021680 574.019959
574.018377 574.016997 574.015871 574.015043 574.014542
574.014377 574.014542 574.015010 574.015742 574.016684
574.017779 574.018972 574.020211 574.021460 574.022696
574.023913 574.025123 574.026352 574.027633 574.029000
574.030477 574.032083 574.033820 574.035677 574.037634
574.039660 574.041723 574.043790 574.045840 574.047865
574.049881 574.051927 574.054067 574.056387 574.058994
574.062010 574.065575 574.069849 574.075007 574.081236

Row 29

578.930513 578.893367 578.856370 578.818997 578.780508
578.739885 578.695744 578.646236 578.588927 578.520683
578.437574 578.334859 578.205467 578.041800 577.842359
577.607646 577.342459 577.059638 576.779854 576.523383
576.308249 576.135520 575.978833 575.815797 575.647111
575.473237 575.275066 575.027431 574.708327 574.267462
574.021698 574.009183 574.008458 574.012125 574.016306
574.020055 574.023259 574.025984 574.028311 574.030306
574.032017 574.033475 574.034698 574.035699 574.036482
574.037045 574.037383 574.037485 574.037340 574.036937
574.036269 574.035336 574.034147 574.032723 574.031097
574.029314 574.027428 574.025502 574.023606 574.021809
574.020178 574.018774 574.017644 574.016824 574.016331
574.016169 574.016322 574.016763 574.017453 574.018347
574.019394 574.020548 574.021767 574.023021 574.024288
574.025564 574.026854 574.028174 574.029548 574.030998
574.032545 574.034202 574.035974 574.037858 574.039841
574.041905 574.044031 574.046201 574.048402 574.050636
574.052918 574.055283 574.057786 574.060500 574.063516
574.066944 574.070910 574.075558 574.081045 574.087543

Row 30

579.106016 579.080416 579.056229 579.033145 579.010673
578.988083 578.964309 578.937847 578.906613 578.867803

578.815920	578.738704	578.634153	578.502003	578.342750	574.042191	574.038558	574.034848	574.031263	574.028006
578.158449	577.953753	577.736556	577.516685	577.302122	574.025254	574.023125	574.021664	574.020847	574.020599
577.094548	576.888373	576.685925	576.481251	576.269008	574.020824	574.021422	574.022305	574.023403	574.024656
576.042964	575.790925	575.495010	575.129952	574.649006	574.026021	574.027460	574.028943	574.030450	574.031967
574.080164	574.021859	574.015588	574.017229	574.020008	574.033487	574.035014	574.036556	574.038130	574.039754
574.022842	574.025503	574.027939	574.030147	574.032134	574.041452	574.043246	574.045159	574.047213	574.049424
574.033908	574.035471	574.036823	574.037962	574.038885	574.051808	574.054373	574.057122	574.060051	574.063152
574.039583	574.040045	574.040252	574.040187	574.039831	574.066412	574.069818	574.073361	574.077039	574.080866
574.039170	574.038201	574.036934	574.035394	574.033619	574.084876	574.089126	574.093696	574.098690	574.104230
574.031665	574.029599	574.027496	574.025439	574.023507	Row 35				
574.021774	574.020303	574.019140	574.018311	574.017826					
574.017678	574.017845	574.018293	574.018983	574.019871					
574.020912	574.022064	574.023292	574.024567	574.025873					
574.027201	574.028555	574.029946	574.031390	574.032905					
574.034508	574.036212	574.038023	574.039944	574.041969	579.881778	579.904635	579.934564	579.972424	580.019192
574.044090	574.046295	574.048577	574.050929	574.053356	580.075969	580.142129	580.195940	580.231201	580.248383
574.055873	574.058508	574.061306	574.064330	574.067656	580.247904	580.230157	580.195534	580.144442	580.077292
574.071380	574.075615	574.080489	574.086146	574.092743	579.994467	579.896225	579.782569	579.653046	579.506537
Row 31					579.341038	579.153480	578.939543	578.693420	578.407371
					578.079757	577.730411	577.350187	576.922561	576.421940
					575.801147	574.937124	574.060653	574.035945	574.037010
					574.035826	574.036129	574.037758	574.040163	574.042857
					574.045494	574.047896	574.050021	574.051918	574.053655
579.275290	579.260743	579.248859	579.239552	579.232598	574.055276	574.056763	574.058025	574.058906	574.059224
579.227575	579.223765	579.220033	579.214653	579.200126	574.058821	574.057602	574.055557	574.052741	574.049260
579.162619	579.101485	579.016793	578.908933	578.778928	574.045255	574.040905	574.036436	574.032112	574.028215
578.628812	578.461936	578.282847	578.096278	577.905300	574.024993	574.022605	574.021090	574.020382	574.020345
577.709329	577.502970	577.277214	577.040383	576.794591	574.020827	574.021687	574.022815	574.024129	574.025572
576.532928	576.244805	575.914366	575.516142	574.997321	574.027098	574.028674	574.030271	574.031868	574.033451
574.154524	574.008128	574.018737	574.021746	574.023713	574.035015	574.036565	574.038114	574.039680	574.041288
574.025785	574.027943	574.030089	574.032170	574.034144	574.042966	574.044742	574.046645	574.048703	574.050940
574.035980	574.037649	574.039130	574.040411	574.041479	574.053377	574.056028	574.058896	574.061976	574.065250
574.042323	574.042923	574.043254	574.043284	574.042986	574.068695	574.072277	574.075966	574.079736	574.083575
574.042335	574.041323	574.039956	574.038264	574.036292	574.087496	574.091541	574.095783	574.100320	574.105274
574.034109	574.031795	574.029444	574.027155	574.025023	Row 36				
574.023135	574.021557	574.020336	574.019491	574.019021					
574.018907	574.019116	574.019608	574.020337	574.021259					
574.022331	574.023513	574.024773	574.026086	574.027435					
574.028813	574.030221	574.031668	574.033166	574.034730					
574.036378	574.038121	574.039970	574.041931	574.044006	580.013762	580.043751	580.081606	580.128381	580.185323
574.046192	574.048486	574.050883	574.053384	574.055990	580.253913	580.328691	580.387007	580.427538	580.450764
574.058714	574.061578	574.064617	574.067878	574.071427	580.457098	580.446907	580.420525	580.378246	580.320315
574.075344	574.079729	574.084697	574.090380	574.096920	580.246876	580.157905	580.053098	579.931736	579.792533
Row 32					579.633479	579.451687	579.243222	579.002862	578.723702
					578.398728	578.047942	577.669786	577.249230	576.763804
					576.174300	575.393747	574.089994	574.057979	574.041060
					574.036363	574.036364	574.038539	574.041718	574.045122
					574.048262	574.050940	574.053187	574.055158	574.057019
579.437927	579.433853	579.433661	579.437500	579.445431	574.058880	574.060743	574.062485	574.063866	574.064587
579.457371	579.472997	579.491611	579.507099	579.502261	574.064387	574.063128	574.060808	574.057519	574.053398
579.475926	579.428319	579.359787	579.270931	579.162778	574.048607	574.043346	574.037882	574.032568	574.027809
579.036914	578.895512	578.741067	578.575739	578.400375	574.023976	574.021297	574.019796	574.019322	574.019638
578.213547	578.011006	577.785737	577.530094	577.258248	574.020501	574.021720	574.023162	574.024743	574.026412
576.970440	576.656855	576.302852	575.884909	575.358070	574.028130	574.029867	574.031596	574.033295	574.034949
574.607942	574.015397	574.026548	574.026558	574.027217	574.036553	574.038115	574.039652	574.041190	574.042758
574.028649	574.030390	574.032293	574.034279	574.036272	574.044391	574.046123	574.047990	574.050029	574.052273
574.038194	574.039986	574.041608	574.043038	574.044264	574.054751	574.057483	574.060474	574.063718	574.067187
574.045270	574.046031	574.046511	574.046664	574.046444	574.070843	574.074629	574.078488	574.082359	574.086200
574.045812	574.044749	574.043259	574.041372	574.039146	574.089996	574.093773	574.097596	574.101568	574.105815
574.036660	574.034017	574.031331	574.028725	574.026318	Row 37				
574.024214	574.022492	574.021195	574.020337	574.019900					
574.019850	574.020138	574.020712	574.021520	574.022514					
574.023651	574.024892	574.026206	574.027571	574.028970					
574.030396	574.031851	574.033340	574.034878	574.036478					
574.038157	574.039931	574.041812	574.043813	574.045938	580.137282	580.173334	580.217852	580.272039	580.337349
574.048193	574.050578	574.053092	574.055736	574.058511	580.415567	580.495670	580.558305	580.603794	580.632611
574.061423	574.064484	574.067718	574.071158	574.074856	580.645156	580.641763	580.622704	580.588182	580.538307
574.078877	574.083307	574.088248	574.093822	574.100162	580.473057	580.392213	580.295280	580.181382	580.094148
Row 33					579.896593	579.720989	579.518703	579.284985	579.013615
					578.696538	578.349049	577.977595	577.568664	577.103000
					576.549166	575.844299	574.794095	574.053367	574.035902
					574.033359	574.034810	574.038472	574.043103	574.047649
					574.051456	574.054366	574.056587	574.058475	574.060358
579.593497	579.599220	579.609987	579.626189	579.648190	574.062450	574.064797	574.067237	574.069391	574.070751
579.767280	579.710596	579.749254	579.772757	579.776037	574.070877	574.069571	574.066886	574.063001	574.058102
579.759433	579.723298	579.668072	579.594360	579.503003	574.052354	574.045951	574.039183	574.032511	574.026550
579.395106	579.271964	579.134827	578.984473	578.820658	574.021903	574.018920	574.017581	574.017568	

Row 39

580.358477	580.403283	580.457086	580.521187	580.597185
580.687045	580.774618	580.845481	580.900193	580.939214
580.962908	580.971552	580.965326	580.944305	580.908431
580.857487	580.791048	580.708429	580.608624	580.490227
580.351357	580.189557	580.001674	579.783690	579.530464
579.235314	578.907996	578.562398	578.188271	577.772477
577.296705	576.732627	576.029786	575.065950	574.027924
574.018381	574.025594	574.035920	574.064838	574.055705
574.061018	574.063364	574.064210	574.064835	574.066071
574.068402	574.072106	574.077140	574.082643	574.086864
574.088201	574.086371	574.082233	574.076622	574.069790
574.061721	574.052370	574.041714	574.030292	574.019770
574.012290	574.008968	574.009252	574.011673	574.014876
574.018087	574.021044	574.023758	574.026314	574.028789
574.031216	574.033584	574.035849	574.037953	574.039849
574.041522	574.042997	574.044330	574.045587	574.046832
574.048120	574.049502	574.051035	574.052790	574.054847
574.057293	574.060196	574.063597	574.067489	574.071818
574.076482	574.081336	574.086186	574.090787	574.094877
574.098255	574.100865	574.102821	574.104351	574.105697

Row 40

580.456243	580.503751	580.560180	580.626774	580.705046
580.796873	580.888025	580.962864	581.021949	581.065735
581.094576	581.108729	581.108350	581.093475	581.064005
581.019674	580.960013	580.884304	580.791526	580.680295
580.548794	580.394688	580.215021	580.006069	579.763123
579.480149	579.168887	578.841445	578.489034	578.100989
577.663383	577.156473	576.548871	575.779179	574.662289
574.000602	574.017969	574.033370	574.051018	574.063934
574.069232	574.069572	574.068276	574.067308	574.067669
574.069802	574.074181	574.081476	574.090769	574.098398
574.100653	574.097461	574.091601	574.084884	574.077087
574.067827	574.057013	574.043810	574.027986	574.012525
574.002287	573.999536	574.002448	574.007707	574.012985
574.017415	574.021016	574.024088	574.026902	574.029620
574.032310	574.034957	574.037486	574.039792	574.041790
574.043451	574.044818	574.045982	574.047049	574.048099
574.049190	574.050363	574.051675	574.053210	574.055080
574.057411	574.060315	574.063861	574.068049	574.072812
574.078025	574.083516	574.089041	574.094249	574.098700
574.102012	574.104061	574.105060	574.105411	574.105467

Row 41

580.545729	580.594898	580.652708	580.720281	580.798960
580.890367	580.984771	581.063534	581.126893	581.175300
581.209107	581.228564	581.233811	581.224865	581.201607
581.163749	581.110801	581.042040	580.956452	580.852689
580.729001	580.583167	580.412405	580.213243	579.981343
579.711535	579.419736	579.113145	578.784379	578.424782
578.023556	577.566204	577.031193	576.381274	575.533848
574.164970	574.008845	574.026803	574.060190	574.079574
574.081707	574.076933	574.071931	574.068517	574.067711
574.069314	574.073442	574.083486	574.100186	574.115130
574.118216	574.110532	574.101254	574.094037	574.085676
574.075007	574.063665	574.048621	574.025504	573.999997
573.984818	573.984816	573.993700	574.003909	574.011943
574.017491	574.021434	574.024624	574.027554	574.030460
574.033427	574.036423	574.039314	574.041905	574.044033
574.045641	574.046813	574.047715	574.048518	574.049328
574.050187	574.051105	574.052122	574.053335	574.054902
574.057013	574.059853	574.063539	574.068083	574.073387
574.079292	574.085624	574.092134	574.098355	574.103539
574.106914	574.108197	574.107853	574.106709	574.105281

Row 42

580.627289	580.677177	580.735258	580.802489	580.879976
580.969005	581.065239	581.147900	581.215466	581.268397
581.307050	581.331675	581.342410	581.339274	581.322140
581.290720	581.244529	581.182854	581.104710	581.008791
580.893420	580.756480	580.595335	580.406729	580.186636
579.932249	579.662576	579.378914	579.075135	578.744214
578.377656	577.964444	577.488843	576.925284	576.224340
575.259894	573.974540	574.002556	574.086197	574.111598
574.099098	574.083639	574.074286	574.067152	574.065562
574.067379	574.067150	574.077786	574.110360	574.143894
574.146305	574.123596	574.107733	574.104671	574.096842
574.081647	574.072919	574.062121	574.025897	573.976195
573.951444	573.962005	573.984326	574.002398	574.013202
574.018939	574.022450	574.025347	574.028203	574.031224
574.034497	574.037966	574.041399	574.044435	574.046746
574.048224	574.049039	574.049523	574.049968	574.050510
574.051133	574.051768	574.052405	574.053154	574.054239
574.055962	574.058623	574.062433	574.067420	574.073410
574.080152	574.087509	574.095395	574.103325	574.110004
574.113748	574.113806	574.111283	574.108182	574.105247

Row 43

580.701371	580.751164	580.808578	580.874379	580.949412
581.034590	581.129703	581.216253	581.287989	581.345382
581.388803	581.418513	581.434663	581.437282	581.426259
581.401321	581.362008	581.307635	581.237257	581.149625
581.043130	580.915750	580.764975	580.587723	580.380220

580.145163	579.899580	579.640336	579.362387	579.060049
578.726638	578.353739	577.929675	577.436095	576.839275
576.061008	574.801680	573.972437	574.173358	574.175907
574.113690	574.082609	574.077306	574.059255	574.059213
574.071079	574.051348	574.046185	574.115838	574.205275
574.199468	574.124913	574.098448	574.122823	574.117546
574.078195	574.079590	574.104777	574.040620	573.922289
573.877791	573.930468	573.980087	574.007764	574.018905
574.022109	574.023849	574.026065	574.028688	574.031738
574.035359	574.039508	574.043825	574.047626	574.050225
574.051404	574.051548	574.051336	574.051307	574.051611
574.052077	574.052446	574.052607	574.052685	574.053016
574.054067	574.056344	574.060243	574.065840	574.072762
574.080456	574.088832	574.098433	574.109251	574.119118
574.124080	574.121814	574.114983	574.109198	574.105901

Row 44

580.768494	580.817517	580.873514	580.937057	581.008727
581.089085	581.178609	581.268780	581.344667	581.406488
581.454630	581.489380	581.510912	581.519281	581.514405
581.496048	581.463787	581.416986	581.354754	581.275904
581.178902	581.061807	580.922215	580.757176	580.563340
580.353115	580.132952	579.899091	579.647376	579.373236
579.071495	578.735917	578.358206	577.925889	577.417462
576.789919	575.942855	574.532702	574.423042	574.281686
574.083282	574.043695	574.117137	574.022695	574.037074
574.104304	574.005126	573.929165	574.091707	574.329324
574.277142	574.068597	574.027309	574.184364	574.170784
574.028156	574.020096	574.265719	574.100333	573.782938
573.732653	573.912110	573.995579	574.027812	574.031116
574.025785	574.024586	574.026497	574.028803	574.031711
574.035701	574.040831	574.046682	574.051930	574.055034
574.055530	574.054337	574.052926	574.052301	574.052560
574.053129	574.053343	574.052910	574.052012	574.051164
574.051074	574.052577	574.056465	574.063024	574.071468
574.080242	574.088968	574.099972	574.115563	574.132609
574.141469	574.134293	574.117065	574.106639	574.109539

Row 45

580.829219	580.876941	580.930959	580.991664	581.059399
581.134422	581.216818	581.305563	581.385600	581.451829
581.504668	581.544436	581.571343	581.585485	581.586825
581.575177	581.550179	581.511258	581.457593	581.388071
581.301234	581.195222	581.067709	580.915835	580.741832
580.558750	580.364834	580.156891	579.931436	579.684791
579.413068	579.111956	578.776193	578.398540	577.967829
577.465519	576.859675	576.086975	575.070315	574.544755
574.575030	574.845470	575.179591	575.367297	575.652966
575.944141	576.165395	576.303418	576.415227	576.483691
576.434709	576.290568	576.151377	576.057908	575.970652
575.876654	575.822024	575.814540	575.724633	575.560356
575.311700	574.900510	574.272770	574.076591	574.047566
574.023790	574.022566	574.027211	574.028286	574.030674
574.034984	574.041326	574.049991	574.058261	574.062328
574.061203	574.057229	574.053678	574.052418	574.053224
574.054553	574.054881	574.053664	574.051320	574.048660
574.046667	574.046626	574.050130	574.058336	574.069980
574.080517	574.087138	574.096491	574.119217	574.152943
574.174890	574.157094	574.111794	574.086249	574.123309

Row 46

580.884121	580.930146	580.981798	581.039307	581.102824
581.172366	581.247735	581.328406	581.410781	581.481409
581.538931	581.583706	581.615993	581.635943	581.643579
581.638786	581.621277	581.590564	581.545916	581.486310
581.410374	581.316325	581.201898	581.066029	580.919852
580.764417	580.596593	580.412747	580.211315	579.990393
579.747583	579.479855	579.183308	578.853447	578.488243
578.084196	577.639221	577.162629	576.718300	576.459014
576.406259	576.496701	576.666583	576.875632	577.126114
577.393943	577.641879	577.841460	577.974789	578.024484

574.029742 574.027065 574.055176 574.088669 574.097790
574.081810 574.058728 574.044636 574.044307 574.053121
574.062268 574.064243 574.058963 574.051094 574.042393
574.032866 574.024272 574.019941 574.031192 574.069937
574.111937 574.089321 574.020735 574.056717 574.191894
574.412731 574.694424 575.405668 575.974476 576.445429

Row 48

580.978700 581.020610 581.066935 581.117681 581.172746
581.231870 581.294584 581.360128 581.427375 581.494739
581.559607 581.614353 581.657397 581.689037 581.709472
581.718781 581.716898 581.703578 581.678347 581.640445
581.588742 581.523519 581.449571 581.360311 581.255496
581.135957 581.002108 580.854043 580.691619 580.514535
580.322409 580.114878 579.891758 579.653342 579.400970
579.138111 578.872217 578.622927 578.425015 578.304931
578.277545 578.343825 578.497196 578.729609 579.032260
579.390474 579.774685 580.127124 580.359237 580.404503
580.293037 580.115297 579.935091 579.764959 579.584053
579.368171 579.112882 578.831775 578.539073 578.238870
577.926633 577.597145 577.250561 576.891611 576.525575
576.155058 575.774320 575.354230 574.859740 574.204856
574.049866 573.970985 574.052531 574.133641 574.144859
574.099145 574.047843 574.023527 574.029391 574.052466
574.075046 574.077718 574.063944 574.051669 574.040308
574.024192 574.008082 573.988205 573.980492 574.058316
574.191634 574.199324 573.939092 575.046916 575.835998
576.466591 576.948593 577.332178 577.652092 577.908178

Row 49

581.019419 581.059094 581.102670 581.150088 581.201182
581.255640 581.312961 581.372407 581.432949 581.493224
581.551517 581.605797 581.653533 581.691004 581.717878
581.734363 581.740543 581.736341 581.721468 581.695956
581.662897 581.621431 581.562601 581.486959 581.395857
581.290277 581.170898 581.038168 580.892390 580.733803
580.562687 580.379501 580.185074 579.980931 579.769780
579.556251 579.347816 579.155467 578.998211 578.906416
578.893839 578.967006 579.128087 579.377709 579.716101
580.140951 580.637703 581.147311 581.478306 581.508507
581.277886 581.004502 580.790836 580.626498 580.450832
580.206767 579.892713 579.549306 579.210084 578.881403
578.551019 578.208189 577.856154 577.506532 577.169250
576.848473 576.541626 576.239525 575.929610 575.590458
575.161079 574.529817 574.054960 574.244990 574.242513
574.115049 574.006541 573.972634 573.998599 574.051035
574.108991 574.108319 574.063069 574.050152 574.046289
574.014067 573.987873 573.984418 573.816782 574.539243
575.279954 575.891700 576.438450 576.993169 577.517790
577.982589 578.369199 578.674205 578.909474 579.077818

Row 50

581.056377 581.093785 581.134650 581.178872 581.226253
581.276469 581.329037 581.383286 581.438328 581.493044
581.546092 581.595959 581.641062 581.679904 581.711270
581.734419 581.749219 581.756165 581.756260 581.750773
581.738954 581.709500 581.661959 581.597927 581.518721
581.425403 581.318827 581.199696 581.068638 580.926289
580.773400 580.610974 580.440460 580.264018 580.084880
579.907793 579.739436 579.588550 579.465418 579.388324
579.383333 579.459754 579.624514 579.884644 580.249726
580.734620 581.360903 581.972192 582.287394 582.334529
582.123212 581.740081 581.514235 581.408984 581.288329
581.012594 580.603214 580.175827 579.792302 579.450067
579.110566 578.747139 578.374445 578.019287 577.696429
577.409202 577.154396 576.925213 576.712686 576.504547
576.283630 576.037697 575.756641 575.383906 574.630244
574.106897 573.872998 573.861900 573.947803 574.023766
574.202174 574.193594 574.012755 574.029565 574.413773
574.828700 575.073733 575.320388 575.688470 576.166590
576.691163 577.222531 577.747985 578.262205 578.731467
579.122428 579.441409 579.694599 579.886520 580.018274

Row 51

581.089977 581.125130 581.163359 581.204548 581.248491
581.294879 581.343278 581.393111 581.443648 581.494008
581.543182 581.590088 581.633652 581.672930 581.707237
581.736271 581.760187 581.779600 581.808567 581.808567
581.806992 581.786316 581.748144 581.693921 581.624913
581.542219 581.446804 581.339547 581.221301 581.092977
580.955639 580.810625 580.659716 580.505334 580.350794
580.200555 580.060416 579.937511 579.840022 579.776750
579.771292 579.843813 580.003333 580.260257 580.629787
581.138801 581.837878 582.428265 582.736073 582.794932
582.620130 582.248565 582.072106 582.063881 581.948620
581.681300 581.232288 580.690097 580.275859 579.960090
579.635540 579.230008 578.812038 578.440264 578.127408
577.869975 577.660311 577.490071 577.351060 577.234834
577.133741 577.043273 576.952610 576.816138 576.546542
576.072952 575.309117 574.430463 574.075100 574.106221
574.636120 575.028334 575.268593 575.510817 575.768877
576.134474 576.333342 576.419340 576.716454 577.150969
577.658802 578.197475 578.741364 579.228687 579.640213
579.984653 580.266978 580.490586 580.657549 580.768270

Row 52

581.120574 581.153507 581.189197 581.227523 581.268293
581.311230 581.355964 581.402025 581.448841 581.495750
581.542035 581.586965 581.629875 581.670248 581.707812
581.742622 581.775107 581.806065 581.836591 581.860705
581.865434 581.851859 581.821396 581.775367 581.714982
581.641350 581.555502 581.458427 581.351130 581.234695
581.110374 580.979686 580.844549 580.707426 580.571492
580.440780 580.320278 580.215918 580.134436 580.083188
580.073230 580.133628 580.276987 580.513590 580.857766
581.333045 581.982765 582.562736 582.867016 582.929731
582.770354 582.454005 582.387410 582.396345 582.285423
582.029693 581.606588 581.030086 580.623619 580.425328
580.150944 579.655092 579.153304 578.764504 578.467743
578.244687 578.080773 577.965010 577.889739 577.847744
577.832732 577.847189 577.898954 577.948955 577.875873
577.577314 576.858646 575.432008 574.107300 574.581821
575.359969 575.890252 576.220673 576.345591 576.599902
576.820995 577.054123 577.093709 577.397409 577.857620
578.397842 578.974685 579.507232 579.959204 580.341775
580.661797 580.923503 581.129558 581.281410 581.379338

Row 53

581.148473 581.179236 581.212489 581.248116 581.285949
581.325756 581.367239 581.410032 581.453713 581.497818
581.541875 581.585446 581.628190 581.669932 581.710734
581.750955 581.791290 581.832766 581.875623 581.904200
581.913891 581.905997 581.881794 581.842503 581.789281
581.732321 581.645415 581.556888 581.458741 581.352159
581.238487 581.119314 580.996568 580.872625 580.750411
580.633496 580.526140 580.433289 580.360510 580.313926
580.300225 580.340930 580.458006 580.658872 580.951968
581.346755 581.848596 582.387243 582.689493 582.745519
582.574987 582.364253 582.381531 582.425557 582.331799
582.087162 581.676102 581.118376 580.756037 580.628055
580.373194 579.901832 579.354414 578.979501 578.717980
578.541187 578.428193 578.365534 578.349168 578.373662
578.424181 578.506923 578.675595 578.978198 579.077441
578.589879 577.634366 576.275476 574.699561 575.445976
576.104674 576.651452 577.029387 577.207104 577.235207
577.244751 577.411435 577.453868 577.843757 578.376093
578.977061 579.576104 580.088800 580.524968 580.893770
581.201380 581.451873 581.647840 581.790719 581.880927

Row 54

581.173941 581.202589 581.233499 581.266572 581.301669
581.338605 581.377154 581.417052 581.458010 581.499736
581.541962 581.584490 581.627242 581.670318 581.714053
581.759071 581.806321 581.857086 581.906807 581.938461
581.951981 581.948543 581.929316 581.895440 581.848026
581.788158 581.716907 581.635359 581.544647 581.445997
581.340780 581.230580 581.117257 581.003023 580.890511
580.782823 580.683556 580.596793 580.527055 580.479262
580.458697 580.476444 580.559960 580.715163 580.943639
581.242123 581.593716 581.947038 582.195585 582.244665
582.151377 582.063219 582.085609 582.169199 582.098049
581.860032 581.443755 580.943493 580.616392 580.474767
580.251990 579.817178 579.386945 579.080554 578.880130
578.767625 578.713883 578.700859 578.736563 578.837094
578.937481 579.015030 579.098424 579.176749 578.976519
578.514319 577.792293 576.816407 575.521573 575.982323
576.711839 577.368180 577.825138 577.959761 577.804415
577.528071 577.146915 577.529029 578.109949 578.748890
579.421842 580.022192 580.531824 580.964253 581.328683
581.631448 581.876867 582.067770 582.205825 582.291721

Row 55

581.197208 581.223792 581.252445 581.283085 581.315603
581.349864 581.385709 581.422965 581.461459 581.501042
581.541618 581.583179 581.625859 581.669977 581.716094
581.765058 581.818053 581.876618 581.929094 581.962979
581.979348 581.979285 581.963878 581.934205 581.891333
581.836322 581.770240 581.694175 581.609270 581.516751
581.417972 581.314457 581.207952 581.100470 580.994329
580.892180 580.797010 580.712115 580.641055 580.587580
580.555536 580.550082 580.596371 580.702231 580.864196
581.072465 581.305444 581.523468 581.673355 581.721460
581.690564 581.642170 581.625041 581.633675 581.572725
581.332195 580.953358 580.577038 580.280789 580.064093
579.843773 579.564137 579.291919 579.080116 578.955935
579.937736 578.955438 578.980747 579.049617 579.148467
579.204766 579.235766 579.248330 579.196639 578.998566
578.616081 578.028762 577.230580 576.196017 576.307462
577.164486 577.952524 578.379155 578.484635 578.288295
577.796362 577.225145 577.486785 578.252048 579.004467
579.732215 580.346160 580.863766 581.300644 581.667114
581.970236 582.214862 582.404248 582.540423 582.624410

Row 56

581.218478 581.243044 581.269507 581.297807 581.327864
581.359588 581.392879 581.427641 581.463801 581.501325
581.540254 581.580732 581.623057 581.667718 581.715453
581.767296 581.824625 581.888544 581.941949 581.977321
581.995667 581.998005 581.985362 581.958765 581.919244
581.867837 581.805591 581.733587 581.652950 581.564882
581.470687 581.371801 581.269830 581.166568 581.064025
580.964423 580.870185 580.783895 580.708227 580.645846



580.599248	580.570591	580.579244	580.636849	580.737166	578.235175	577.847768	577.353504	577.704594	578.937750
580.868542	581.011687	581.139383	581.222793	581.246107	579.930575	580.713171	581.347119	581.866102	582.290921
581.217882	581.163191	581.100882	581.022751	580.890583	582.635321	582.908738	583.117752	583.266911	583.359229
580.671554	580.386423	580.093402	579.834257	579.615578	Row 61				
579.424960	579.271535	579.129461	578.999498	578.992734					
579.136913	579.224969	579.284823	579.344277	579.402433					
579.442998	579.458411	579.438730	579.355956	579.158663					
578.801759	578.269713	577.541070	576.562558	576.278318					
577.337382	578.215487	578.673657	578.780966	578.559805					
578.014156	577.413925	577.411656	578.303766	579.159867					
579.932301	580.569902	581.103003	581.550090	581.923175					
582.230386	582.477313	582.667760	582.804192	582.888000					
Row 57					581.300681	581.315556	581.331602	581.348811	581.367187
					581.386749	581.407542	581.429643	581.453181	581.478349
					581.505423	581.534791	581.566972	581.602652	581.642718
					581.688299	581.740809	581.801227	581.851877	581.885333
					581.902455	581.904130	581.891271	581.864821	581.825745
					581.775018	581.713615	581.642504	581.562639	581.474961
					581.380396	581.279861	581.174257	581.064454	580.951264
					580.835389	580.717338	580.597299	580.474983	580.349479
					580.219162	580.081635	579.952728	579.842743	579.744128
					579.647166	579.543095	579.426418	579.288100	579.105696
581.237930	581.260514	581.284841	581.310868	581.338544	579.094602	579.250555	579.420010	579.580409	579.725592
581.367814	581.398631	581.430962	581.464812	581.500240	579.860699	579.990041	580.112201	580.223588	580.320878
581.537387	581.576516	581.618042	581.662582	581.711002	580.404174	580.474011	580.530423	580.573513	580.604952
581.764470	581.824512	581.891131	581.944931	581.981117	580.628316	580.646476	580.662263	580.678546	580.698295
580.000647	582.004490	581.993626	581.969046	581.931748	580.724722	580.731107	580.675204	580.551781	580.353010
581.882745	581.823064	581.753763	581.675941	581.590755	580.066735	579.672880	579.134432	578.371067	577.158575
581.499441	581.403333	581.303882	581.202669	581.101403	576.541158	577.784561	578.331637	578.540544	578.523351
581.001912	580.906108	580.815934	580.733271	580.659817	578.327732	577.975943	577.513064	577.471877	578.716929
580.596891	580.545143	580.518235	580.531450	580.577508	579.767675	580.594994	581.260450	581.802096	582.243426
580.645065	580.718302	580.778115	580.806496	580.793333	582.599917	582.882173	583.097584	583.251280	583.346696
580.740491	580.657465	580.550308	580.413198	580.234140	Row 62				
580.011976	579.765111	579.527042	579.307601	579.108000					
579.006018	579.163141	579.249986	579.301169	579.364468					
579.444620	579.516209	579.573374	579.622916	579.665021					
579.693588	579.700847	579.675532	579.580095	579.368310					
579.020295	578.513472	577.808899	576.803290	575.892318	581.313320	581.326302	581.340304	581.355319	581.371349
577.235172	578.203940	578.724488	578.865190	578.650411	581.388411	581.406546	581.425825	581.446369	581.468351
578.115267	577.554669	577.258435	578.262729	579.220851	581.492025	581.517737	581.545952	581.577278	581.612496
580.040518	580.708786	581.262614	581.724008	582.107016	581.652591	581.698788	581.752580	581.801328	581.832670
582.421041	582.672536	582.865934	583.004182	583.089063	581.847454	581.846567	581.830934	581.801519	581.759314
Row 58					581.705317	581.640519	581.565882	581.482333	581.390760
					581.292019	581.186934	581.076298	580.960859	580.841297
					580.718179	580.591871	580.462367	580.329066	580.190570
					580.044685	579.889841	579.746765	579.620254	579.503144
					579.381878	579.243635	579.096834	579.078343	579.221710
					579.361569	579.518242	579.685501	579.851348	580.009877
					580.159924	580.298693	580.421757	580.529774	580.623253
					580.702770	580.768823	580.821766	580.861962	580.889885
					580.906100	580.911925	580.915119	580.920881	580.933439
					580.957369	580.956047	580.988354	580.780845	580.598111
581.255728	581.276359	581.298587	581.322386	581.347725	580.342077	580.000481	579.553832	578.969421	578.188248
581.374582	581.402949	581.432843	581.464325	581.497522	577.350245	578.246707	578.597301	578.712775	578.654953
581.532651	581.570051	581.610220	581.653854	581.701900	578.448293	578.101020	577.628829	577.073558	578.428297
581.755603	581.816570	581.883978	581.937679	581.974056	579.540196	580.420155	581.120500	581.686514	582.145305
581.994030	581.998535	581.988518	581.964942	581.928782	582.514450	582.805890	583.027914	583.186264	583.284797
581.881029	581.822689	581.754794	581.678406	581.594630	Row 63				
581.504625	581.409617	581.310903	581.209858	581.107915					
581.006547	580.907213	580.811291	580.719973	580.634124					
580.554088	580.479393	580.420593	580.394566	580.394057					
580.408666	580.425368	580.429629	580.407941	580.351604					
580.259688	580.136455	579.982851	579.790071	579.553225					
579.305309	579.061390	579.120111	579.219713	579.300788					
579.391317	579.489908	579.571767	579.634925	579.693859					
579.753052	579.807749	579.855038	579.895649	579.929287					
579.953012	579.961604	579.934357	579.820140	579.601758					
579.260842	578.770915	578.084633	577.098485	575.506131	581.325018	581.336119	581.348087	581.360908	581.374577
576.986661	577.960010	578.560604	578.742737	578.554872	581.389102	581.404511	581.420861	581.438247	581.456813
578.147397	577.639977	577.036802	578.126032	579.194904	581.476765	581.498390	581.522073	581.548314	581.577756
580.070234	580.774018	581.352190	581.830805	582.226133	581.611202	581.649643	581.694275	581.739643	581.768289
582.548963	582.806686	583.004412	583.145601	583.232440	581.780010	581.775698	581.756302	581.722829	581.676322
Row 59					581.617830	581.548380	581.468942	581.380421	581.283654
					581.179418	581.068449	580.951438	580.829029	580.701798
					580.570240	580.434702	580.295182	580.150909	579.999914
					579.839145	579.670685	579.516809	579.378805	579.254039
					579.126419	578.986275	578.120484	579.272695	579.430486
					579.593118	579.763583	579.939706	580.115979	580.287050
					580.441550	580.578131	580.698336	580.803186	580.893415
					580.969648	581.032436	581.082273	581.119660	581.145164
					581.159464	581.163401	581.158097	581.150442	581.152163
					581.168482	581.161099	581.103458	580.993549	580.828284
581.379943	581.405840	581.433237	581.462234	581.493002	580.603562	580.314540	579.957045	579.533830	579.082559
581.525803	581.561021	581.599197	581.641066	581.687601	578.739385	578.854015	578.945175	578.939987	578.821094
581.740067	581.800079	581.866766	581.919900	581.955875	578.584722	578.223757	577.736386	577.171329	578.092252
581.975587	581.979945	581.969874	581.946318	581.910239	579.248925	580.189112	580.928071	581.520179	581.997244
581.862611	581.804422	581.736679	581.660404	581.576647	582.379418	582.680207	582.908895	583.071872	583.173422
581.486488	581.391043	581.291466	581.188940	581.084655	Row 64				
580.979772	580.875363	580.772321	580.671249	580.572321					
580.475088	580.378224	580.291543	580.231857	580.192005					
580.162478	580.132208	580.089110	580.020663	579.916007					
579.773157	579.600362	579.398683	579.157804	579.126909					

581.442055 581.454514 581.467824 581.482210 581.497964
581.515450 581.535119 581.557496 581.583173 581.604379
581.607621 581.593570 581.563273 581.517912 581.458761
581.387109 581.304169 581.210996 581.108446 580.997201
580.877822 580.750830 580.616736 580.475987 580.328905
580.175800 580.017362 579.854963 579.689825 579.518621
579.334046 579.152129 578.981895 578.961618 579.051557
579.161853 579.291105 579.444643 579.618535 579.805942
580.002296 580.204785 580.409643 580.598880 580.768150
580.918431 581.050823 581.166407 581.266148 581.350884
581.421346 581.478191 581.522041 581.553516 581.573291
581.582143 581.581039 581.571238 581.554456 581.533104
581.518706 581.500963 581.444616 581.349354 581.215163
581.042754 580.834684 580.597371 580.344283 580.098642
579.887192 579.716824 579.561611 579.384269 579.154988
578.851509 578.452603 577.962599 577.424939 577.398760
578.611259 579.575420 580.383527 581.033108 581.548596
581.957250 582.276623 582.518345 582.690171 582.797171

Row 66

581.355828 581.361432 581.367422 581.373744 581.380348
581.387184 581.394206 581.401372 581.408651 581.416025
581.423489 581.431058 581.438772 581.446693 581.454914
581.463561 581.472790 581.482782 581.493734 581.505078
581.502786 581.482199 581.444437 581.390837 581.322902
581.242169 581.150057 581.047713 580.935952 580.815289
580.686076 580.548674 580.403542 580.251108 580.091435
579.924241 579.750067 579.571704 579.396256 579.225764
579.044331 579.004239 578.995413 578.973630 579.077512
579.226054 579.388501 579.568082 579.762890 579.969170
580.183645 580.403895 580.614012 580.802585 580.970728
581.119574 581.250252 581.363836 581.461299 581.543503
581.611210 581.665107 581.705833 581.734021 581.750334
581.755517 581.750462 581.736295 581.714485 581.686994
581.656855 581.630306 581.573797 581.483814 581.360905
581.206484 581.023625 580.818105 580.599360 580.379886
580.170573 579.972421 579.772802 579.551161 579.286195
578.957696 578.543889 578.069058 577.551433 577.092761
578.305753 579.263842 580.049714 580.708000 581.243220
581.664966 581.993405 582.241458 582.417521 582.526969

Row 67

581.365126 581.368977 581.373052 581.377282 581.381596
581.385917 581.390167 581.394263 581.398123 581.401660
581.404786 581.407410 581.409436 581.410760 581.411271
581.410841 581.409325 581.406554 581.402332 581.396421
581.385811 581.357373 581.310469 581.246659 581.167805
581.075865 580.972609 580.859352 580.736821 580.605221
580.464499 580.314729 580.156421 579.990326 579.816376
579.632295 579.437200 579.233897 579.031379 579.052900
579.065940 579.058129 579.039505 579.014062 579.099206
579.273166 579.465009 579.671376 579.889474 580.116475
580.350168 580.583503 580.794942 580.983754 581.151363
581.299114 581.428259 581.539940 581.635174 581.714857
581.779775 581.830631 581.868064 581.892688 581.905124
581.906037 581.896184 581.876473 581.848019 581.812207
581.770732 581.728945 581.671367 581.584891 581.470116
581.328443 581.162514 580.976612 580.776673 580.569249
580.358870 580.144705 579.919102 579.669264 579.379858
579.033838 578.618952 578.171431 577.674262 577.065845
578.024937 578.987205 579.746992 580.369146 580.885805
581.311803 581.649279 581.903773 582.084183 582.196071

Row 68

581.374160 581.376317 581.378540 581.380743 581.382834
581.384710 581.386259 581.387356 581.387865 581.387632
581.386485 581.384223 581.380617 581.375395 581.368235
581.358754 581.346497 581.330928 581.311439 581.287361
581.258004 581.219386 581.161291 581.084761 580.992224
580.886359 580.769572 580.643475 580.508625 580.364644
580.210638 580.046028 579.871487 579.688966 579.500558
579.297332 579.074128 579.049076 579.092522 579.127666
579.135531 579.120205 579.089892 579.053929 579.011581
579.300853 579.522625 579.757215 580.000135 580.248903
580.502188 580.741724 580.955312 581.144909 581.312312
581.459136 581.586812 581.696591 581.789562 581.866660
581.928696 581.976373 582.010318 582.031105 582.039285
582.035413 582.020075 581.993917 581.957661 581.912099
581.858031 581.796463 581.734708 581.650124 581.540715
581.407475 581.252274 581.077920 580.887893 580.685511
580.472480 580.247363 580.004860 579.736257 579.430297
579.073251 578.682828 578.276833 577.830880 577.287236
577.817883 578.772804 579.492362 580.070798 580.549286
580.945500 581.267244 581.518481 581.702663 581.824406

Row 69

581.383058 581.383591 581.384039 581.384300 581.384259
581.383789 581.382744 581.380959 581.378246 581.374385
581.369122 581.362153 581.353119 581.341584 581.327019
581.308785 581.286108 581.258067 581.223596 581.181519
581.130653 581.069984 580.997055 580.904476 580.794766
580.671005 580.537660 580.396609 580.248087 580.090676
579.921802 579.739010 579.543279 579.338389 579.132776
579.102371 579.155913 579.191762 579.218641 579.231644
579.224032 579.194637 579.146179 579.083061 579.064014
579.304006 579.562287 580.827786 580.096894 580.367825
580.637378 580.881671 581.097813 581.288382 581.455632

581.601500 581.727628 581.835405 581.925998 582.000388
582.059403 582.103742 582.134000 582.150701 582.154307
582.145246 582.123919 582.090703 582.045940 581.989882
581.922583 581.843673 581.761513 581.677497 581.571263
581.443148 581.294206 581.126038 580.940488 580.739063
580.522116 580.288059 580.032950 579.750570 579.432677
579.084282 578.735042 578.383592 578.019617 577.606348
577.761938 578.654648 579.295651 579.814360 580.249549
580.615710 580.918962 581.162512 581.349141 581.482423

Row 70

581.391941 581.390932 581.389697 581.388118 581.386060
581.383372 581.379876 581.375371 581.369621 581.362346
581.353216 581.341833 581.327718 581.310282 581.288803
581.262392 581.229956 581.190166 581.141436 581.081955
581.009816 580.923336 580.821621 580.705205 580.572248
580.425810 580.271848 580.113631 579.950607 579.779702
579.595944 579.389878 579.164751 579.034153 579.146558
579.241771 579.301029 579.336173 579.353835 579.352995
579.330624 579.284728 579.214646 579.118887 579.987026
579.287500 579.586688 579.885832 580.182337 580.475119
580.757157 581.006387 581.224992 581.416327 581.583184
581.727855 581.852211 581.957778 582.045807 582.117317
582.173143 582.213970 582.240356 582.252758 582.251545
582.237011 582.209374 582.168759 582.115170 582.048413
581.967969 581.872781 581.765458 581.665349 581.560602
581.435195 581.289328 581.123665 580.938960 580.735655
580.513406 580.270646 580.004338 579.709965 579.392947
579.077356 578.769960 578.477457 578.210189 577.993892
578.068596 578.644910 578.150836 579.593008 579.980094
580.315805 580.601554 580.838154 581.026850 581.169867

Row 71

581.400921 581.398465 581.395653 581.392353 581.388413
581.383659 581.377890 581.370869 581.362318 581.351908
581.339244 581.323846 581.305129 581.282375 581.254687
581.220952 581.179774 581.129407 581.067693 580.992023
580.899416 580.786890 580.652426 580.496661 580.324463
580.144407 579.963944 579.786733 579.609581 579.425954
579.233545 579.054555 579.151869 579.247696 579.334753
579.407952 579.460509 579.491527 579.501997 579.490946
579.455933 579.394122 579.302871 579.181040 579.035645
579.259908 579.598597 579.935118 580.260185 580.573510
580.865305 581.118875 581.339250 581.530710 581.696626
581.839646 581.961857 582.064912 582.150124 582.218540
582.270991 582.308135 582.330481 582.338418 582.332216
582.312039 582.277933 582.229803 582.167370 582.090092
581.997045 581.886733 581.758939 581.633199 581.510424
581.383214 581.238127 581.072303 580.875364 580.678186
580.448911 580.196395 579.919116 579.628775 579.336076
579.049433 578.778588 578.536954 578.347352 578.257426
578.359709 578.661307 579.027584 579.390861 579.730284
580.037447 580.307875 580.539131 580.730415 580.882442

Row 72

581.410100 581.406301 581.402030 581.397143 581.391475
581.384834 581.376995 581.367698 581.356629 581.343421
581.327624 581.308699 581.285977 581.258636 581.225644
581.185700 581.137150 581.077871 581.005128 580.915399
580.804235 580.666382 580.496880 580.294461 580.066741
579.830806 579.606918 579.408024 579.219111 579.021394
579.129965 579.256005 579.357930 579.447142 579.525040
579.588699 579.634620 579.660620 579.665288 579.646671
579.601795 579.526570 579.415714 579.264034 579.077998
579.202936 579.598693 579.981907 580.336157 580.666894
580.965738 581.222019 581.442776 581.633256 581.797377
581.938092 582.057658 582.157813 582.239906 582.304986
582.353866 582.387162 582.405331 582.408683 582.397393
582.371502 582.330904 582.275316 582.204233 582.116856
582.011981 581.887854 581.743111 581.596661 581.452246
581.304242 581.146798 580.974386 580.782619 580.569106
580.334004 580.080045 579.812133 579.536793 579.261845
578.996562 578.752532 578.545563 578.398923 578.346246
578.421117 578.618468 578.889342 579.187959 579.487150
579.771253 580.030675 580.259641 580.455193 580.616561

Row 73

581.419571 581.414540 581.408938 581.402612 581.395385
581.387051 581.377372 581.366065 581.352798 581.337170
581.318701 581.296805 581.270766 581.239689 581.202454
581.157641 581.103414 581.037374 580.956319 580.855884
580.729985 580.570085 580.364986 580.105350 579.800252
579.483689 579.193245 578.989477 579.100707 579.235699
579.357538 579.467761 579.564616 579.649156 579.721529
579.779844 579.821452 579.843835 579.844654 579.821263
579.770127 579.686021 579.560514 579.378701 579.102728
579.068211 579.599485 580.039192 580.418811 580.760344
581.062272 581.318388 581.537404 581.725364 581.886572
582.024167 582.140487 582.237294 582.335932 582.377423
582.422537 582.451840 582.465722 582.464415 582.448001
582.416409 582.369399 582.306534 582.227133 582.130208
582.014370 581.877717 581.718651 581.556029 581.394682
581.229817 581.056725 580.871149 580.669812 580.450947
580.214695 579.963241 579.700739 579.433142 579.168129
578.915271 578.686564 578.497307 578.366809 578.316727
578.362839 578.502301 578.712815 578.966123 579.237509
579.507761 579.763091 579.994605 580.197372 580.369402

Row 74

581.429412	581.423269	581.416472	581.408862	581.400255
581.390438	581.379163	581.366135	581.351010	581.333373
581.312727	581.288467	581.259854	581.225969	581.185663
581.137470	581.079495	581.009235	580.923277	580.816799
580.682599	580.509083	580.257554	579.947130	579.518931
579.080657	579.047766	579.214509	579.357552	579.476805
579.584750	579.684048	579.774305	579.854724	579.923994
579.979937	580.019829	580.040845	580.040218	580.015072
579.961888	579.875396	579.746232	579.555456	579.260609
579.006086	579.647718	580.128240	580.518616	580.859242
581.158019	581.409887	581.624426	581.808001	581.965002
582.098565	582.210986	582.303974	582.378812	582.436463
582.477631	582.502816	582.512334	582.506337	582.484819
582.447604	582.394340	582.324461	582.237151	582.131284
582.005348	581.857353	581.686167	581.511463	581.337160
581.159139	580.973486	580.776747	580.566295	580.340705
580.100084	579.846290	579.583054	579.316024	579.052799
578.802983	578.578274	578.392468	578.260943	578.198631
578.215793	578.313643	578.483667	578.709478	578.968758
579.238200	579.499278	579.740092	579.954233	580.139061

Row 75

581.439690	581.432557	581.424705	581.415973	581.406173
581.395090	581.382472	581.368023	581.351395	581.332173
581.309861	581.283861	581.253442	581.217706	581.175532
581.125506	581.068805	580.994036	580.906950	580.799947
580.666092	580.493840	580.260257	579.894512	579.464064
579.403901	579.439424	579.522619	579.619762	579.716418
579.810262	579.900378	579.985305	580.063186	580.131719
580.188061	580.228974	580.251160	580.251562	580.227462
580.176152	580.093967	579.974296	579.803634	579.553558
579.164991	579.792897	580.269818	580.643938	580.967379
581.254514	581.497351	581.704400	581.881616	582.033078
582.161688	582.269562	582.358272	582.428985	582.482566
582.519633	582.540605	582.545717	582.535040	582.508481
582.465773	582.406464	582.329885	582.235113	582.120918
581.985702	581.827417	581.646447	581.463271	581.279391
581.091233	580.895427	580.689003	580.469656	580.236055
579.988153	579.727503	579.457530	579.183748	578.913847
578.657567	578.426313	578.232461	578.088295	578.004571
577.989248	578.047947	578.185696	578.400253	578.668177
578.955153	579.235224	579.493916	579.724509	579.924750

Row 76

581.450457	581.442458	581.433694	581.424003	581.413200
581.401071	581.387365	581.371795	581.354018	581.333634
581.310165	581.283039	581.251568	581.214910	581.172036
581.121662	581.062168	580.991478	580.906862	580.804636
580.679650	580.524452	580.328536	580.087161	579.874641
579.779240	579.768967	579.808091	579.872806	579.949269
580.030792	580.113770	580.195454	580.273107	580.343633
580.403399	580.448344	580.474389	580.478053	580.456963
580.409925	580.336245	580.234684	580.102226	579.932803
579.702872	580.071676	580.470934	580.795401	581.084815
581.350965	581.580262	581.777037	581.946093	582.090810
582.213639	582.316392	582.400419	582.466726	582.516047
582.548896	582.565594	582.566294	582.550982	582.519483
582.471449	582.406341	582.323402	582.221625	582.099699
581.955957	581.788304	581.600569	581.412046	581.221471
581.025705	580.821735	580.606826	580.378727	580.135934
579.878029	579.606097	579.323202	579.034841	578.749127
578.476471	578.228616	578.017138	577.851769	577.739250
577.683820	577.692069	577.788214	578.010434	578.322227
578.653991	578.970012	579.256395	579.508771	579.726974

Row 77

581.461750	581.453011	581.443477	581.432991	581.421371
581.408410	581.393868	581.377469	581.358888	581.337749
581.313606	581.285936	581.254112	581.217391	581.174873
581.125470	581.067859	581.000417	580.921154	580.827658
580.717143	580.586986	580.437213	580.278955	580.145007
580.066289	580.043252	580.061703	580.107435	580.170035
580.242814	580.321406	580.402441	580.482672	580.558406
580.625166	580.676893	580.707032	580.714539	580.698641
580.658408	580.593656	580.510647	580.417061	580.328116
580.295445	580.453832	580.708622	580.962506	581.207110
581.444195	581.656786	581.841256	582.000799	582.137846
582.254253	582.351435	582.430469	582.492160	582.537087
582.565644	582.578049	582.574365	582.554498	582.518193
582.465027	582.394385	582.305438	582.197107	582.068017
581.916440	581.740230	581.549899	581.358678	581.163880
580.962698	580.752326	580.530056	580.293438	580.040498
579.770085	579.482429	579.179930	578.868054	578.555865
578.255546	577.980605	577.743058	577.550443	577.404108
579.299768	577.230208	577.208613	577.486121	577.121144
578.336660	578.707669	579.031140	579.309721	579.547603

Row 78

581.473597	581.464239	581.454073	581.442949	581.430660
581.417109	581.401971	581.385020	581.365958	581.344440
581.320068	581.292377	581.260826	581.224783	581.183514
581.136160	581.081734	581.019112	580.947074	580.864421
580.770319	580.665180	580.552637	580.442596	580.335140

580.293408	580.272448	580.283928	580.320506	580.375413
580.443425	580.520635	580.603812	580.689711	580.774033
580.843791	580.894128	580.924820	580.935672	580.926585
580.897734	580.849983	580.785840	580.717543	580.671804
580.681606	580.777429	580.939201	581.128506	581.327205
581.529704	581.724209	581.895404	582.044702	582.173541
582.283136	582.374473	582.448323	582.505274	582.545472
582.569986	582.578121	582.570120	582.545806	582.504853
582.446768	582.370870	582.276269	582.161822	582.026099
581.867317	581.684891	581.496017	581.304312	581.107430
580.902808	580.687719	580.459321	580.214727	579.951141
579.666156	579.358408	579.028824	578.682440	578.329948
577.987291	577.672546	577.400798	577.178232	576.998626
576.844788	576.684888	576.422644	576.798146	577.478908
578.017526	578.458880	578.825466	579.132176	579.389732

Row 79

581.486009	581.476150	581.465485	581.453874	581.441153
581.427140	581.411628	581.394381	581.375131	581.353575
581.329365	581.302106	581.271352	581.236596	581.192774
581.152766	581.102411	581.045552	580.981625	580.910348
580.832098	580.748586	580.663851	580.585027	580.521365
580.480795	580.466773	580.478300	580.511970	580.563862
580.630487	580.708989	580.796878	580.891077	580.975184
581.041922	581.091138	581.122799	581.137030	581.134223
581.115262	581.081945	581.037765	580.989179	580.955798
580.965934	581.029585	581.139907	581.280629	581.438708
581.606843	581.779558	581.937574	582.076550	582.197063
582.299736	582.385140	582.453753	582.505941	582.541955
582.561924	582.565857	582.553637	582.525014	582.479592
582.416814	582.335944	582.236033	582.115891	581.974032
581.808624	581.626275	581.406069	581.250253	581.053167
580.846959	580.628899	580.395892	580.144426	579.870534
579.569869	579.238224	578.873193	578.477787	578.064882
577.657736	577.284304	576.968757	576.719125	576.516503
576.326513	576.110879	575.808840	576.070775	577.046246
577.725221	578.240794	578.649816	578.982517	579.257249

Row 80

581.498989	581.488738	581.477700	581.465742	581.452714
581.438452	581.422768	581.405454	581.386276	581.364974
581.341257	581.314804	581.285263	581.252255	581.215381
581.174238	581.128456	581.077759	581.022067	580.961687
580.897595	580.831844	580.767957	580.710985	580.666723
580.640143	580.634022	580.648728	580.682987	580.734860
580.802429	580.884099	580.978559	581.074446	581.154866
581.219385	581.267954	581.300695	581.317954	581.320413
581.309282	581.286612	581.255741	581.221775	581.192290
581.192032	581.232088	581.308739	581.413521	581.537792
581.675018	581.820752	581.965905	582.095043	582.207494
582.303400	582.382976	582.446433	582.493935	582.525576
582.541363	582.541205	582.524901	582.492129	582.442431
582.375195	582.289633	582.184749	582.059307	581.911777
581.742682	581.566509	581.385342	581.197856	581.002250
580.796262	580.577126	580.341459	580.085055	579.802549
579.486992	579.129564	578.720684	578.256086	577.750020
577.240111	576.773103	576.395959	576.135856	575.939441
575.730830	575.480425	575.206647	575.370931	576.690639
577.496751	578.074005	578.515961	578.867556	579.154105

Row 81

581.512525	581.501988	581.490692	581.478515	581.465325
581.450973	581.435295	581.418113	581.399228	581.378424
581.355468	581.330112	581.302096	581.271157	581.237043
581.199542	581.158516	581.113969	581.066146	581.015675
580.963759	580.912376	580.864411	580.823530	580.793673
580.778269	580.779577	580.798519	580.834987	580.888368
580.958028	581.043632	581.143572	581.235877	581.313542
581.376449	581.424648	581.458375	581.478102	581.484630
581.479223	581.463794	581.441094	581.414786	581.389124
581.376441	581.397265	581.44		

581.612558 581.450745 581.281216 581.103074 580.914896
580.714689 580.499776 580.266543 580.009983 579.722804
579.393614 579.002765 578.511128 577.825253 576.859810
575.842743 574.775969 574.795978 575.257819 575.581460
575.719888 575.782065 575.770843 575.612982 576.485860
577.364606 577.964356 578.410962 578.761722 579.046469

Row 83

581.541189 581.530353 581.518842 581.506563 581.493412
581.479280 581.464052 581.447605 581.429810 581.410540
581.389665 581.367067 581.342641 581.316315 581.288063
581.257934 581.226090 581.192846 581.158737 581.124578
581.091525 581.061117 581.035246 581.016046 581.005703
581.006217 581.019220 581.045927 581.087226 581.143895
581.216891 581.307713 581.407918 581.495504 581.566999
581.630587 581.678371 581.713397 581.736187 581.747482
581.748280 581.739867 581.723796 581.701775 581.675429
581.647518 581.640547 581.658531 581.697369 581.752929
581.821238 581.898606 581.981621 582.067046 582.151683
582.229915 582.294143 582.343770 582.378545 582.398220
582.405251 582.391123 582.363628 582.319545 582.258271
582.179068 582.081031 581.964227 581.835767 581.698090
581.551957 581.397607 581.234780 581.062733 580.880227
580.685471 580.476004 580.248452 579.998085 579.717983
579.397321 579.017461 578.541057 577.870854 577.013324
576.66719 576.163064 576.070538 576.137207 576.243492
576.319440 576.359705 576.353756 576.255136 576.697067
577.495153 578.035681 578.445348 578.772771 579.042312

Row 84

581.556257 581.545390 581.533900 581.521707 581.508725
581.494862 581.480026 581.464120 581.447049 581.428723
581.409057 581.387984 581.365463 581.341489 581.316113
581.289466 581.261787 581.233460 581.205055 581.177367
581.151450 581.128623 581.110437 581.098596 581.094830
581.100766 581.117822 581.147192 581.189904 581.246986
581.319693 581.409834 581.508669 581.594921 581.668097
581.728349 581.775943 581.811233 581.834712 581.847025
581.848993 581.841602 581.825964 581.803214 581.774344
581.741329 581.726040 581.733077 581.758752 581.799499
581.851879 581.912614 581.978589 582.046800 582.114292
582.178097 582.235222 582.281050 582.312243 582.328483
582.329436 582.314728 582.283917 582.236474 582.171762
582.089219 581.992092 581.882991 581.763295 581.634038
581.495862 581.348994 581.193250 581.028026 580.852281
580.664485 580.462520 580.243496 580.003440 579.736756
579.435297 579.086880 578.673983 578.183532 577.671035
577.258929 576.988360 576.849319 576.810436 576.824914
576.855925 576.887675 576.915086 576.941996 577.186428
577.745064 578.177664 578.528785 578.820786 579.067460

Row 85

581.571766 581.560934 581.549536 581.537503 581.524766
581.511251 581.496886 581.481600 581.465327 581.448009
581.429601 581.410080 581.389453 581.367768 581.345132
581.321729 581.297846 581.273895 581.250443 581.228237
581.208217 581.191508 581.179397 581.173269 581.174528
581.184520 581.204475 581.235496 581.278612 581.334882
581.405564 581.492351 581.589432 581.674819 581.747286
581.807064 581.854436 581.889759 581.913478 581.926142
581.928400 581.920989 581.904686 581.880223 581.848174
581.811259 581.791275 581.790709 581.806437 581.835442
581.874786 581.921612 581.973148 582.026691 582.079583
582.129192 582.172923 582.208267 582.232894 582.244785
582.242365 582.224624 582.191170 582.142206 582.078425
582.000857 581.910687 581.809095 581.697120 581.575572
581.444975 581.305537 581.157134 580.999298 580.831201
580.651617 580.458861 580.250691 580.024167 579.775473
579.499809 579.191803 578.848121 578.476559 578.110276
577.797367 577.566603 577.420862 577.346539 577.322344
577.329553 577.358696 577.412158 577.513641 577.726488
578.042450 578.360272 578.646137 578.897167 579.116586

Row 86

581.587677 581.576935 581.565686 581.553874 581.541443
581.528336 581.514501 581.499888 581.484458 581.468179
581.451042 581.433056 581.414266 581.394760 581.374683
581.354252 581.333774 581.313665 581.294469 581.276869
581.261691 581.249899 581.242564 581.240825 581.245837
581.258720 581.280520 581.312210 581.354713 581.408969
581.476026 581.557159 581.650816 581.735693 581.807695
581.867100 581.914210 581.949370 581.972974 581.985477
581.987383 581.979226 581.961529 581.934742 581.899154
581.860709 581.839085 581.833723 581.842197 581.862069
581.890890 581.926226 581.965667 582.006837 582.047391
582.085027 582.117508 582.142706 582.158675 582.163739
582.156585 582.136331 582.102557 582.055289 581.994929
581.922150 581.837770 581.742640 581.637534 581.523081
581.399703 581.267589 581.126676 580.976629 580.816838
580.646400 580.464096 580.268379 580.057372 579.828957
579.581103 579.312833 579.026541 578.731999 578.448912
578.201309 578.006384 577.869417 577.785902 577.746377
577.741789 577.767758 577.827403 577.933187 578.099831
578.317604 578.552937 578.781217 578.992337 579.183573

Row 87

581.603946 581.593341 581.582289 581.570745 581.558665
581.546010 581.532744 581.518836 581.504267 581.489033
581.473147 581.456647 581.439607 581.422140 581.404414
581.386664 581.369201 581.352430 581.336855 581.323092
581.311864 581.303991 581.300370 581.301943 581.309661
581.324448 581.347179 581.378664 581.419663 581.470907
581.533126 581.607055 581.693333 581.777972 581.849690
581.908799 581.955611 581.990452 582.013669 582.025633
582.026725 582.017321 581.997756 581.968270 581.928980
581.893434 581.872381 581.864403 581.867798 581.880700
581.901140 581.927090 581.956501 581.987321 582.017520
582.045104 582.068153 582.084857 582.093574 582.092894
582.081697 582.059200 582.024976 581.978937 581.921288
581.852454 581.772993 581.683512 581.584588 581.476703
581.360205 581.235272 581.101896 580.959875 580.808810
580.648109 580.477003 580.294582 580.099890 579.892124
579.671068 579.437921 579.196641 578.955399 578.726636
578.524178 578.358748 578.235273 578.153219 578.108859
578.098126 578.119052 578.173110 578.264516 578.395416
578.558723 578.739110 578.921944 579.097982 579.262637

Row 88

581.620528 581.610098 581.599280 581.588039 581.576345
581.564171 581.551494 581.538304 581.524597 581.510389
581.495712 581.480627 581.465224 581.449636 581.434043
581.418683 581.403861 581.389958 581.377437 581.366844
581.358808 581.354024 581.353244 581.357246 581.366810
581.382690 581.405592 581.436158 581.474960 581.522492
581.579146 581.645153 581.720435 581.802014 581.873590
581.932463 581.978950 582.013356 582.035985 582.047135
582.047090 582.036101 582.014358 581.981953 581.943020
581.913184 581.894032 581.884975 581.884959 581.892635
581.906474 581.924831 581.945994 581.968225 581.989786
582.008969 582.024132 582.033734 582.036382 582.030875
582.016247 581.991800 581.957110 581.912018 581.856599
581.791107 581.715916 581.631455 581.538154 581.436389
581.326451 581.208516 581.082633 580.948721 580.806574
580.655880 580.496258 580.327328 580.148831 579.960852
579.764186 579.560885 579.354925 579.152647 578.962373
578.792866 578.651256 578.541646 578.465061 578.420460
578.406199 578.421289 578.465901 578.540608 578.644167
578.771337 578.913431 579.061365 579.208073 579.349015

Row 89

581.637379 581.627153 581.616597 581.605685 581.594398
581.582720 581.570642 581.558165 581.545304 581.532085
581.518560 581.504800 581.490911 581.477034 581.463351
581.450098 581.437566 581.426106 581.416135 581.408136
581.402649 581.400265 581.401609 581.407321 581.418035
581.434353 581.456826 581.485936 581.522070 581.565496
581.616318 581.674380 581.739108 581.809222 581.879648
581.938340 581.984487 582.018378 582.040276 582.050421
582.049016 582.036215 582.012101 581.978421 581.947527
581.923345 581.906682 581.897520 581.895300 581.899109
581.907796 581.920056 581.934487 581.949636 581.964033
581.976228 581.984822 581.988505 581.986089 581.976545
581.959037 581.932938 581.897838 581.853540 581.800032
581.737452 581.666045 581.586115 581.497983 581.401950
581.298266 581.187114 581.068595 580.942736 580.809498
580.668802 580.520581 580.364850 580.201834 580.032150
579.857072 579.678850 579.501009 579.328421 579.166935
579.022513 578.900171 578.803235 578.733215 578.690248
578.673802 578.683293 578.718257 578.777914 578.860228
578.961199 579.075177 579.196107 579.318736 579.439152

Row 90

581.654455 581.644456 581.634181 581.623614 581.612745
581.601568 581.590084 581.578307 581.566260 581.553984
581.541538 581.529006 581.516499 581.504161 581.492173
581.480759 581.470193 581.460793 581.452933 581.447032
581.443554 581.442996 581.445877 581.452718 581.464027
581.480273 581.501873 581.529159 581.562359 581.601557
581.646636 581.697193 581.752400 581.810808 581.870109
581.926609 581.972417 582.005741 582.026813 582.035822
582.032909 582.018152 581.994257 581.969057 581.945882
581.926731 581.912633 581.903893 581.900296 581.901261
581.905947 581.913341 581.922309 581.931652 581.940141
581.946551 581.949698 581.948469 581.941849 581.928956
581.909062 581.881605 581.846199 581.802628 581.750825
581.690852 581.622865 581.547080 581.463742 581.373098
581.275373 581.170758 581.059404 580.941427 580.816923
580.685998 580.548818 580.405675 580.257098 580.103985
579.947780 579.790642 579.635562 579.486319 579.347197
579.222471 579.115830 579.029951 578.966378 578.925700
578.907869 578.912492 578.938892 578.985903 579.051493
579.132546 579.225062 579.324749 579.427657 579.530561

Row 91

581.671715 581.661957 581.651976 581.641763 581.631314
581.620633 581.609730 581.598627 581.587355 581.575964
581.564520 581.553112 581.541854 581.530887 581.520387
581.510565 581.501670 581.493992 581.487858 581.483632
581.481710 581.482506 581.486447 581.493953 581.505424
581.521218 581.541632 581.566876 581.597049 581.632096
581.671759 581.715502 581.762417 581.811107 581.859587
581.905256 581.945075 581.976043 581.995948 582.004097

582.001591	581.990943	581.975296	581.957671	581.940514	579.943264	579.883188	579.832540	579.792029	579.762102
581.925542	581.913782	581.905683	581.901241	581.900111	579.742943	579.734463	579.736314	579.747899	579.768393
581.901696	581.905217	581.909772	581.914379	581.918019	579.796780	579.831901	579.872519	579.917384	579.965297
581.919666	581.918321	581.913038	581.902954	581.887311					
581.865474	581.836943	581.801361	581.758505	581.708280					
581.650698	581.585854	581.513906	581.435045	581.349481					
581.257426	581.159079	581.054633	580.944275	580.828205	Row 96				
580.706666	580.579985	580.448635	580.313314	580.175041	581.759442	581.750944	581.742429	581.733907	581.725399
580.035262	579.895938	579.759570	579.629134	579.507870	581.716927	581.708522	581.700222	581.692074	581.684135
579.398969	579.305232	579.228816	579.171124	579.132862	581.676473	581.669166	581.662305	581.655993	581.650348
579.114180	579.114791	579.134011	579.170666	579.222965	581.645496	581.641579	581.638744	581.637147	581.636946
579.288448	579.364135	579.446840	579.533528	579.621575	581.638300	581.641356	581.646251	581.653096	581.661975
					581.672926	581.685939	581.700940	581.717781	581.736231
					581.755963	581.776557	581.797498	581.818187	581.837976
Row 92					581.856200	581.872243	581.885596	581.895918	581.903078
					581.907163	581.908456	581.907387	581.904460	581.900188
581.689117	581.679610	581.669929	581.660071	581.650039	581.895036	581.889375	581.883460	581.877424	581.871275
581.639842	581.629499	581.619036	581.608494	581.597925	581.864911	581.858134	581.850667	581.842176	581.832282
581.587401	581.577012	581.566871	581.557115	581.547910	581.820587	581.806684	581.790174	581.770680	581.747859
581.539452	581.531966	581.525710	581.520971	581.518062	581.721410	581.691079	581.656668	581.618031	581.575081
581.517316	581.519079	581.523697	581.531505	581.542811	581.527782	581.476150	581.420249	581.360184	581.296105
581.557879	581.576909	581.600015	581.627196	581.658304	581.228198	581.156693	581.081859	581.004015	580.923533
581.693004	581.730713	581.770548	581.811266	581.851233	580.840850	580.756478	580.671017	580.585160	580.499702
581.888497	581.920909	581.946502	581.963894	581.972691	580.415541	580.333665	580.255131	580.181033	580.112457
581.973465	581.967870	581.957923	581.945724	581.933096	580.050433	579.995884	579.949585	579.912121	579.898372
581.921428	581.911638	581.904203	581.899236	581.896547	579.864997	579.855433	579.854900	579.862912	579.878799
581.895719	581.896163	581.897163	581.897924	581.897605	579.901734	579.930776	579.964917	580.003128	580.044407
581.895351	581.890323	581.881720	581.868809	581.850937					
581.827554	581.798216	581.762598	581.720483	581.671762					
581.616415	581.554501	581.486136	581.411479	581.330713	Row 97				
581.244041	581.151674	581.053836	580.950766	580.842743					
580.730101	580.613272	580.492833	580.369562	580.244500	581.777048	581.768788	581.760539	581.752316	581.744138
580.119016	579.994841	579.874066	579.759068	579.652362	581.736030	581.728024	581.720157	581.712476	581.705036
579.556402	579.473368	579.404999	579.352508	579.316580	581.697900	581.691142	581.684844	581.679102	581.674019
579.297426	579.294835	579.308192	579.336452	579.378108	581.669708	581.666291	581.663894	581.662650	581.662689
579.431203	579.493445	579.562389	579.635657	579.711110	581.664138	581.667116	581.671725	581.678046	581.686130
					581.695990	581.707594	581.720853	581.735619	581.751672
					581.768720	581.786396	581.804265	581.821838	581.838596
Row 93					581.854020	581.867634	581.879049	581.888000	581.894373
					581.898211	581.899698	581.899124	581.896844	581.893227
581.706625	581.697373	581.687992	581.678485	581.668859	581.888612	581.883279	581.877426	581.871158	581.864485
581.659130	581.649319	581.639460	581.629596	581.619784	581.857332	581.849542	581.840894	581.831117	581.819902
581.610096	581.600623	581.591472	581.582776	581.574688	581.806920	581.791833	581.774308	581.754029	581.730705
581.567388	581.561077	581.555983	581.552356	581.550461	581.704081	581.673941	581.640115	581.602479	581.560958
581.550579	581.552994	581.555985	581.565815	581.576716	581.515523	581.466194	581.413031	581.356139	581.295663
581.590874	581.608413	581.629371	581.653682	581.681142	581.231787	581.164735	581.094777	581.022226	580.947448
581.711382	581.743829	581.777678	581.811869	581.845097	580.870868	580.792977	580.714337	580.635588	580.557450
581.875878	581.902692	581.924200	581.939489	581.948276	580.480717	580.406246	580.334941	580.267722	580.205498
581.950971	581.948575	581.942450	581.934059	581.924743	580.149121	580.099356	580.056844	580.022074	579.995368
581.915587	581.907359	581.900507	581.895190	581.891318	579.976862	579.966514	579.964098	579.969220	579.981333
581.888603	581.886598	581.884740	581.882389	581.878854	579.999764	580.023744	580.052443	580.085009	580.120600
581.873425	581.865398	581.854101	581.838908	581.819262					
581.794684	581.764787	581.729275	581.687947	581.640688					
581.587464	581.528310	581.463318	581.392621	581.316389	Row 98				
581.234819	581.148130	581.056569	580.960414	580.859993					
580.755699	580.648026	580.537598	580.425214	580.311883	581.794614	581.786582	581.778585	581.770641	581.762770
580.198861	580.087659	579.980027	579.877891	579.783246	581.754998	581.747355	581.739880	581.732616	581.725617
579.698022	579.623944	579.562423	579.514478	579.480723	581.718940	581.712655	581.706837	581.701571	581.696949
579.461377	579.456282	579.464916	579.486396	579.519478	581.693070	581.690038	581.687963	581.686953	581.687118
579.562598	579.613954	579.671627	579.733721	579.798485	581.688558	581.691365	581.695617	581.701368	581.708646
					581.717445	581.727717	581.739370	581.752257	581.766176
					581.780867	581.796014	581.811251	581.826176	581.840371
Row 94					581.853424	581.864962	581.874679	581.882362	581.887911
					581.891337	581.892754	581.892359	581.890396	581.887128
581.724202	581.715206	581.706122	581.696957	581.687722	581.882801	581.877621	581.871736	581.865226	581.858099
581.678438	581.669130	581.659833	581.650595	581.641473	581.850293	581.841683	581.832092	581.821298	581.809047
581.632539	581.623880	581.615601	581.607825	581.600692	581.795069	581.779083	581.760811	581.739989	581.716372
581.594365	581.589023	581.584866	581.582109	581.580976	581.689745	581.659926	581.626771	581.590175	581.550078
581.581702	581.584516	581.589643	581.597283	581.607608	581.506459	581.459341	581.408787	581.354899	581.297818
581.620743	581.636752	581.655620	581.677236	581.701370	581.237724	581.174838	581.109421	581.041779	580.972264
581.727651	581.755548	581.784352	581.813179	581.840995	580.901284	580.829301	580.756837	580.684480	580.612874
581.866678	581.889122	581.907387	581.920842	581.929283	580.542721	580.474769	580.409791	580.348570	580.291870
581.932963	581.932537	581.928924	581.923148	581.916188	580.240403	580.194807	580.155618	580.123246	580.097962
581.900873	581.901820	581.895420	581.889840	581.885046	580.079888	580.068993	580.065096	580.067879	580.076896
581.880839	581.876881	581.872730	581.867869	581.861733	580.091593	580.111340	580.135449	580.163209	580.193913
581.853736	581.843291	581.829829	581.812823	581.791796					
581.766335	581.736101	581.700833	581.660346	581.614530					
581.563344	581.506812	581.445008	581.378052	581.306105	Row 99				
581.229359	581.148041	581.062410	580.972769	580.879475					
580.782956	580.683730	580.582436	580.479855	580.376935	581.812119	581.804302	581.796543	581.788859	581.781272
580.274807	580.174786	580.078342	579.987055	579.902533	581.773806	581.766493	581.759369	581.752476	581.745863
579.826321	579.759806	579.704133	579.660153	579.628397	581.739585	581.733704	581.728289	581.723416	581.719166
579.609067	579.602045	579.606903	579.622908	579.649048	581.715625	581.712882	581.711030	581.710159	581.710358
579.684064	579.726519	579.774881	579.827619	579.883289	581.711707	581.714277	581.718123	581.723280	581.729758
					581.737538	581.746564	581.756741	581.767931	581.779950
					581.792569	581.805514	581.818481	581.831135	581.843137
Row 95					581.854156	581.863894	581.872104	581.878613	581.883327
					581.886237	581.887409	581.886971	581.885091	581.881951
581.741818	581.733074	581.724279	581.715444	581.706582	581.877727	581.872568	581.866580	581.859820	581.852292
581.697718	581.688878	581.680102	581.671436	581.662937	581.843942	581.834669	581.824327	581.812735	581.799685
581.654677	581.646739	581.639220	581.632234	581.625910	581.784952	581.768303	581.749508	581.728346	581.704613
581.620393	581.615841	581.612428	581.610336	581.609756	581.67812				

581.759830	581.754292	581.749213	581.744660	581.740704
581.737420	581.734885	581.733175	581.732365	581.732526
581.733722	581.736006	581.739415	581.743970	581.749667
581.756479	581.764345	581.773171	581.782830	581.793155
581.803945	581.814967	581.825961	581.836651	581.846758
581.856013	581.864172	581.871034	581.876452	581.880340
581.882673	581.883484	581.882853	581.880891	581.877721
581.873467	581.868231	581.862088	581.855076	581.847191
581.838386	581.828577	581.817642	581.805432	581.791776
581.776487	581.759372	581.740241	581.718909	581.695206
581.668982	581.640110	581.608493	581.574062	581.536782
581.496651	581.453699	581.407993	581.359634	581.308756
581.255529	581.200157	581.142882	581.083984	581.023780
580.962629	580.900932	580.839130	580.777705	580.717175
580.658087	580.601012	580.546527	580.495205	580.447596
580.404213	580.365508	580.331862	580.303569	580.280827
580.263730	580.252268	580.246325	580.245690	580.250063
580.259070	580.272275	580.289203	580.309352	580.332214

Streamlines

Number of Streamlines = 426

Streamline #1

Coordinates of Streamline:
Start x: 9780.960000 y: 9715.520000
End x: 10100.937084 y: 9373.980594

Streamline #2

Coordinates of Streamline:
Start x: 9780.279123 y: 9737.185688
End x: 10124.378478 y: 9411.862680

Streamline #3

Coordinates of Streamline:
Start x: 9778.239178 y: 9758.766232
End x: 10102.169771 y: 10012.933330

Streamline #4

Coordinates of Streamline:
Start x: 9774.848216 y: 9780.175922
End x: 10021.295846 y: 10051.596503

Streamline #5

Coordinates of Streamline:
Start x: 9770.119620 y: 9801.330444
End x: 9978.047698 y: 10073.672797

Streamline #6

Coordinates of Streamline:
Start x: 9764.072052 y: 9822.146312
End x: 9947.266926 y: 10091.197229

Streamline #7

Coordinates of Streamline:
Start x: 9756.729377 y: 9842.541375
End x: 9919.877354 y: 10102.809345

Streamline #8

Coordinates of Streamline:
Start x: 9748.120576 y: 9862.435142
End x: 9896.298334 y: 10120.770614

Streamline #9

Coordinates of Streamline:
Start x: 9738.279621 y: 9881.749103
End x: 9870.909734 y: 10126.939146

Streamline #10

Coordinates of Streamline:
Start x: 9727.245352 y: 9900.407033
End x: 9850.464950 y: 10139.770403

Streamline #11

Coordinates of Streamline:
Start x: 9715.061316 y: 9918.335298
End x: 9830.642099 y: 10150.813637

Streamline #12

Coordinates of Streamline:
Start x: 9701.775597 y: 9935.463145
End x: 9811.479453 y: 10160.097129

Streamline #13

Coordinates of Streamline:
Start x: 9687.440628 y: 9951.722976
End x: 9793.994654 y: 10167.108855

Streamline #14

Coordinates of Streamline:
Start x: 9672.112982 y: 9967.050622
End x: 9783.422932 y: 10179.640810

Streamline #15

Coordinates of Streamline:
Start x: 9655.853152 y: 9981.385591
End x: 9768.640591 y: 10181.174724

Streamline #16

Coordinates of Streamline:
Start x: 9638.725306 y: 9994.671311
End x: 9759.154741 y: 10188.015085

Streamline #17

Coordinates of Streamline:
Start x: 9620.797041 y: 10006.855348
End x: 9750.265180 y: 10191.902974

Streamline #18

Coordinates of Streamline:
Start x: 9602.139111 y: 10017.889617
End x: 9742.331486 y: 10193.748875

Streamline #19

Coordinates of Streamline:
Start x: 9582.825151 y: 10027.730572
End x: 9741.055096 y: 10200.435980

Streamline #20

Coordinates of Streamline:
Start x: 9562.931383 y: 10036.339374
End x: 9731.122872 y: 10198.689768

Streamline #21

Coordinates of Streamline:
Start x: 9542.536321 y: 10043.682049
End x: 9726.961126 y: 10201.370148

Streamline #22

Coordinates of Streamline:
Start x: 9521.720453 y: 10049.729618
End x: 9721.303713 y: 10202.424291

Streamline #23

Coordinates of Streamline:
Start x: 9500.565931 y: 10054.458214
End x: 9722.380135 y: 10207.172597

Streamline #24

Coordinates of Streamline:
Start x: 9479.156241 y: 10057.849177
End x: 9713.945797 y: 10205.706901

Streamline #25

Coordinates of Streamline:
Start x: 9457.575878 y: 10059.889122
End x: 9712.745471 y: 10207.906898

Streamline #26

Coordinates of Streamline:
Start x: 9435.910009 y: 10060.570000
End x: 9710.545890 y: 10209.206908

Streamline #27

Coordinates of Streamline:
Start x: 9414.244141 y: 10059.889123
End x: 9707.418597 y: 10209.878651

Streamline #28

Coordinates of Streamline:
Start x: 9392.663778 y: 10057.849179
End x: 9703.415922 y: 10210.215239

Streamline #29

Coordinates of Streamline:
Start x: 9371.254088 y: 10054.458218
End x: 9707.909125 y: 10212.864341

Streamline #30

Coordinates of Streamline:

Start x: 9350.099565 y: 10049.729622
End x: 9702.482413 y: 10212.402184

Streamline #31

Coordinates of Streamline:
Start x: 9329.283697 y: 10043.682054
End x: 9705.646088 y: 10214.075833

Streamline #32

Coordinates of Streamline:
Start x: 9308.888634 y: 10036.339381
End x: 9698.565280 y: 10213.443374

Streamline #33

Coordinates of Streamline:
Start x: 9288.994866 y: 10027.730579
End x: 9699.824211 y: 10214.268184

Streamline #34

Coordinates of Streamline:
Start x: 9269.680905 y: 10017.889626
End x: 9699.312686 y: 10214.772819

Streamline #35

Coordinates of Streamline:
Start x: 9251.022975 y: 10006.855357
End x: 9695.457197 y: 10215.044226

Streamline #36

Coordinates of Streamline:
Start x: 9233.094709 y: 9994.671322
End x: 9702.601611 y: 10216.157907

Streamline #37

Coordinates of Streamline:
Start x: 9215.966863 y: 9981.385603
End x: 9024.874447 y: 9908.177951

Streamline #38

Coordinates of Streamline:
Start x: 9199.707031 y: 9967.050634
End x: 9022.975071 y: 9887.690516

Streamline #39

Coordinates of Streamline:
Start x: 9184.379385 y: 9951.722989
End x: 9021.047327 y: 9869.401369

Streamline #40

Coordinates of Streamline:
Start x: 9170.044415 y: 9935.463159
End x: 9022.393264 y: 9855.788247

Streamline #41

Coordinates of Streamline:
Start x: 9156.758695 y: 9918.335313
End x: 9025.433926 y: 9844.227014

Streamline #42

Coordinates of Streamline:
Start x: 9144.574657 y: 9900.407048
End x: 9022.777502 y: 9826.965061

Streamline #43

Coordinates of Streamline:
Start x: 9133.540388 y: 9881.749119
End x: 9021.021579 y: 9810.343767

Streamline #44

Coordinates of Streamline:
Start x: 9123.699432 y: 9862.435159
End x: 9020.158809 y: 9794.071575

Streamline #45

Coordinates of Streamline:
Start x: 9115.090630 y: 9842.541392
End x: 9020.230661 y: 9777.981191

Streamline #46

Coordinates of Streamline:
Start x: 9107.747954 y: 9822.146330
End x: 9021.297215 y: 9761.976807

Streamline #47

Coordinates of Streamline:
Start x: 9101.700384 y: 9801.330462
End x: 9023.423948 y: 9746.006855

Streamline #48

Coordinates of Streamline:
Start x: 9096.971787 y: 9780.175940
End x: 9019.624244 y: 9723.507388

Streamline #49

Coordinates of Streamline:
Start x: 9093.580825 y: 9758.766250
End x: 9023.982400 y: 9707.644020

Streamline #50

Coordinates of Streamline:
Start x: 9091.540878 y: 9737.185887
End x: 9022.492774 y: 9685.301506

Streamline #51

Coordinates of Streamline:
Start x: 9090.860000 y: 9715.520018
End x: 9022.219408 y: 9663.083371

Streamline #52

Coordinates of Streamline:
Start x: 9091.540876 y: 9693.854150
End x: 9023.167972 y: 9641.060081

Streamline #53

Coordinates of Streamline:
Start x: 9093.580820 y: 9672.273787
End x: 9025.337411 y: 9619.308160

Streamline #54

Coordinates of Streamline:
Start x: 9096.971780 y: 9650.864097
End x: 9021.874950 y: 9591.152242

Streamline #55

Coordinates of Streamline:
Start x: 9101.700375 y: 9629.709574
End x: 9019.744722 y: 9563.302458

Streamline #56

Coordinates of Streamline:
Start x: 9107.747943 y: 9608.893705
End x: 9025.462944 y: 9542.910153

Streamline #57

Coordinates of Streamline:
Start x: 9115.090616 y: 9588.498642
End x: 9019.277299 y: 9509.013672

Streamline #58

Coordinates of Streamline:
Start x: 9123.699417 y: 9568.604875
End x: 9020.826770 y: 9482.822030

Streamline #59

Coordinates of Streamline:
Start x: 9133.540370 y: 9549.290914
End x: 9023.480167 y: 9457.434986

Streamline #60

Coordinates of Streamline:
Start x: 9144.574638 y: 9530.632983
End x: 9021.285262 y: 9425.375121

Streamline #61

Coordinates of Streamline:
Start x: 9156.758673 y: 9512.704717
End x: 9020.479941 y: 9394.070056

Streamline #62

Coordinates of Streamline:
Start x: 9170.044391 y: 9495.576870
End x: 9020.982722 y: 9363.700664

Streamline #63

Coordinates of Streamline:
Start x: 9184.379359 y: 9479.317038
End x: 9022.692353 y: 9334.471750

Streamline #64

Coordinates of Streamline:
Start x: 9199.707004 y: 9463.989391
End x: 9021.109004 y: 9298.054812

Streamline #65

Coordinates of Streamline:

Start x: 9215.966834 y: 9449.654421
End x: 9025.144372 y: 9271.708865

Streamline #66

Coordinates of Streamline:
Start x: 9233.094679 y: 9436.368700
End x: 9023.101688 y: 9229.397888

Streamline #67

Coordinates of Streamline:
Start x: 9251.022944 y: 9424.184662
End x: 9024.060031 y: 9187.719731

Streamline #68

Coordinates of Streamline:
Start x: 9269.680873 y: 9413.150392
End x: 9202.804446 y: 8634.787332

Streamline #69

Coordinates of Streamline:
Start x: 9288.994833 y: 9403.309436
End x: 9223.410685 y: 8646.197151

Streamline #70

Coordinates of Streamline:
Start x: 9308.888599 y: 9394.700633
End x: 9258.613747 y: 8683.149840

Streamline #71

Coordinates of Streamline:
Start x: 9329.283661 y: 9387.357957
End x: 9331.056263 y: 8745.053474

Streamline #72

Coordinates of Streamline:
Start x: 9350.099529 y: 9381.310387
End x: 9405.923240 y: 8820.461423

Streamline #73

Coordinates of Streamline:
Start x: 9371.254051 y: 9376.581789
End x: 9467.800303 y: 8868.704727

Streamline #74

Coordinates of Streamline:
Start x: 9392.663741 y: 9373.190826
End x: 9507.175546 y: 8900.951477

Streamline #75

Coordinates of Streamline:
Start x: 9414.244104 y: 9371.150879
End x: 9538.635682 y: 8927.933693

Streamline #76

Coordinates of Streamline:
Start x: 9435.909972 y: 9370.470000
End x: 9578.335297 y: 8922.144601

Streamline #77

Coordinates of Streamline:
Start x: 9457.575841 y: 9371.150876
End x: 9616.668510 y: 8929.484795

Streamline #78

Coordinates of Streamline:
Start x: 9479.156204 y: 9373.190819
End x: 9665.909323 y: 8922.827894

Streamline #79

Coordinates of Streamline:
Start x: 9500.565894 y: 9376.581779
End x: 9723.738295 y: 8922.652971

Streamline #80

Coordinates of Streamline:
Start x: 9521.720417 y: 9381.310373
End x: 9804.429935 y: 8925.499453

Streamline #81

Coordinates of Streamline:
Start x: 9542.536286 y: 9387.357940
End x: 9890.077627 y: 8993.971064

Streamline #82

Coordinates of Streamline:
Start x: 9562.931349 y: 9394.700613
End x: 9908.006132 y: 9051.881453

Streamline #83

Coordinates of Streamline:
Start x: 9582.825117 y: 9403.309413
End x: 9921.009023 y: 9094.567265

Streamline #84

Coordinates of Streamline:
Start x: 9602.139078 y: 9413.150365
End x: 9934.578594 y: 9126.115422

Streamline #85

Coordinates of Streamline:
Start x: 9620.797009 y: 9424.184633
End x: 9950.741899 y: 9148.209243

Streamline #86

Coordinates of Streamline:
Start x: 9638.725276 y: 9436.368668
End x: 9953.414710 y: 9170.832434

Streamline #87

Coordinates of Streamline:
Start x: 9655.853123 y: 9449.654385
End x: 9959.895425 y: 9185.760840

Streamline #88

Coordinates of Streamline:
Start x: 9672.112955 y: 9463.989353
End x: 9968.460743 y: 9192.351074

Streamline #89

Coordinates of Streamline:
Start x: 9687.440603 y: 9479.316997
End x: 9975.599351 y: 9200.017549

Streamline #90

Coordinates of Streamline:
Start x: 9701.775573 y: 9495.576827
End x: 9975.312097 y: 9215.260179

Streamline #91

Coordinates of Streamline:
Start x: 9715.061294 y: 9512.704672
End x: 9983.293037 y: 9227.198385

Streamline #92

Coordinates of Streamline:
Start x: 9727.245333 y: 9530.632936
End x: 9998.954414 y: 9235.165116

Streamline #93

Coordinates of Streamline:
Start x: 9738.279604 y: 9549.290865
End x: 10006.260125 y: 9249.923773

Streamline #94

Coordinates of Streamline:
Start x: 9748.120560 y: 9568.604824
End x: 10013.176553 y: 9266.139644

Streamline #95

Coordinates of Streamline:
Start x: 9756.729364 y: 9588.498591
End x: 10027.082696 y: 9277.629542

Streamline #96

Coordinates of Streamline:
Start x: 9764.072040 y: 9608.893653
End x: 10040.302099 y: 9290.196207

Streamline #97

Coordinates of Streamline:
Start x: 9770.119611 y: 9629.709520
End x: 10045.322132 y: 9309.856426

Streamline #98

Coordinates of Streamline:
Start x: 9774.848209 y: 9650.864042
End x: 10057.500158 y: 9325.150154

Streamline #99

Coordinates of Streamline:
Start x: 9778.239173 y: 9672.273732
End x: 10068.621884 y: 9341.654951

Streamline #100

Coordinates of Streamline:

Start x: 9780.279120 y: 9693.854095
End x: 10085.398760 y: 9353.938962

Streamline #101

Coordinates of Streamline:
Start x: 10355.560000 y: 10574.370000
End x: 10335.998461 y: 10257.036676

Streamline #102

Coordinates of Streamline:
Start x: 10354.061714 y: 10598.184567
End x: 10336.498381 y: 10257.788727

Streamline #103

Coordinates of Streamline:
Start x: 10349.590487 y: 10621.623565
End x: 10336.753981 y: 10264.852923

Streamline #104

Coordinates of Streamline:
Start x: 10342.216831 y: 10644.317345
End x: 10337.339800 y: 10264.473688

Streamline #105

Coordinates of Streamline:
Start x: 10332.057033 y: 10665.908014
End x: 10612.620178 y: 10901.585865

Streamline #106

Coordinates of Streamline:
Start x: 10319.271320 y: 10686.055074
End x: 10573.584056 y: 10903.086925

Streamline #107

Coordinates of Streamline:
Start x: 10304.061331 y: 10704.440794
End x: 10524.978572 y: 10902.799230

Streamline #108

Coordinates of Streamline:
Start x: 10286.666934 y: 10720.775219
End x: 10468.733603 y: 10903.037952

Streamline #109

Coordinates of Streamline:
Start x: 10267.362452 y: 10734.800747
End x: 10403.962945 y: 10904.766472

Streamline #110

Coordinates of Streamline:
Start x: 10246.452327 y: 10746.296187
End x: 10328.361368 y: 10906.589552

Streamline #111

Coordinates of Streamline:
Start x: 10224.266323 y: 10755.080247
End x: 10242.940281 y: 10907.528965

Streamline #112

Coordinates of Streamline:
Start x: 10201.154328 y: 10761.014400
End x: 10124.463654 y: 10903.592650

Streamline #113

Coordinates of Streamline:
Start x: 10177.480831 y: 10764.005058
End x: 9754.672040 y: 10201.601086

Streamline #114

Coordinates of Streamline:
Start x: 10153.619179 y: 10764.005059
End x: 9755.601555 y: 10201.564107

Streamline #115

Coordinates of Streamline:
Start x: 10129.945682 y: 10761.014402
End x: 9756.819047 y: 10203.225827

Streamline #116

Coordinates of Streamline:
Start x: 10106.833687 y: 10755.080251
End x: 9757.694800 y: 10201.654066

Streamline #117

Coordinates of Streamline:
Start x: 10084.647683 y: 10746.296191
End x: 9759.243843 y: 10203.948173

Streamline #118

Coordinates of Streamline:
Start x: 10063.737557 y: 10734.800753
End x: 9759.902892 y: 10199.244797

Streamline #119

Coordinates of Streamline:
Start x: 10044.433073 y: 10720.775226
End x: 9760.948334 y: 10196.297987

Streamline #120

Coordinates of Streamline:
Start x: 10027.038676 y: 10704.440801
End x: 9762.464402 y: 10194.667530

Streamline #121

Coordinates of Streamline:
Start x: 10011.828686 y: 10686.055082
End x: 9764.543139 y: 10194.142996

Streamline #122

Coordinates of Streamline:
Start x: 9999.042972 y: 10665.908023
End x: 9767.310698 y: 10194.668485

Streamline #123

Coordinates of Streamline:
Start x: 9988.883173 y: 10644.317355
End x: 9770.943929 y: 10196.292465

Streamline #124

Coordinates of Streamline:
Start x: 9981.509516 y: 10621.623575
End x: 9773.044863 y: 10189.880486

Streamline #125

Coordinates of Streamline:
Start x: 9977.038287 y: 10598.184577
End x: 9779.125434 y: 10194.101316

Streamline #126

Coordinates of Streamline:
Start x: 9975.540000 y: 10574.370010
End x: 9783.878973 y: 10190.533200

Streamline #127

Coordinates of Streamline:
Start x: 9977.038284 y: 10550.555443
End x: 9790.437977 y: 10186.682857

Streamline #128

Coordinates of Streamline:
Start x: 9981.509511 y: 10527.116445
End x: 9800.406221 y: 10182.802709

Streamline #129

Coordinates of Streamline:
Start x: 9988.883166 y: 10504.422664
End x: 9812.588414 y: 10171.392239

Streamline #130

Coordinates of Streamline:
Start x: 9999.042962 y: 10482.831995
End x: 9833.947925 y: 10160.693868

Streamline #131

Coordinates of Streamline:
Start x: 10011.828674 y: 10462.684934
End x: 9861.115156 y: 10152.385000

Streamline #132

Coordinates of Streamline:
Start x: 10027.038662 y: 10444.299214
End x: 9889.053782 y: 10137.687610

Streamline #133

Coordinates of Streamline:
Start x: 10044.433058 y: 10427.964787
End x: 9919.599571 y: 10115.565609

Streamline #134

Coordinates of Streamline:
Start x: 10063.737539 y: 10413.939258
End x: 9957.572562 y: 10094.765342

Streamline #135

Coordinates of Streamline:

Start x: 10084.647664 y: 10402.443818
End x: 9999.306889 y: 10077.753243

Streamline #136

Coordinates of Streamline:

Start x: 10106.833667 y: 10393.659756
End x: 10052.424073 y: 10052.714286

Streamline #137

Coordinates of Streamline:

Start x: 10129.945662 y: 10387.725602
End x: 10117.104573 y: 10014.638282

Streamline #138

Coordinates of Streamline:

Start x: 10153.619158 y: 10384.734942
End x: 10273.593427 y: 9977.206263

Streamline #139

Coordinates of Streamline:

Start x: 10177.480811 y: 10384.734940
End x: 10300.664565 y: 10112.357562

Streamline #140

Coordinates of Streamline:

Start x: 10201.154308 y: 10387.725597
End x: 10310.763874 y: 10161.878337

Streamline #141

Coordinates of Streamline:

Start x: 10224.266304 y: 10393.659746
End x: 10315.560165 y: 10182.378742

Streamline #142

Coordinates of Streamline:

Start x: 10246.452308 y: 10402.443805
End x: 10318.654931 y: 10199.575879

Streamline #143

Coordinates of Streamline:

Start x: 10267.362435 y: 10413.939242
End x: 10322.996255 y: 10213.622464

Streamline #144

Coordinates of Streamline:

Start x: 10286.666919 y: 10427.964768
End x: 10328.579813 y: 10223.441158

Streamline #145

Coordinates of Streamline:

Start x: 10304.061317 y: 10444.299191
End x: 10329.238508 y: 10236.188840

Streamline #146

Coordinates of Streamline:

Start x: 10319.271308 y: 10462.684909
End x: 10331.174890 y: 10244.271135

Streamline #147

Coordinates of Streamline:

Start x: 10332.057023 y: 10482.831968
End x: 10330.778393 y: 10254.577535

Streamline #148

Coordinates of Streamline:

Start x: 10342.216823 y: 10504.422636
End x: 10332.422958 y: 10257.749745

Streamline #149

Coordinates of Streamline:

Start x: 10349.590482 y: 10527.116416
End x: 10333.460400 y: 10262.492583

Streamline #150

Coordinates of Streamline:

Start x: 10354.061712 y: 10550.555412
End x: 10334.912891 y: 10258.982027

Streamline #151

Coordinates of Streamline:

Start x: 11007.700000 y: 10277.950000
End x: 11477.300252 y: 10412.615131

Streamline #152

Coordinates of Streamline:

Start x: 11006.958906 y: 10295.631965
End x: 11470.448434 y: 10415.923658

Streamline #153

Coordinates of Streamline:

Start x: 11004.740823 y: 10313.189903
End x: 11461.582971 y: 10417.758651

Streamline #154

Coordinates of Streamline:

Start x: 11001.061308 y: 10330.500659
End x: 11450.049798 y: 10419.072717

Streamline #155

Coordinates of Streamline:

Start x: 10995.946171 y: 10347.442810
End x: 11444.686572 y: 10423.618323

Streamline #156

Coordinates of Streamline:

Start x: 10989.431291 y: 10363.897519
End x: 11436.555314 y: 10429.453149

Streamline #157

Coordinates of Streamline:

Start x: 10981.562365 y: 10379.749367
End x: 11444.631609 y: 10432.840249

Streamline #158

Coordinates of Streamline:

Start x: 10972.394589 y: 10394.887167
End x: 11449.707043 y: 10435.696941

Streamline #159

Coordinates of Streamline:

Start x: 10961.992266 y: 10409.204736
End x: 11459.627565 y: 10433.281140

Streamline #160

Coordinates of Streamline:

Start x: 10950.428363 y: 10422.601647
End x: 11467.069148 y: 10431.848370

Streamline #161

Coordinates of Streamline:

Start x: 10937.783991 y: 10434.983931
End x: 11472.961907 y: 10432.073100

Streamline #162

Coordinates of Streamline:

Start x: 10924.147842 y: 10446.264735
End x: 11481.812558 y: 10425.515765

Streamline #163

Coordinates of Streamline:

Start x: 10909.615563 y: 10456.364932
End x: 11485.465924 y: 10429.449298

Streamline #164

Coordinates of Streamline:

Start x: 10894.289089 y: 10465.213677
End x: 11491.776155 y: 10426.465674

Streamline #165

Coordinates of Streamline:

Start x: 10878.275922 y: 10472.748901
End x: 11496.994360 y: 10425.511189

Streamline #166

Coordinates of Streamline:

Start x: 10861.688385 y: 10478.917751
End x: 11501.355947 y: 10426.808729

Streamline #167

Coordinates of Streamline:

Start x: 10844.642827 y: 10483.676957
End x: 11507.267062 y: 10421.258545

Streamline #168

Coordinates of Streamline:

Start x: 10827.258810 y: 10486.993136
End x: 11512.094463 y: 10418.443196

Streamline #169

Coordinates of Streamline:

Start x: 10809.658270 y: 10488.843028
End x: 11516.161878 y: 10418.902838

Streamline #170

Coordinates of Streamline:

Start x: 10791.964663 y: 10489.213656
End x: 11520.804884 y: 10413.731775

Streamline #171

Coordinates of Streamline:

Start x: 10774.302096 y: 10488.102422
End x: 11524.707278 y: 10413.343923

Streamline #172

Coordinates of Streamline:

Start x: 10756.794461 y: 10485.517120
End x: 11528.189381 y: 10419.079873

Streamline #173

Coordinates of Streamline:

Start x: 10739.564559 y: 10481.475884
End x: 11532.357124 y: 10413.702467

Streamline #174

Coordinates of Streamline:

Start x: 10722.733247 y: 10476.007060
End x: 11536.195504 y: 10409.963996

Streamline #175

Coordinates of Streamline:

Start x: 10706.418584 y: 10469.149008
End x: 11540.163286 y: 10413.592411

Streamline #176

Coordinates of Streamline:

Start x: 10690.735007 y: 10460.949832
End x: 11543.848351 y: 10408.054832

Streamline #177

Coordinates of Streamline:

Start x: 10675.792522 y: 10451.467044
End x: 10728.029945 y: 10902.767778

Streamline #178

Coordinates of Streamline:

Start x: 10661.695943 y: 10440.767159
End x: 10340.094495 y: 10266.251440

Streamline #179

Coordinates of Streamline:

Start x: 10648.544146 y: 10428.925228
End x: 10343.751865 y: 10264.570690

Streamline #180

Coordinates of Streamline:

Start x: 10636.429381 y: 10416.024314
End x: 10348.016275 y: 10263.965474

Streamline #181

Coordinates of Streamline:

Start x: 10625.436624 y: 10402.154909
End x: 10349.466457 y: 10257.643308

Streamline #182

Coordinates of Streamline:

Start x: 10615.642983 y: 10387.414295
End x: 10349.369912 y: 10250.436183

Streamline #183

Coordinates of Streamline:

Start x: 10607.117152 y: 10371.905868
End x: 10346.151091 y: 10241.304700

Streamline #184

Coordinates of Streamline:

Start x: 10599.918934 y: 10355.738408
End x: 10347.335749 y: 10234.661819

Streamline #185

Coordinates of Streamline:

Start x: 10594.098820 y: 10339.025319
End x: 10343.814176 y: 10225.258864

Streamline #186

Coordinates of Streamline:

Start x: 10589.697633 y: 10321.883830
End x: 10343.584215 y: 10216.728255

Streamline #187

Coordinates of Streamline:

Start x: 10586.746244 y: 10304.434176
End x: 10336.812137 y: 10206.338008

Streamline #188

Coordinates of Streamline:

Start x: 10585.265355 y: 10286.798756
End x: 10332.455728 y: 10196.569331

Streamline #189

Coordinates of Streamline:

Start x: 10585.265354 y: 10269.101267
End x: 10330.536985 y: 10186.613705

Streamline #190

Coordinates of Streamline:

Start x: 10586.746241 y: 10251.465846
End x: 10331.117773 y: 10175.625822

Streamline #191

Coordinates of Streamline:

Start x: 10589.697628 y: 10234.016192
End x: 10325.113045 y: 10164.929153

Streamline #192

Coordinates of Streamline:

Start x: 10594.098813 y: 10216.874703
End x: 10321.116543 y: 10147.916921

Streamline #193

Coordinates of Streamline:

Start x: 10599.918926 y: 10200.161613
End x: 10318.366053 y: 10121.108706

Streamline #194

Coordinates of Streamline:

Start x: 10607.117142 y: 10183.994152
End x: 10309.721629 y: 10092.821007

Streamline #195

Coordinates of Streamline:

Start x: 10615.642971 y: 10168.485724
End x: 10305.325427 y: 10059.833709

Streamline #196

Coordinates of Streamline:

Start x: 10625.436611 y: 10153.745109
End x: 10297.080608 y: 10002.399313

Streamline #197

Coordinates of Streamline:

Start x: 10636.429366 y: 10139.875703
End x: 10321.399576 y: 9920.311262

Streamline #198

Coordinates of Streamline:

Start x: 10648.544129 y: 10126.974788
End x: 10376.171736 y: 9885.222966

Streamline #199

Coordinates of Streamline:

Start x: 10661.695926 y: 10115.132856
End x: 10421.088900 y: 9867.074176

Streamline #200

Coordinates of Streamline:

Start x: 10675.792504 y: 10104.432969
End x: 10463.924049 y: 9844.478676

Streamline #201

Coordinates of Streamline:

Start x: 10690.734987 y: 10094.950179
End x: 10493.911760 y: 9822.483966

Streamline #202

Coordinates of Streamline:

Start x: 10706.418564 y: 10086.751002
End x: 10529.110828 y: 9812.179120

Streamline #203

Coordinates of Streamline:

Start x: 10722.733226 y: 10079.892948
End x: 10564.394564 y: 9794.058553

Streamline #204

Coordinates of Streamline:

Start x: 10739.564537 y: 10074.424122
End x: 10602.607958 y: 9778.254069

Streamline #205

Coordinates of Streamline:

Start x: 10756.794438 y: 10070.382884
End x: 10632.929006 y: 9768.082685

Streamline #206

Coordinates of Streamline:

Start x: 10774.302074 y: 10067.797580
End x: 10662.083790 y: 9760.728862

Streamline #207

Coordinates of Streamline:

Start x: 10791.964640 y: 10066.686344
End x: 10694.152276 y: 9754.693318

Streamline #208

Coordinates of Streamline:

Start x: 10809.658248 y: 10067.056971
End x: 10724.460011 y: 9741.451379

Streamline #209

Coordinates of Streamline:

Start x: 10827.258787 y: 10068.906861
End x: 10753.609836 y: 9740.444233

Streamline #210

Coordinates of Streamline:

Start x: 10844.642805 y: 10072.223038
End x: 10779.516949 y: 9732.435616

Streamline #211

Coordinates of Streamline:

Start x: 10861.688364 y: 10076.982242
End x: 10810.693152 y: 9725.156044

Streamline #212

Coordinates of Streamline:

Start x: 10878.275902 y: 10083.151090
End x: 10843.482240 y: 9710.180803

Streamline #213

Coordinates of Streamline:

Start x: 10894.289069 y: 10090.686313
End x: 10872.803214 y: 9707.962245

Streamline #214

Coordinates of Streamline:

Start x: 10909.615544 y: 10099.535056
End x: 10899.550486 y: 9699.891975

Streamline #215

Coordinates of Streamline:

Start x: 10924.147824 y: 10109.635251
End x: 10939.547558 y: 9693.097464

Streamline #216

Coordinates of Streamline:

Start x: 10937.783974 y: 10120.916054
End x: 10980.709494 y: 9674.590899

Streamline #217

Coordinates of Streamline:

Start x: 10950.428347 y: 10133.298337
End x: 11059.233800 y: 9494.842706

Streamline #218

Coordinates of Streamline:

Start x: 10961.992252 y: 10146.695247
End x: 11558.503754 y: 10393.204810

Streamline #219

Coordinates of Streamline:

Start x: 10972.394576 y: 10161.012815
End x: 11545.212401 y: 10403.330032

Streamline #220

Coordinates of Streamline:

Start x: 10981.562355 y: 10176.150613
End x: 11530.196221 y: 10398.494856

Streamline #221

Coordinates of Streamline:

Start x: 10989.431282 y: 10192.002461
End x: 11520.761803 y: 10402.202991

Streamline #222

Coordinates of Streamline:

Start x: 10995.946164 y: 10208.457169
End x: 11514.874266 y: 10409.270646

Streamline #223

Coordinates of Streamline:

Start x: 11001.061302 y: 10225.399319
End x: 11501.962197 y: 10405.473526

Streamline #224

Coordinates of Streamline:

Start x: 11004.740819 y: 10242.710074
End x: 11493.118908 y: 10407.317718

Streamline #225

Coordinates of Streamline:

Start x: 11006.958904 y: 10260.268013
End x: 11489.406026 y: 10414.237061

Streamline #226

Coordinates of Streamline:

Start x: 10354.380000 y: 9670.660000
End x: 10351.844434 y: 9891.350979

Streamline #227

Coordinates of Streamline:

Start x: 10372.634737 y: 9670.203684
End x: 10368.339027 y: 9878.564416

Streamline #228

Coordinates of Streamline:

Start x: 10390.889474 y: 9669.747368
End x: 10390.255646 y: 9863.954565

Streamline #229

Coordinates of Streamline:

Start x: 10409.144211 y: 9669.291053
End x: 10419.991808 y: 9856.099124

Streamline #230

Coordinates of Streamline:

Start x: 10427.398947 y: 9668.834737
End x: 10447.503239 y: 9837.107580

Streamline #231

Coordinates of Streamline:

Start x: 10445.653684 y: 9668.378421
End x: 10472.596968 y: 9827.471194

Streamline #232

Coordinates of Streamline:

Start x: 10463.908421 y: 9667.922105
End x: 10492.421222 y: 9818.151038

Streamline #233

Coordinates of Streamline:

Start x: 10482.163158 y: 9667.465789
End x: 10510.355413 y: 9808.366868

Streamline #234

Coordinates of Streamline:

Start x: 10500.417895 y: 9667.009474
End x: 10526.595829 y: 9798.588319

Streamline #235

Coordinates of Streamline:

Start x: 10518.672632 y: 9666.553158
End x: 10541.817865 y: 9788.833669

Streamline #236

Coordinates of Streamline:

Start x: 10536.927368 y: 9666.096842
End x: 10557.062143 y: 9778.988717

Streamline #237

Coordinates of Streamline:

Start x: 10555.182105 y: 9665.640526
End x: 10577.523687 y: 9777.782822

Streamline #238

Coordinates of Streamline:

Start x: 10573.436842 y: 9665.184211
End x: 10595.241556 y: 9768.228417

Streamline #239

Coordinates of Streamline:

Start x: 10591.691579 y: 9664.727895
End x: 10619.897367 y: 9766.618843

Streamline #240

Coordinates of Streamline:

Start x: 10609.946316 y: 9664.271579
End x: 10642.728666 y: 9754.663767

Streamline #241

Coordinates of Streamline:

Start x: 10628.201053 y: 9663.815263
End x: 10666.719094 y: 9751.567241

Streamline #242

Coordinates of Streamline:

Start x: 10646.455789 y: 9663.358947
End x: 10686.352927 y: 9739.581930

Streamline #243

Coordinates of Streamline:

Start x: 10664.710526 y: 9662.902632
End x: 10705.583517 y: 9738.402211

Streamline #244

Coordinates of Streamline:

Start x: 10682.965263 y: 9662.446316
End x: 10719.199623 y: 9729.721583

Streamline #245

Coordinates of Streamline:

Start x: 10701.220000 y: 9661.990000
End x: 10734.278082 y: 9731.110228

Streamline #246

Coordinates of Streamline:

Start x: 10347.310000 y: 9655.650000
End x: 10327.776205 y: 9905.017560

Streamline #247

Coordinates of Streamline:

Start x: 10347.132222 y: 9639.976667
End x: 10187.758156 y: 9405.992688

Streamline #248

Coordinates of Streamline:

Start x: 10346.954444 y: 9624.303333
End x: 10198.237733 y: 9399.537104

Streamline #249

Coordinates of Streamline:

Start x: 10346.776667 y: 9608.630000
End x: 10211.074243 y: 9395.584033

Streamline #250

Coordinates of Streamline:

Start x: 10346.598889 y: 9592.956667
End x: 10227.324961 y: 9398.250247

Streamline #251

Coordinates of Streamline:

Start x: 10346.421111 y: 9577.283333
End x: 10247.617942 y: 9395.139452

Streamline #252

Coordinates of Streamline:

Start x: 10346.243333 y: 9561.610000
End x: 10264.889327 y: 9395.978729

Streamline #253

Coordinates of Streamline:

Start x: 10346.065556 y: 9545.936667
End x: 10280.289243 y: 9390.602038

Streamline #254

Coordinates of Streamline:

Start x: 10345.887778 y: 9530.263333
End x: 10293.877509 y: 9387.978161

Streamline #255

Coordinates of Streamline:

Start x: 10345.710000 y: 9514.590000
End x: 10305.432722 y: 9387.399171

Streamline #256

Coordinates of Streamline:

Start x: 10357.460000 y: 9511.510000
End x: 10320.661729 y: 9393.000053

Streamline #257

Coordinates of Streamline:

Start x: 10373.856000 y: 9511.825500
End x: 10338.537236 y: 9382.841078

Streamline #258

Coordinates of Streamline:

Start x: 10390.252000 y: 9512.141000
End x: 10362.363205 y: 9381.412442

Streamline #259

Coordinates of Streamline:

Start x: 10406.648000 y: 9512.456500
End x: 10385.993930 y: 9389.472728

Streamline #260

Coordinates of Streamline:

Start x: 10423.044000 y: 9512.772000
End x: 10411.389215 y: 9388.331085

Streamline #261

Coordinates of Streamline:

Start x: 10439.440000 y: 9513.087500
End x: 10437.390310 y: 9388.088047

Streamline #262

Coordinates of Streamline:

Start x: 10455.836000 y: 9513.403000
End x: 10463.415089 y: 9388.713418

Streamline #263

Coordinates of Streamline:

Start x: 10472.232000 y: 9513.718500
End x: 10486.349267 y: 9389.697680

Streamline #264

Coordinates of Streamline:

Start x: 10488.628000 y: 9514.034000
End x: 10505.228066 y: 9390.374638

Streamline #265

Coordinates of Streamline:

Start x: 10505.024000 y: 9514.349500
End x: 10522.120862 y: 9390.743554

Streamline #266

Coordinates of Streamline:

Start x: 10521.420000 y: 9514.665000
End x: 10537.926584 y: 9390.936348

Streamline #267

Coordinates of Streamline:

Start x: 10537.816000 y: 9514.980500
End x: 10553.364878 y: 9391.105253

Streamline #268

Coordinates of Streamline:

Start x: 10554.212000 y: 9515.296000
End x: 10569.356918 y: 9391.368475

Streamline #269

Coordinates of Streamline:

Start x: 10570.608000 y: 9515.611500
End x: 10586.855059 y: 9391.793357

Streamline #270

Coordinates of Streamline:

Start x: 10587.004000 y: 9515.927000
End x: 10604.824885 y: 9392.380016

Streamline #271

Coordinates of Streamline:

Start x: 10603.400000 y: 9516.242500
End x: 10623.406322 y: 9393.159639

Streamline #272

Coordinates of Streamline:

Start x: 10619.796000 y: 9516.558000
End x: 10642.115763 y: 9384.501374

Streamline #273

Coordinates of Streamline:

Start x: 10636.192000 y: 9516.873500
End x: 10660.362069 y: 9385.616563

Streamline #274

Coordinates of Streamline:

Start x: 10652.588000 y: 9517.189000
End x: 10680.848255 y: 9386.740215

Streamline #275

Coordinates of Streamline:

Start x: 10668.984000 y: 9517.504500
End x: 10701.582569 y: 9387.911451

Streamline #276

Coordinates of Streamline:
Start x: 10685.380000 y: 9517.820000
End x: 10721.992854 y: 9379.430061

Streamline #277

Coordinates of Streamline:
Start x: 10711.330000 y: 9650.390000
End x: 10746.995360 y: 9728.968469

Streamline #278

Coordinates of Streamline:
Start x: 10709.506667 y: 9636.256667
End x: 10750.779785 y: 9722.467923

Streamline #279

Coordinates of Streamline:
Start x: 10707.683333 y: 9622.123333
End x: 10765.547779 y: 9725.637865

Streamline #280

Coordinates of Streamline:
Start x: 10705.860000 y: 9607.990000
End x: 10817.047799 y: 9397.297206

Streamline #281

Coordinates of Streamline:
Start x: 10704.036667 y: 9593.856667
End x: 10804.599502 y: 9398.719226

Streamline #282

Coordinates of Streamline:
Start x: 10702.213333 y: 9579.723333
End x: 10793.338357 y: 9390.535969

Streamline #283

Coordinates of Streamline:
Start x: 10700.390000 y: 9565.590000
End x: 10777.865594 y: 9391.101948

Streamline #284

Coordinates of Streamline:
Start x: 10698.566667 y: 9551.456667
End x: 10763.840108 y: 9382.402726

Streamline #285

Coordinates of Streamline:
Start x: 10696.743333 y: 9537.323333
End x: 10749.122435 y: 9383.847379

Streamline #286

Coordinates of Streamline:
Start x: 10694.920000 y: 9523.190000
End x: 10736.544563 y: 9386.099415

Streamline #287

Coordinates of Streamline:
Start x: 12147.160000 y: 9811.730000

Streamline #288

Coordinates of Streamline:
Start x: 12144.733249 y: 9842.564797

Streamline #289

Coordinates of Streamline:
Start x: 12137.512750 y: 9872.640339

Streamline #290

Coordinates of Streamline:
Start x: 12125.676297 y: 9901.216066

Streamline #291

Coordinates of Streamline:
Start x: 12109.515341 y: 9927.588349

Streamline #292

Coordinates of Streamline:
Start x: 12089.427820 y: 9951.107816

Streamline #293

Coordinates of Streamline:
Start x: 12065.908354 y: 9971.195338

Streamline #294

Coordinates of Streamline:
Start x: 12039.536071 y: 9987.356294

Streamline #295

Coordinates of Streamline:
Start x: 12010.960344 y: 9999.192749

Streamline #296

Coordinates of Streamline:
Start x: 11980.884802 y: 10006.413248

Streamline #297

Coordinates of Streamline:
Start x: 11950.050005 y: 10008.840000

Streamline #298

Coordinates of Streamline:
Start x: 11919.215208 y: 10006.413250

Streamline #299

Coordinates of Streamline:
Start x: 11889.139666 y: 9999.192752
End x: 11710.657785 y: 10280.127465

Streamline #300

Coordinates of Streamline:
Start x: 11860.563939 y: 9987.356299
End x: 11697.307482 y: 10362.374735

Streamline #301

Coordinates of Streamline:
Start x: 11834.191655 y: 9971.195344
End x: 11636.903752 y: 10078.816067

Streamline #302

Coordinates of Streamline:
Start x: 11810.672188 y: 9951.107823
End x: 11628.995108 y: 10045.388266

Streamline #303

Coordinates of Streamline:
Start x: 11790.584665 y: 9927.588358
End x: 11618.732208 y: 10009.603063

Streamline #304

Coordinates of Streamline:
Start x: 11774.423708 y: 9901.216075
End x: 11615.263467 y: 9968.356107

Streamline #305

Coordinates of Streamline:
Start x: 11762.587253 y: 9872.640349
End x: 11608.058245 y: 9925.935329

Streamline #306

Coordinates of Streamline:
Start x: 11755.366753 y: 9842.564807
End x: 11597.329866 y: 9884.349853

Streamline #307

Coordinates of Streamline:
Start x: 11752.940000 y: 9811.730011
End x: 11582.195723 y: 9839.133713

Streamline #308

Coordinates of Streamline:
Start x: 11755.366749 y: 9780.895214
End x: 11573.436457 y: 9787.548224

Streamline #309

Coordinates of Streamline:
Start x: 11762.587246 y: 9750.819671
End x: 11555.071762 y: 9721.234424

Streamline #310

Coordinates of Streamline:
Start x: 11774.423699 y: 9722.243943
End x: 11564.943471 y: 9525.420638

Streamline #311

Coordinates of Streamline:
Start x: 11790.584653 y: 9695.871659
End x: 11656.532908 y: 9499.466676

Streamline #312

Coordinates of Streamline:

Start x: 11810.672173 y: 9672.352192
 End x: 11718.887919 y: 9482.665543

Streamline #313

Coordinates of Streamline:
 Start x: 11834.191638 y: 9652.264668
 End x: 11768.644692 y: 9471.615705

Streamline #314

Coordinates of Streamline:
 Start x: 11860.563920 y: 9636.103710
 End x: 11814.915556 y: 9459.206396

Streamline #315

Coordinates of Streamline:
 Start x: 11889.139646 y: 9624.267255
 End x: 11855.771809 y: 9444.626601

Streamline #316

Coordinates of Streamline:
 Start x: 11919.215187 y: 9617.046754

Streamline #317

Coordinates of Streamline:
 Start x: 11950.049984 y: 9614.620000

Streamline #318

Coordinates of Streamline:
 Start x: 11980.884781 y: 9617.046749

Streamline #319

Coordinates of Streamline:
 Start x: 12010.960324 y: 9624.267245

Streamline #320

Coordinates of Streamline:
 Start x: 12039.536052 y: 9636.103696

Streamline #321

Coordinates of Streamline:
 Start x: 12065.908337 y: 9652.264650

Streamline #322

Coordinates of Streamline:
 Start x: 12089.427805 y: 9672.352169

Streamline #323

Coordinates of Streamline:
 Start x: 12109.515329 y: 9695.871634

Streamline #324

Coordinates of Streamline:
 Start x: 12125.676287 y: 9722.243915

Streamline #325

Coordinates of Streamline:
 Start x: 12137.512744 y: 9750.819641

Streamline #326

Coordinates of Streamline:
 Start x: 12144.733246 y: 9780.895182

Streamline #327

Coordinates of Streamline:
 Start x: 10732.370000 y: 9600.970000
 End x: 10828.603757 y: 9402.291037

Streamline #328

Coordinates of Streamline:
 Start x: 10757.375556 y: 9607.478889
 End x: 10879.903421 y: 9426.060014

Streamline #329

Coordinates of Streamline:
 Start x: 10782.381111 y: 9613.987778
 End x: 10923.617089 y: 9442.859160

Streamline #330

Coordinates of Streamline:
 Start x: 10807.386667 y: 9620.496667
 End x: 10943.557124 y: 9447.845198

Streamline #331

Coordinates of Streamline:
 Start x: 10832.392222 y: 9627.005556
 End x: 10954.705372 y: 9452.409340

Streamline #332

Coordinates of Streamline:
 Start x: 10857.397778 y: 9633.514444
 End x: 10960.715026 y: 9464.868005

Streamline #333

Coordinates of Streamline:
 Start x: 10882.403333 y: 9640.023333
 End x: 10972.659399 y: 9460.820017

Streamline #334

Coordinates of Streamline:
 Start x: 10907.408889 y: 9646.532222
 End x: 10980.008144 y: 9468.459382

Streamline #335

Coordinates of Streamline:
 Start x: 10932.414444 y: 9653.041111
 End x: 10991.382677 y: 9470.211526

Streamline #336

Coordinates of Streamline:
 Start x: 10957.420000 y: 9659.550000
 End x: 11003.609673 y: 9473.857492

Streamline #337

Coordinates of Streamline:
 Start x: 11111.570000 y: 10085.000000
 End x: 11560.514378 y: 10397.349644

Streamline #338

Coordinates of Streamline:
 Start x: 11110.081724 y: 10081.810690
 End x: 11560.707889 y: 10392.545195

Streamline #339

Coordinates of Streamline:
 Start x: 11108.593448 y: 10078.621379
 End x: 11563.790236 y: 10394.641858

Streamline #340

Coordinates of Streamline:
 Start x: 11107.105172 y: 10075.432069
 End x: 11568.864069 y: 10391.982222

Streamline #341

Coordinates of Streamline:
 Start x: 11105.616897 y: 10072.242759
 End x: 11580.336603 y: 10389.224940

Streamline #342

Coordinates of Streamline:
 Start x: 11104.128621 y: 10069.053448
 End x: 11618.984416 y: 10381.450424

Streamline #343

Coordinates of Streamline:
 Start x: 11102.640345 y: 10065.864138
 End x: 11615.897487 y: 10018.370719

Streamline #344

Coordinates of Streamline:
 Start x: 11101.152069 y: 10062.674828
 End x: 11347.090343 y: 9850.694249

Streamline #345

Coordinates of Streamline:
 Start x: 11099.663793 y: 10059.485517
 End x: 11346.340397 y: 9873.768444

Streamline #346

Coordinates of Streamline:
 Start x: 11098.175517 y: 10056.296207
 End x: 11336.927208 y: 9869.164886

Streamline #347

Coordinates of Streamline:
 Start x: 11096.687241 y: 10053.106897
 End x: 11335.780676 y: 9856.124660

Streamline #348

Coordinates of Streamline:
 Start x: 11095.198966 y: 10049.917586
 End x: 11334.273685 y: 9847.063358

Streamline #349

Coordinates of Streamline:
Start x: 11093.710690 y: 10046.728276
End x: 11331.939809 y: 9839.833639

Streamline #350

Coordinates of Streamline:
Start x: 11092.222414 y: 10043.538966
End x: 11328.833135 y: 9833.578454

Streamline #351

Coordinates of Streamline:
Start x: 11090.734138 y: 10040.349655
End x: 11333.669836 y: 9823.643846

Streamline #352

Coordinates of Streamline:
Start x: 11089.245862 y: 10037.160345
End x: 11329.356483 y: 9818.530235

Streamline #353

Coordinates of Streamline:
Start x: 11087.757586 y: 10033.971034
End x: 11324.322612 y: 9813.359356

Streamline #354

Coordinates of Streamline:
Start x: 11086.269310 y: 10030.781724
End x: 11327.835220 y: 9805.444734

Streamline #355

Coordinates of Streamline:
Start x: 11084.781034 y: 10027.592414
End x: 11321.288643 y: 9799.658765

Streamline #356

Coordinates of Streamline:
Start x: 11083.292759 y: 10024.403103
End x: 11323.259101 y: 9791.217786

Streamline #357

Coordinates of Streamline:
Start x: 11081.804483 y: 10021.213793
End x: 11324.061418 y: 9779.691853

Streamline #358

Coordinates of Streamline:
Start x: 11080.316207 y: 10018.024483
End x: 11314.715118 y: 9770.558658

Streamline #359

Coordinates of Streamline:
Start x: 11078.827931 y: 10014.835172
End x: 11313.731193 y: 9758.711640

Streamline #360

Coordinates of Streamline:
Start x: 11077.339655 y: 10011.645862
End x: 11311.430978 y: 9746.005224

Streamline #361

Coordinates of Streamline:
Start x: 11075.851379 y: 10008.456552
End x: 11307.339414 y: 9732.113215

Streamline #362

Coordinates of Streamline:
Start x: 11074.363103 y: 10005.267241
End x: 11310.066088 y: 9715.014390

Streamline #363

Coordinates of Streamline:
Start x: 11072.874828 y: 10002.077931
End x: 11298.097919 y: 9690.998819

Streamline #364

Coordinates of Streamline:
Start x: 11071.386552 y: 9998.888621
End x: 11295.986969 y: 9655.995022

Streamline #365

Coordinates of Streamline:
Start x: 11069.898276 y: 9995.699310
End x: 11282.225183 y: 9633.056732

Streamline #366

Coordinates of Streamline:
Start x: 11068.410000 y: 9992.510000
End x: 11098.770274 y: 9516.593586

Streamline #367

Coordinates of Streamline:
Start x: 10227.400000 y: 9761.290000
End x: 10302.896610 y: 9916.963075

Streamline #368

Coordinates of Streamline:
Start x: 10224.825787 y: 9785.781997
End x: 10291.816506 y: 9913.359875

Streamline #369

Coordinates of Streamline:
Start x: 10217.215655 y: 9809.203576
End x: 10282.629678 y: 9926.555567

Streamline #370

Coordinates of Streamline:
Start x: 10204.902203 y: 9830.531102
End x: 10265.147503 y: 9928.736034

Streamline #371

Coordinates of Streamline:
Start x: 10188.423587 y: 9848.832459
End x: 10245.929212 y: 9937.460679

Streamline #372

Coordinates of Streamline:
Start x: 10168.500002 y: 9863.307792
End x: 10227.021930 y: 9951.335819

Streamline #373

Coordinates of Streamline:
Start x: 10146.002204 y: 9873.324457
End x: 10204.783757 y: 9961.236415

Streamline #374

Coordinates of Streamline:
Start x: 10121.913456 y: 9878.444679
End x: 10184.783473 y: 9975.164849

Streamline #375

Coordinates of Streamline:
Start x: 10097.286550 y: 9878.444680
End x: 10163.723775 y: 9984.191946

Streamline #376

Coordinates of Streamline:
Start x: 10073.197802 y: 9873.324459
End x: 10144.250667 y: 9987.299248

Streamline #377

Coordinates of Streamline:
Start x: 10050.700004 y: 9863.307795
End x: 10133.417455 y: 9992.421897

Streamline #378

Coordinates of Streamline:
Start x: 10030.776418 y: 9848.832464
End x: 10131.387520 y: 10000.230526

Streamline #379

Coordinates of Streamline:
Start x: 10014.297801 y: 9830.531107
End x: 10131.439432 y: 9993.184963

Streamline #380

Coordinates of Streamline:
Start x: 10001.984347 y: 9809.203582
End x: 10143.696326 y: 9987.706418

Streamline #381

Coordinates of Streamline:
Start x: 9994.374214 y: 9785.782003
End x: 10173.860327 y: 9978.961825

Streamline #382

Coordinates of Streamline:
Start x: 9991.800000 y: 9761.290006
End x: 10223.889787 y: 9956.458924

Streamline #383

Coordinates of Streamline:
Start x: 9994.374211 y: 9736.798009
End x: 10170.059651 y: 9403.356836

Streamline #384

Coordinates of Streamline:
Start x: 10001.984342 y: 9713.376430
End x: 10148.759883 y: 9407.120360

Streamline #385

Coordinates of Streamline:
Start x: 10014.297794 y: 9692.048903
End x: 10140.984095 y: 9408.544455

Streamline #386

Coordinates of Streamline:
Start x: 10030.776409 y: 9673.747545
End x: 10138.872420 y: 9409.865612

Streamline #387

Coordinates of Streamline:
Start x: 10050.699993 y: 9659.272212
End x: 10141.260536 y: 9407.742925

Streamline #388

Coordinates of Streamline:
Start x: 10073.197790 y: 9649.255545
End x: 10145.849406 y: 9411.277754

Streamline #389

Coordinates of Streamline:
Start x: 10097.286538 y: 9644.135322
End x: 10153.209721 y: 9411.199216

Streamline #390

Coordinates of Streamline:
Start x: 10121.913443 y: 9644.135320
End x: 10161.890828 y: 9407.711427

Streamline #391

Coordinates of Streamline:
Start x: 10146.002192 y: 9649.255539
End x: 10170.245776 y: 9400.842057

Streamline #392

Coordinates of Streamline:
Start x: 10168.499991 y: 9659.272202
End x: 10177.165776 y: 9400.032980

Streamline #393

Coordinates of Streamline:
Start x: 10188.423577 y: 9673.747532
End x: 10182.237430 y: 9404.883587

Streamline #394

Coordinates of Streamline:
Start x: 10204.902195 y: 9692.048888
End x: 10184.974039 y: 9405.815533

Streamline #395

Coordinates of Streamline:
Start x: 10217.215650 y: 9713.376413
End x: 10308.968913 y: 9914.293667

Streamline #396

Coordinates of Streamline:
Start x: 10224.825785 y: 9736.797991
End x: 10305.689239 y: 9911.267309

Streamline #397

Coordinates of Streamline:
Start x: 11397.880000 y: 10128.120000
End x: 11629.434358 y: 10377.669174

Streamline #398

Coordinates of Streamline:
Start x: 11397.093793 y: 10122.616207
End x: 11634.270382 y: 10376.511519

Streamline #399

Coordinates of Streamline:
Start x: 11396.307586 y: 10117.112414
End x: 11638.939113 y: 10374.648870

Streamline #400

Coordinates of Streamline:
Start x: 11395.521379 y: 10111.608621
End x: 11643.308286 y: 10371.728953

Streamline #401

Coordinates of Streamline:
Start x: 11394.735172 y: 10106.104828
End x: 11650.261653 y: 10375.691069

Streamline #402

Coordinates of Streamline:
Start x: 11393.948966 y: 10100.601034
End x: 11655.544307 y: 10373.730178

Streamline #403

Coordinates of Streamline:
Start x: 11393.162759 y: 10095.097241
End x: 11626.004406 y: 10062.057480

Streamline #404

Coordinates of Streamline:
Start x: 11392.376552 y: 10089.593448
End x: 11621.027213 y: 10061.483566

Streamline #405

Coordinates of Streamline:
Start x: 11391.590345 y: 10084.089655
End x: 11618.601829 y: 10057.687475

Streamline #406

Coordinates of Streamline:
Start x: 11390.804138 y: 10078.585862
End x: 11622.008306 y: 10048.991708

Streamline #407

Coordinates of Streamline:
Start x: 11390.017931 y: 10073.082069
End x: 11616.637439 y: 10046.421382

Streamline #408

Coordinates of Streamline:
Start x: 11389.231724 y: 10067.578276
End x: 11618.564203 y: 10038.618517

Streamline #409

Coordinates of Streamline:
Start x: 11388.445517 y: 10062.074483
End x: 11620.085533 y: 10030.980623

Streamline #410

Coordinates of Streamline:
Start x: 11387.659310 y: 10056.570690
End x: 11612.302287 y: 10026.960426

Streamline #411

Coordinates of Streamline:
Start x: 11386.873103 y: 10051.066897
End x: 11612.726312 y: 10018.439623

Streamline #412

Coordinates of Streamline:
Start x: 11386.086897 y: 10045.563103
End x: 11612.652885 y: 10009.472768

Streamline #413

Coordinates of Streamline:
Start x: 11385.300690 y: 10040.059310
End x: 11612.002276 y: 9999.886474

Streamline #414

Coordinates of Streamline:
Start x: 11384.514483 y: 10034.555517
End x: 11610.686562 y: 9989.512500

Streamline #415

Coordinates of Streamline:
Start x: 11383.728276 y: 10029.051724
End x: 11608.590656 y: 9978.182242

Streamline #416

Coordinates of Streamline:
Start x: 11382.942069 y: 10023.547931
End x: 11603.547622 y: 9959.140082

Streamline #417

Coordinates of Streamline:
Start x: 11382.155862 y: 10018.044138
End x: 11600.530788 y: 9945.987313

Streamline #418

Coordinates of Streamline:
Start x: 11381.369655 y: 10012.540345
End x: 11595.389326 y: 9930.503719

Streamline #419

Coordinates of Streamline:
Start x: 11380.583448 y: 10007.036552
End x: 11588.463420 y: 9913.130166

Streamline #420

Coordinates of Streamline:
Start x: 11379.797241 y: 10001.532759
End x: 11578.857479 y: 9893.110424

Streamline #421

Coordinates of Streamline:
Start x: 11379.011034 y: 9996.028966
End x: 11573.832129 y: 9867.073918

Streamline #422

Coordinates of Streamline:
Start x: 11378.224828 y: 9990.525172
End x: 11563.667722 y: 9824.075825

Streamline #423

Coordinates of Streamline:
Start x: 11377.438621 y: 9985.021379
End x: 11339.807002 y: 9823.586898

Streamline #424

Coordinates of Streamline:
Start x: 11376.652414 y: 9979.517586
End x: 11342.969853 y: 9831.875737

Streamline #425

Coordinates of Streamline:
Start x: 11375.866207 y: 9974.013793
End x: 11349.439883 y: 9838.194726

Streamline #426

Coordinates of Streamline:
Start x: 11375.080000 y: 9968.510000
End x: 11351.344439 y: 9842.865700

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Particle Traces

Number of Particle-traces = 0

APPENDIX C-2

**GROUNDWATER MODELING OF
REMEDIAL ALTERNATIVES – AREA BCE**

**Area BCE Extraction Wells
Modeling Summary**

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

Date: 10/19/99
Time: 16:46:34.00

Input File: PND4-1C2.WFL
Map File : C:\WINFLOW\BCC\CURRENT\BCCCLEAN.MAP

Model Entities

Number of Linesinks Defined by Infiltration Rate = 0

Number of Linesinks Defined by Head = 81

Line Sink #1
x1: 9455.809570 y1: 8852.379883
x2: 9532.019531 y2: 8919.309570
Discharge per length = 0.001110
Head in Center of Linesink = 573.999207
Total Linesink Discharge = 0.112584 [L3/T]

Line Sink #2
x1: 9758.330078 y1: 8921.110352
x2: 9856.000000 y2: 8920.000000
Discharge per length = 0.000275
Head in Center of Linesink = 573.999878
Total Linesink Discharge = 0.026884 [L3/T]

Line Sink #3
x1: 9933.679688 y1: 9097.740234
x2: 9962.000000 y2: 9176.000000
Discharge per length = 0.000678
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.056455 [L3/T]

Line Sink #4
x1: 10070.490234 y1: 9330.889648
x2: 10125.000000 y2: 9402.000000
Discharge per length = 0.000794
Head in Center of Linesink = 573.999939
Total Linesink Discharge = 0.071138 [L3/T]

Line Sink #5
x1: 10243.269531 y1: 9391.910156
x2: 10352.000000 y2: 9380.000000
Discharge per length = 0.001185
Head in Center of Linesink = 573.999512
Total Linesink Discharge = 0.129582 [L3/T]

Line Sink #6
x1: 10466.790039 y1: 9379.070313
x2: 10570.000000 y2: 9384.000000
Discharge per length = 0.001902
Head in Center of Linesink = 573.999939
Total Linesink Discharge = 0.196526 [L3/T]

Line Sink #7
x1: 10676.169922 y1: 9380.349609
x2: 10766.000000 y2: 9374.000000
Discharge per length = 0.001018
Head in Center of Linesink = 573.999451
Total Linesink Discharge = 0.091694 [L3/T]

Line Sink #8
x1: 10958.150391 y1: 9452.929688
x2: 11058.000000 y2: 9493.280273
Discharge per length = 0.000869
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.093572 [L3/T]

Line Sink #9
x1: 11164.320313 y1: 9533.219727
x2: 11264.900391 y2: 9559.000000
Discharge per length = 0.001631
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.169359 [L3/T]

Line Sink #10

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x1: 11274.799805 y1: 9557.620117
x2: 11375.000000 y2: 9548.629883
Discharge per length = -0.000046
Head in Center of Linesink = 574.000061
Total Linesink Discharge = -0.004610 [L3/T]
Line Sink #11
x1: 11798.269531 y1: 9458.070313
x2: 11910.019531 y2: 9429.009766
Discharge per length = 0.002061
Head in Center of Linesink = 573.999756
Total Linesink Discharge = 0.237977 [L3/T]
Line Sink #12
x1: 12250.440430 y1: 9339.889648
x2: 12379.919922 y2: 9307.370117
Discharge per length = 0.000623
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.083199 [L3/T]
Line Sink #13
x1: 12609.480469 y1: 9251.900391
x2: 12842.719727 y2: 9201.009766
Discharge per length = 0.000822
Head in Center of Linesink = 573.999817
Total Linesink Discharge = 0.196245 [L3/T]
Line Sink #14
x1: 9238.709961 y1: 8655.839844
x2: 9162.280273 y2: 8589.679688
Discharge per length = 0.000422
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.042610 [L3/T]
Line Sink #15
x1: 8799.389648 y1: 8269.179688
x2: 8743.000000 y2: 8212.000000
Discharge per length = 0.001424
Head in Center of Linesink = 573.999573
Total Linesink Discharge = 0.114330 [L3/T]
Line Sink #16
x1: 9305.000000 y1: 7620.000000
x2: 9499.110352 y2: 7798.709961
Discharge per length = 0.000588
Head in Center of Linesink = 573.999756
Total Linesink Discharge = 0.155033 [L3/T]
Line Sink #17
x1: 10618.910156 y1: 8563.019531
x2: 10893.000000 y2: 8655.000000
Discharge per length = 0.000076
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.022065 [L3/T]
Line Sink #18
x1: 11621.400391 y1: 8674.400391
x2: 11886.000000 y2: 8669.000000
Discharge per length = 0.000110
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.029010 [L3/T]
Line Sink #19
x1: 12429.190430 y1: 8627.009766
x2: 12836.000000 y2: 8598.000000
Discharge per length = 0.000486
Head in Center of Linesink = 573.999817
Total Linesink Discharge = 0.198403 [L3/T]
Line Sink #20
x1: 10298.349609 y1: 10053.889648
x2: 10275.230469 y2: 9945.990234
Discharge per length = 0.000224
Head in Center of Linesink = 579.000000
Total Linesink Discharge = 0.024763 [L3/T]
Line Sink #21
x1: 9915.799805 y1: 10113.259766
x2: 10032.509766 y2: 10055.139648
Discharge per length = 0.001196
Head in Center of Linesink = 578.999939
Total Linesink Discharge = 0.155944 [L3/T]
Line Sink #22
x1: 9803.790039 y1: 10170.790039
x2: 9702.000000 y2: 10222.000000
Discharge per length = 0.001863
Head in Center of Linesink = 578.999878
Total Linesink Discharge = 0.212225 [L3/T]
Line Sink #23
x1: 10341.650391 y1: 9900.759766
x2: 10457.000000 y2: 9838.719727
Discharge per length = -0.000835
Head in Center of Linesink = 579.000000
Total Linesink Discharge = -0.109384 [L3/T]
Line Sink #24
x1: 10574.030273 y1: 9781.690430
x2: 10679.879883 y2: 9750.730469
Discharge per length = -0.000683
Head in Center of Linesink = 578.999939
Total Linesink Discharge = -0.075352 [L3/T]
Line Sink #25
x1: 10795.110352 y1: 9720.509766
x2: 10904.009766 y2: 9693.559570
Discharge per length = -0.001775
Head in Center of Linesink = 579.000183
Total Linesink Discharge = -0.199128 [L3/T]

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Line Sink #26
 x1: 11634.080078 y1: 10079.360352
 x2: 11606.690430 y2: 9965.889648
 Discharge per length = 0.002729
 Head in Center of Linesink = 576.999817
 Total Linesink Discharge = 0.318582 [L3/T]

Line Sink #27
 x1: 11447.019531 y1: 10428.690430
 x2: 11581.000000 y2: 10397.530273
 Discharge per length = 0.002365
 Head in Center of Linesink = 575.000000
 Total Linesink Discharge = 0.325365 [L3/T]

Line Sink #28
 x1: 11748.410156 y1: 10464.120117
 x2: 11704.809570 y2: 10284.269531
 Discharge per length = 0.001609
 Head in Center of Linesink = 574.999939
 Total Linesink Discharge = 0.297721 [L3/T]

Line Sink #29
 x1: 11243.259766 y1: 9603.580078
 x2: 11342.610352 y2: 9578.759766
 Discharge per length = 0.000642
 Head in Center of Linesink = 574.000122
 Total Linesink Discharge = 0.065785 [L3/T]

Line Sink #30
 x1: 9013.269531 y1: 8457.370117
 x2: 9089.059570 y2: 8525.450195
 Discharge per length = 0.000398
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.040583 [L3/T]

Line Sink #31
 x1: 9089.059570 y1: 8526.740234
 x2: 9159.709961 y2: 8588.400391
 Discharge per length = 0.000402
 Head in Center of Linesink = 573.999878
 Total Linesink Discharge = 0.037702 [L3/T]

Line Sink #32
 x1: 9009.419922 y1: 8452.230469
 x2: 8938.759766 y2: 8398.280273
 Discharge per length = 0.000441
 Head in Center of Linesink = 573.999878
 Total Linesink Discharge = 0.039200 [L3/T]

Line Sink #33
 x1: 8870.679688 y1: 8337.900391
 x2: 8936.190430 y2: 8394.419922
 Discharge per length = 0.000508
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.043916 [L3/T]

Line Sink #34
 x1: 8801.959961 y1: 8269.179688
 x2: 8868.759766 y2: 8335.969727
 Discharge per length = 0.000617
 Head in Center of Linesink = 573.999817
 Total Linesink Discharge = 0.058304 [L3/T]

Line Sink #35
 x1: 9242.559570 y1: 8657.120117
 x2: 9319.639648 y2: 8726.490234
 Discharge per length = 0.000462
 Head in Center of Linesink = 573.999817
 Total Linesink Discharge = 0.047880 [L3/T]

Line Sink #36
 x1: 9322.209961 y1: 8727.780273
 x2: 9385.150391 y2: 8788.150391
 Discharge per length = 0.000549
 Head in Center of Linesink = 573.999817
 Total Linesink Discharge = 0.047849 [L3/T]

Line Sink #37
 x1: 9386.440430 y1: 8789.440430
 x2: 9453.240234 y2: 8851.099609
 Discharge per length = 0.000695
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.063197 [L3/T]

Line Sink #38
 x1: 9541.230469 y1: 8919.830078
 x2: 9636.290039 y2: 8921.110352
 Discharge per length = 0.001133
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.107713 [L3/T]

Line Sink #39
 x1: 9641.429688 y1: 8919.830078
 x2: 9753.190430 y2: 8919.830078
 Discharge per length = 0.000629
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.070348 [L3/T]

Line Sink #40
 x1: 9857.879883 y1: 8917.900391
 x2: 9896.419922 y2: 9003.959961
 Discharge per length = 0.000223
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.021012 [L3/T]

Line Sink #41
 x1: 9895.139648 y1: 9006.530273
 x2: 9931.110352 y2: 9093.889648
 Discharge per length = 0.000506
 Head in Center of Linesink = 574.000000

Total Linesink Discharge = 0.047776 [L3/T]
 Line Sink #42
 x1: 9961.299805 y1: 9176.740234
 x2: 10012.679688 y2: 9252.530273
 Discharge per length = 0.000785
 Head in Center of Linesink = 573.999756
 Total Linesink Discharge = 0.071888 [L3/T]
 Line Sink #43
 x1: 10013.959961 y1: 9252.530273
 x2: 10070.490234 y2: 9328.320313
 Discharge per length = 0.000736
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.069580 [L3/T]
 Line Sink #44
 x1: 10128.290039 y1: 9404.110352
 x2: 10234.269531 y2: 9391.910156
 Discharge per length = 0.000752
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.080217 [L3/T]
 Line Sink #45
 x1: 10356.309570 y1: 9379.070313
 x2: 10459.080078 y2: 9379.070313
 Discharge per length = 0.001737
 Head in Center of Linesink = 574.000061
 Total Linesink Discharge = 0.178481 [L3/T]
 Line Sink #46
 x1: 10573.410156 y1: 9384.209961
 x2: 10671.040039 y2: 9381.639648
 Discharge per length = 0.001625
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.158685 [L3/T]
 Line Sink #47
 x1: 10768.030273 y1: 9375.860352
 x2: 10857.950195 y2: 9411.820313
 Discharge per length = 0.000857
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.082970 [L3/T]
 Line Sink #48
 x1: 10859.230469 y1: 9413.110352
 x2: 10954.290039 y2: 9450.360352
 Discharge per length = 0.000868
 Head in Center of Linesink = 573.999573
 Total Linesink Discharge = 0.088665 [L3/T]
 Line Sink #49
 x1: 11061.559570 y1: 9494.679688
 x2: 11160.469727 y2: 9530.650391
 Discharge per length = 0.001219
 Head in Center of Linesink = 573.999207
 Total Linesink Discharge = 0.128348 [L3/T]
 Line Sink #50
 x1: 11378.849609 y1: 9547.349609
 x2: 11468.769531 y2: 9534.500000
 Discharge per length = 0.000167
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.015211 [L3/T]
 Line Sink #51
 x1: 11471.339844 y1: 9533.219727
 x2: 11549.700195 y2: 9521.650391
 Discharge per length = 0.001288
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.102030 [L3/T]
 Line Sink #52
 x1: 11554.200195 y1: 9519.730469
 x2: 11667.240234 y2: 9492.750000
 Discharge per length = 0.001313
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.152609 [L3/T]
 Line Sink #53
 x1: 11671.089844 y1: 9490.190430
 x2: 11793.129883 y2: 9459.360352
 Discharge per length = 0.001957
 Head in Center of Linesink = 573.999023
 Total Linesink Discharge = 0.246392 [L3/T]
 Line Sink #54
 x1: 11913.879883 y1: 9427.250000
 x2: 12014.080078 y2: 9400.269531
 Discharge per length = 0.001599
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.165889 [L3/T]
 Line Sink #55
 x1: 12019.200195 y1: 9398.980469
 x2: 12124.530273 y2: 9370.719727
 Discharge per length = 0.001148
 Head in Center of Linesink = 573.999878
 Total Linesink Discharge = 0.125166 [L3/T]
 Line Sink #56
 x1: 12129.690430 y1: 9369.440430
 x2: 12244.019531 y2: 9342.459961
 Discharge per length = 0.000835
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.098082 [L3/T]
 Line Sink #57
 x1: 12383.389648 y1: 9304.559570
 x2: 12605.629883 y2: 9253.179688
 Discharge per length = 0.000474

Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.108196 [L3/T]
 Line Sink #58
 x1: 9501.480469 y1: 7801.080078
 x2: 9698.190430 y2: 7983.569824
 Discharge per length = 0.000201
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.053897 [L3/T]
 Line Sink #59
 x1: 9702.929688 y1: 7988.310059
 x2: 9885.410156 y2: 8158.950195
 Discharge per length = 0.000139
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.034665 [L3/T]
 Line Sink #60
 x1: 9892.519531 y1: 8163.689941
 x2: 10103.450195 y2: 8334.320313
 Discharge per length = 0.000099
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.026989 [L3/T]
 Line Sink #61
 x1: 10111.750000 y1: 8335.509766
 x2: 10365.330078 y2: 8463.480469
 Discharge per length = 0.000085
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.024150 [L3/T]
 Line Sink #62
 x1: 10370.070313 y1: 8461.110352
 x2: 10611.799805 y2: 8560.650391
 Discharge per length = 0.000085
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.022096 [L3/T]
 Line Sink #63
 x1: 10896.200195 y1: 8655.440430
 x2: 11206.660156 y2: 8672.030273
 Discharge per length = 0.000080
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.024764 [L3/T]
 Line Sink #64
 x1: 11216.139648 y1: 8669.660156
 x2: 11607.179688 y2: 8676.769531
 Discharge per length = 0.000098
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.038342 [L3/T]
 Line Sink #65
 x1: 11891.209961 y1: 8667.299805
 x2: 12412.599609 y2: 8627.009766
 Discharge per length = 0.000145
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.075837 [L3/T]
 Line Sink #66
 x1: 9805.070313 y1: 10169.500000
 x2: 9914.259766 y2: 10116.830078
 Discharge per length = 0.001236
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.149783 [L3/T]
 Line Sink #67
 x1: 10035.009766 y1: 10050.040039
 x2: 10145.490234 y2: 9997.370117
 Discharge per length = 0.000876
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.107191 [L3/T]
 Line Sink #68
 x1: 10148.059570 y1: 9996.089844
 x2: 10254.679688 y2: 9944.700195
 Discharge per length = 0.000283
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.033555 [L3/T]
 Line Sink #69
 x1: 10298.349609 y1: 10057.750000
 x2: 10320.190430 y2: 10156.660156
 Discharge per length = 0.000705
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.071425 [L3/T]
 Line Sink #70
 x1: 10342.030273 y1: 10256.860352
 x2: 10320.190430 y2: 10157.950195
 Discharge per length = 0.002174
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.220210 [L3/T]
 Line Sink #71
 x1: 10257.250000 y1: 9940.849609
 x2: 10336.889648 y2: 9902.309570
 Discharge per length = -0.000200
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.017685 [L3/T]
 Line Sink #72
 x1: 10458.290039 y1: 9836.150391
 x2: 10571.330078 y2: 9783.490234
 Discharge per length = -0.001084
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.135203 [L3/T]
 Line Sink #73
 x1: 10681.169922 y1: 9749.440430
 x2: 10792.929688 y2: 9721.179688

Discharge per length = -0.001013
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.116783 [L3/T]
 Line Sink #74
 x1: 10906.580078 y1: 9692.280273
 x2: 11014.490234 y2: 9664.019531
 Discharge per length = -0.002471
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.275668 [L3/T]
 Line Sink #75
 x1: 11017.059570 y1: 9661.450195
 x2: 11126.250000 y2: 9635.759766
 Discharge per length = -0.002813
 Head in Center of Linesink = 579.000122
 Total Linesink Discharge = -0.315514 [L3/T]
 Line Sink #76
 x1: 11130.099609 y1: 9633.190430
 x2: 11240.580078 y2: 9604.929688
 Discharge per length = -0.004543
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.518036 [L3/T]
 Line Sink #77
 x1: 11502.000000 y1: 9540.059570
 x2: 11527.690430 y2: 9636.400391
 Discharge per length = -0.001726
 Head in Center of Linesink = 577.000061
 Total Linesink Discharge = -0.172051 [L3/T]
 Line Sink #78
 x1: 11526.410156 y1: 9640.250000
 x2: 11549.530273 y2: 9735.309570
 Discharge per length = 0.000703
 Head in Center of Linesink = 577.000000
 Total Linesink Discharge = 0.068819 [L3/T]
 Line Sink #79
 x1: 11550.809570 y1: 9737.879883
 x2: 11576.500000 y2: 9841.929688
 Discharge per length = 0.000969
 Head in Center of Linesink = 577.000061
 Total Linesink Discharge = 0.103854 [L3/T]
 Line Sink #80
 x1: 11577.139648 y1: 9846.429688
 x2: 11606.690430 y2: 9962.040039
 Discharge per length = 0.002253
 Head in Center of Linesink = 576.999756
 Total Linesink Discharge = 0.268817 [L3/T]
 Line Sink #81
 x1: 11586.139648 y1: 10396.240234
 x2: 11710.740234 y2: 10365.410156
 Discharge per length = 0.001063
 Head in Center of Linesink = 574.999878
 Total Linesink Discharge = 0.136478 [L3/T]

Number of Ponds = 10

Pond #1
 Center of Pond -- x: 9863.690430 y: 9771.309570
 Radius = 357.489990
 Infiltration Rate = 0.000002
 Head at Center of Pond = 581.034241
 Total Pond Flux = 0.987672 [L3/T]
 Pond #2
 Center of Pond -- x: 10779.519531 y: 10159.440430
 Radius = 330.489990
 Infiltration Rate = 0.000003
 Head at Center of Pond = 582.165405
 Total Pond Flux = 0.936762 [L3/T]
 Pond #3
 Center of Pond -- x: 11295.660156 y: 9892.900391
 Radius = 240.630005
 Infiltration Rate = 0.000005
 Head at Center of Pond = 581.027954
 Total Pond Flux = 0.993212 [L3/T]
 Pond #4
 Center of Pond -- x: 9461.429688 y: 9236.889648
 Radius = 292.000000
 Infiltration Rate = 0.000002
 Head at Center of Pond = 580.717957
 Total Pond Flux = 0.658947 [L3/T]
 Pond #5
 Center of Pond -- x: 10127.879883 y: 10456.309570
 Radius = 196.600006
 Infiltration Rate = 0.000003
 Head at Center of Pond = 581.796143
 Total Pond Flux = 0.331497 [L3/T]
 Pond #6
 Center of Pond -- x: 11860.480469 y: 9758.450195
 Radius = 254.770004
 Infiltration Rate = 0.000011
 Head at Center of Pond = 583.108948
 Total Pond Flux = 2.222660 [L3/T]
 Pond #7
 Center of Pond -- x: 10427.480469 y: 9572.870117
 Radius = 70.000000
 Infiltration Rate = 0.000055

Head at Center of Pond = 582.398315
 Total Pond Flux = 0.840502 [L3/T]
 Pond #8
 Center of Pond -- x: 10600.910156 y: 9607.610352
 Radius = 70.000000
 Infiltration Rate = 0.000041
 Head at Center of Pond = 582.155212
 Total Pond Flux = 0.629607 [L3/T]
 Pond #9
 Center of Pond -- x: 10761.839844 y: 9620.469727
 Radius = 40.000000
 Infiltration Rate = 0.000041
 Head at Center of Pond = 580.403870
 Total Pond Flux = 0.206088 [L3/T]
 Pond #10
 Center of Pond -- x: 11421.280273 y: 9700.990234
 Radius = 64.430000
 Infiltration Rate = 0.000027
 Head at Center of Pond = 579.108154
 Total Pond Flux = 0.356032 [L3/T]

Number of Wells = 60

Well #1
 Center of Well -- x: 10070.589844 y: 9500.400391
 Radius = 1.500000
 Pumping Rate = 0.080000
 Head at Well Radius = 575.375427
 Well #2
 Center of Well -- x: 10094.469727 y: 9531.730469
 Radius = 1.500000
 Pumping Rate = 0.080000
 Head at Well Radius = 575.355530
 Well #3
 Center of Well -- x: 10213.759766 y: 9683.230469
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 577.482483
 Well #4
 Center of Well -- x: 10118.419922 y: 9563.080078
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 576.272339
 Well #5
 Center of Well -- x: 10143.230469 y: 9593.110352
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 576.659851
 Well #6
 Center of Well -- x: 10168.040039 y: 9623.139648
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 576.991333
 Well #7
 Center of Well -- x: 10190.250000 y: 9654.500000
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 577.272400
 Well #8
 Center of Well -- x: 10310.410156 y: 9806.740234
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 577.904907
 Well #9
 Center of Well -- x: 10336.530273 y: 9842.000000
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 578.068481
 Well #10
 Center of Well -- x: 10363.959961 y: 9873.349609
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 578.438843
 Well #11
 Center of Well -- x: 10238.559570 y: 9712.679688
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 577.653259
 Well #12
 Center of Well -- x: 10263.370117 y: 9744.019531
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 577.762756
 Well #13
 Center of Well -- x: 10285.570313 y: 9776.690430
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 577.815430
 Well #14
 Center of Well -- x: 10444.169922 y: 9872.040039
 Radius = 1.500000
 Pumping Rate = 0.090000
 Head at Well Radius = 577.794861
 Well #15

Center of Well -- x: 10568.070313 y: 9812.339844
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.492004

Well #16
Center of Well -- x: 10475.519531 y: 9857.120117
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.599243

Well #17
Center of Well -- x: 10506.860352 y: 9840.700195
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.586243

Well #18
Center of Well -- x: 10539.410156 y: 9825.769531
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.545349

Well #19
Center of Well -- x: 10597.919922 y: 9801.889648
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.408875

Well #20
Center of Well -- x: 10744.179688 y: 9763.089844
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.284607

Well #21
Center of Well -- x: 10627.480469 y: 9795.919922
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.314758

Well #22
Center of Well -- x: 10657.620117 y: 9788.450195
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.250610

Well #23
Center of Well -- x: 10685.969727 y: 9781.000000
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.210632

Well #24
Center of Well -- x: 10712.839844 y: 9772.040039
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.261963

Well #25
Center of Well -- x: 10894.929688 y: 9727.259766
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.102478

Well #26
Center of Well -- x: 10774.030273 y: 9757.120117
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.250793

Well #27
Center of Well -- x: 10805.089844 y: 9749.940430
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.241089

Well #28
Center of Well -- x: 10835.240234 y: 9743.679688
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.210815

Well #29
Center of Well -- x: 10866.570313 y: 9734.730469
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.149414

Well #30
Center of Well -- x: 10925.259766 y: 9720.330078
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.104431

Well #31
Center of Well -- x: 11048.160156 y: 9691.860352
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.034790

Well #32
Center of Well -- x: 10955.250000 y: 9712.839844
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.118591

Well #33
Center of Well -- x: 10986.719727 y: 9705.339844
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.091980

Well #34

Center of Well -- x: 11016.690430 y: 9697.849609
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.063904

Well #35
Center of Well -- x: 11254.990234 y: 9637.900391
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 575.003967

Well #36
Center of Well -- x: 11078.139648 y: 9684.360352
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 577.021240

Well #37
Center of Well -- x: 11108.110352 y: 9676.870117
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 576.998901

Well #38
Center of Well -- x: 11136.429688 y: 9668.419922
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 576.986755

Well #39
Center of Well -- x: 11164.919922 y: 9661.330078
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 576.901794

Well #40
Center of Well -- x: 11192.440430 y: 9654.389648
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 576.660767

Well #41
Center of Well -- x: 11221.190430 y: 9647.580078
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 576.177185

Well #42
Center of Well -- x: 11287.000000 y: 9628.910156
Radius = 1.500000
Pumping Rate = 0.070000
Head at Well Radius = 573.860962

Well #43
Center of Well -- x: 11309.709961 y: 9623.990234
Radius = 1.500000
Pumping Rate = 0.040000
Head at Well Radius = 574.261353

Well #44
Center of Well -- x: 11328.099609 y: 9619.990234
Radius = 1.500000
Pumping Rate = 0.030000
Head at Well Radius = 574.505920

Well #45
Center of Well -- x: 11347.690430 y: 9615.250000
Radius = 1.500000
Pumping Rate = 0.030000
Head at Well Radius = 574.549438

Well #46
Center of Well -- x: 11366.990234 y: 9610.570313
Radius = 1.500000
Pumping Rate = 0.030000
Head at Well Radius = 574.547180

Well #47
Center of Well -- x: 11445.559570 y: 9594.860352
Radius = 1.500000
Pumping Rate = 0.030000
Head at Well Radius = 574.292542

Well #48
Center of Well -- x: 11469.290039 y: 9597.450195
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 574.404053

Well #49
Center of Well -- x: 11488.790039 y: 9618.419922
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 575.498169

Well #50
Center of Well -- x: 11496.280273 y: 9646.889648
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 576.030823

Well #51
Center of Well -- x: 11552.480469 y: 9870.950195
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 575.749756

Well #52
Center of Well -- x: 11541.990234 y: 9837.980469
Radius = 1.500000
Pumping Rate = 0.090000
Head at Well Radius = 575.424072

Well #53

Center of Well -- x: 11533.000000 y: 9806.509766
 Radius = 1.500000
 Pumping Rate = 0.090000
 Head at Well Radius = 575.417053

Well #54
 Center of Well -- x: 11525.500000 y: 9775.040039
 Radius = 1.500000
 Pumping Rate = 0.070000
 Head at Well Radius = 575.889465

Well #55
 Center of Well -- x: 11519.509766 y: 9743.570313
 Radius = 1.500000
 Pumping Rate = 0.070000
 Head at Well Radius = 576.062439

Well #56
 Center of Well -- x: 11503.580078 y: 9679.120117
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 576.388977

Well #57
 Center of Well -- x: 11512.009766 y: 9712.099609
 Radius = 1.500000
 Pumping Rate = 0.050000
 Head at Well Radius = 576.463806

Well #58
 Center of Well -- x: 11386.099609 y: 9605.650391
 Radius = 1.500000
 Pumping Rate = 0.030000
 Head at Well Radius = 574.452271

Well #59
 Center of Well -- x: 11404.459961 y: 9601.469727
 Radius = 1.500000
 Pumping Rate = 0.030000
 Head at Well Radius = 574.354919

Well #60
 Center of Well -- x: 11423.910156 y: 9597.150391
 Radius = 1.500000
 Pumping Rate = 0.030000
 Head at Well Radius = 574.243958

Reference Head = 582.000000 Defined at -- x: 10200.940430 y: 10653.509766

Calibration Targets

Target Head	Computed Head	Residual	Well Name
576.21	577.41	-1.2026	RFI-17
578.01	578.43	-0.4171	RFI-42
580.29	579.86	0.4315	RFI-43
581.32	581.74	-0.4233	RFI-33
581.18	582.44	-1.2600	PS-11
580.86	581.13	-0.2741	PS-12
581.22	577.99	3.2265	RFI-32
582.32	578.37	3.9531	PS-13
581.05	581.18	-0.1287	R-15
582.55	579.64	2.9070	RFI-36
580.27	578.97	1.2960	RFIPZ23
581.64	578.55	3.0866	RFI-51
579.29	578.84	0.4537	RFIPZ22
580.54	578.51	2.0253	R-11
580.23	579.05	1.1830	RFIPZ16
573.69	576.07	-2.3804	RFIPZ27
576.79	576.06	0.7345	RFIPZ18
575.54	575.87	-0.3294	R-13
580.83	575.52	5.3144	R-08
576.77	575.10	1.6731	R-09
573.84	574.99	-1.1534	RFIPZ17
575.66	574.19	1.4736	RFIPZ21
573.61	574.03	-0.4195	RFIPZ19
573.50	574.02	-0.5165	RFIPZ20
582.05	582.01	0.0439	RFI-20
582.63	582.05	0.5829	PS-05
581.60	580.15	1.4529	PS-06
582.09	581.01	1.0817	PS-04
580.73	580.62	0.1133	RFI-31
580.19	579.37	0.8156	RFI-30
581.27	579.11	2.1590	RFIPZ26
580.81	578.85	1.9632	RFIPZ25
579.99	578.71	1.2798	RFI-29
579.92	578.34	1.5751	RFI-18
582.23	578.23	3.9991	PS-08
581.36	579.11	2.2451	RFIPZ24
580.20	578.07	2.1284	RFI-35
581.62	580.56	1.0568	PS-07
581.11	581.20	-0.0935	RFI-27
581.62	580.41	1.2110	PS-09
579.92	577.94	1.9761	RFI-28
573.68	574.02	-0.3440	RFI-34
573.55	574.03	-0.4793	RFI-45
582.42	581.28	1.1410	RFI-37

Number of Targets = 44
Residual Mean = 0.980939
Residual Standard Deviation = 1.542389
Residual Sum of Squares = 147.013047
Absolute Residual Mean = 1.409205
Minimum Residual = -2.380418
Maximum Residual = 5.314442
Observed Range in Head = 9.130000
Resid. Std./Range in Head = 0.168936

Aquifer Properties

.... Steady-State Flow Model

Permeability.....= 0.007820 [L/T]
Porosity.....= 0.100000
Elevation of Aquifer Top....= 585.000000
Elevation of Aquifer Bottom.= 572.800000
Uniform Regional Gradient...= 0.000000
Angle of Uniform Gradient...= 0.000000
Recharge.....= 0.000000

Contour Matrix

Number of nodes in the X-direction = 100
Number of nodes in the Y-direction = 100

Minimum X Coordinate = 9025.477979
Minimum Y Coordinate = 8203.024170
Maximum X Coordinate = 11901.302297
Maximum Y Coordinate = 10901.187749

Minimum Head = 573.739371
Maximum Head = 583.369365

CONTOUR GRID -----

Row 1						576.085541	576.106668	576.127172	576.147101	576.166504
	575.424171	575.396418	575.363601	575.326206	575.284666	576.185426	576.203912	576.222006	576.239748	576.257178
	575.239384	575.190753	575.139168	575.085030	575.028758	576.274334	576.291251	576.307963	576.324501	576.340895
	574.970785	574.911557	574.851533	574.791170	574.730922	576.357176	576.373371	576.389511	576.405626	576.421746
	574.671227	574.612495	574.555107	574.499403	574.445673	576.437905	576.454139	576.470485	576.486983	576.503676
	574.394155	574.345023	574.298390	574.254318	574.212863	576.520611	576.537837	576.555404	576.573368	576.591787
	574.174159	574.138556	574.106851	574.080578	574.061749					
	574.048947	574.036344	574.109929	574.262717	574.398195					
	574.519852	574.629977	574.730205	574.821870	574.906192					
	574.984278	575.057069	575.125312	575.189591	575.250359					
	575.307980	575.362753	575.414928	575.464721	575.512317	575.129003	575.127842	575.118333	575.101793	575.079243
	575.557879	575.601546	575.643438	575.683660	575.722304	575.051513	575.019305	574.983238	574.943874	574.901739
	575.759451	575.795174	575.829541	575.862615	575.894456	574.857333	574.811137	574.763614	574.715212	574.666358
	575.925120	575.954663	575.983138	576.010597	576.037090	574.617457	574.568887	574.520998	574.474102	574.428480
	576.062669	576.087382	576.111279	576.134407	576.156816	574.384370	574.341979	574.301480	574.263032	574.226800
	576.178551	576.199660	576.220190	576.240184	576.259687	574.192986	574.161851	574.133709	574.108814	574.087079
	576.278743	576.297393	576.315679	576.333639	576.351312	574.067770	574.049635	574.031368	574.011788	574.020310
	576.368733	576.385937	576.402957	576.419825	576.436571	574.175805	574.311473	574.430814	574.536343	574.630952
	576.453226	576.469820	576.486383	576.502945	576.519540	574.717333	574.797306	574.872001	574.942162	575.008324
	576.536201	576.552962	576.569863	576.586942	576.604243	575.070899	575.130227	575.186600	575.240276	575.291477
	576.621809	576.639689	576.657933	576.676595	576.695730	575.340399	575.387203	575.432025	575.474979	575.516160
						575.555654	575.593536	575.629876	575.664743	575.698200
						575.730311	575.761138	575.790739	575.819173	575.846498
						575.872771	575.898047	575.922383	575.945834	575.968456
						575.990303	576.011429	576.031886	576.051728	576.071004
						576.089764	576.108057	576.125927	576.143421	576.160578
						576.177438	576.194037	576.210409	576.226586	576.242596
						576.258468	576.274230	576.289909	576.305535	576.321137
						576.336747	576.352401	576.368136	576.383993	576.400015
						576.416250	576.432747	576.449561	576.466746	576.484364
Row 2										
	575.277590	575.262937	575.241628	575.214556	575.182443					
	575.145902	575.105477	575.061672	575.014965	574.965827					
	574.914719	574.862101	574.808431	574.754156	574.699712					
	574.645517	574.591961	574.539406	574.488176	574.438554					
	574.390776	574.345035	574.301481	574.260238	574.221440					
	574.185288	574.152119	574.122482	574.097080	574.076257					
	574.058926	574.042783	574.025988	574.067026	574.220374					
	574.355614	574.476326	574.584759	574.682696	574.771878					
	574.853923	574.930118	575.001397	575.068433	575.131728					
	575.191674	575.248591	575.302749	575.354380	575.403687	574.979717	574.992153	574.994539	574.988600	574.975648
	575.450844	575.496000	575.539284	575.580805	575.620656	574.956726	574.932694	574.904288	574.872154	574.836882
	575.658920	575.695673	575.730983	575.764915	575.797532	574.799011	574.759051	574.717478	574.674746	574.631280
	575.828892	575.859054	575.888074	575.916006	575.942905	574.587481	574.543718	574.500333	574.457634	574.415898
	575.968824	575.993815	576.017931	576.041224	576.063743	574.375368	574.336258	574.298756	574.263036	574.229270
						574.197637	574.168324	574.141500	574.117226	574.095329

574.075303	574.056366	574.037633	574.018215	573.997178
573.973305	574.131885	574.266954	574.381523	574.481754
574.572840	574.657143	574.735841	574.809679	574.879199
574.944829	575.006930	575.065827	575.121812	575.175145
575.226047	575.274700	575.321248	575.365808	575.408479
575.449344	575.488480	575.525959	575.561853	575.596231
575.629160	575.660707	575.690934	575.719906	575.747683
575.774326	575.799897	575.824455	575.848061	575.870775
575.892656	575.913762	575.934151	575.953878	575.972998
575.991566	576.009632	576.027247	576.044458	576.061308
576.077839	576.094088	576.110089	576.125871	576.141464
576.156894	576.172186	576.187366	576.202460	576.217496
576.232507	576.247526	576.262590	576.277741	576.293022
576.308481	576.324171	576.340145	576.356463	576.373186

Row 5

574.830929	574.856839	574.871058	574.875670	574.872258
574.862070	574.846120	574.825257	574.800215	574.771646
574.740135	574.706223	574.670406	574.633147	574.594875
574.555991	574.516860	574.477821	574.439179	574.401210
574.364158	574.328244	574.293662	574.260593	574.229202
574.199647	574.172067	574.146553	574.123103	574.101558
574.081572	574.062645	574.044212	574.025711	574.006613
573.986367	573.963922	574.093731	574.216533	574.321235
574.417742	574.507414	574.591104	574.669486	574.743102
574.812399	574.877774	574.939600	574.998236	575.054004
575.107166	575.157929	575.206447	575.252839	575.297202
575.339619	575.380167	575.418921	575.455959	575.491355
575.525184	575.557519	575.588429	575.617981	575.646243
575.673279	575.699157	575.723941	575.747699	575.770495
575.792393	575.813458	575.833752	575.853336	575.872268
575.890609	575.908413	575.925735	575.942626	575.959133
575.975300	575.991164	576.006759	576.022115	576.037258
576.052211	576.066996	576.081636	576.096155	576.110578
576.124935	576.139259	576.153587	576.167959	576.182422
576.197024	576.211818	576.226860	576.242212	576.257937

Row 6

574.683571	574.722739	574.748645	574.763670	574.769665
574.768077	574.760066	574.746592	574.728474	574.706427
574.681087	574.653027	574.622767	574.590783	574.557514
574.523360	574.488690	574.453838	574.419111	574.384782
574.351098	574.318283	574.286535	574.256033	574.226941
574.199398	574.173519	574.149365	574.126925	574.106083
574.086618	574.068227	574.050588	574.033435	574.016670
574.000589	573.986773	573.986998	574.031900	574.142934
574.247562	574.344768	574.435174	574.519496	574.598339
574.672206	574.741552	574.806848	574.868576	574.927169
574.982958	575.036177	575.086988	575.135509	575.181831
575.226034	575.268194	575.308393	575.346717	575.383252
575.418083	575.451290	575.482951	575.513139	575.541925
575.569383	575.595584	575.620601	575.644506	575.667373
575.689272	575.710273	575.730444	575.749851	575.768559
575.786632	575.804133	575.821120	575.837650	575.853774
575.869538	575.884981	575.900137	575.915033	575.929693
575.944135	575.958377	575.972437	575.986334	576.000092
576.013738	576.027302	576.040823	576.054340	576.067899
576.081552	576.095351	576.109356	576.123632	576.138244

Row 7

574.538138	574.590555	574.627990	574.653226	574.668438
574.675270	574.675015	574.668740	574.657347	574.641620
574.622242	574.599826	574.574916	574.548007	574.519545
574.489938	574.459554	574.428731	574.397771	574.366951
574.336518	574.306697	574.277688	574.249672	574.222807
574.197228	574.173039	574.150298	574.129007	574.109102
574.090457	574.072910	574.056315	574.040615	574.025973
574.013020	574.003423	573.999823	573.998919	573.998174
574.055049	574.163980	574.264117	574.356671	574.442532
574.522349	574.596671	574.666145	574.731524	574.793456
574.852367	574.908516	574.962062	575.013113	575.061749
575.108043	575.152072	575.193929	575.233717	575.271539
575.307495	575.341680	575.374178	575.405070	575.434433
575.462348	575.488893	575.514150	575.538201	575.561127
575.583006	575.603917	575.623933	575.643126	575.661568
575.679329	575.696478	575.713082	575.729203	575.744899
575.760219	575.775203	575.789885	575.804289	575.818433
575.832331	575.845995	575.859435	575.872665	575.885704
575.898575	575.911310	575.923943	575.936518	575.949079
575.961679	575.974373	575.987223	576.000296	576.013665

Row 8

574.394768	574.461033	574.509734	574.544903	574.569115
574.584162	574.591450	574.592149	574.587252	574.577612
574.563969	574.546973	574.527197	574.505154	574.481301
574.456052	574.429779	574.402820	574.375479	574.348030
574.320724	574.293785	574.267417	574.241799	574.217093

574.193432	574.170921	574.149628	574.129578	574.110753
574.093100	574.076553	574.061076	574.046722	574.033717
574.022566	574.014070	574.008716	574.005577	574.003545
574.002180	574.000903	574.071491	574.176262	574.272146
574.360174	574.440982	574.515515	574.585232	574.651213
574.713959	574.773712	574.830612	574.884748	574.936182
574.984972	575.031203	575.074985	575.116454	575.155745
575.192983	575.228276	575.261721	575.293405	575.323412
575.351828	575.378744	575.404252	575.428445	575.451417
575.473257	575.494048	575.513874	575.532811	575.550938
575.568333	575.585074	575.601237	575.616894	575.632110
575.646939	575.661424	575.675597	575.689478	575.703078
575.716403	575.729454	575.742235	575.754750	575.767012
575.779042	575.790867	575.802526	575.814060	575.825516
575.836946	575.848409	575.859968	575.871694	575.883666

Row 9

574.255775	574.335342	574.394343	574.439148	574.472196
574.495260	574.509852	574.517264	574.518597	574.514784
574.506624	574.494807	574.479936	574.462541	574.443093
574.422010	574.399669	574.376407	574.352530	574.328312
574.304002	574.279828	574.255993	574.232684	574.210062
574.188267	574.167411	574.147578	574.128817	574.111148
574.094570	574.079081	574.064703	574.051524	574.039733
574.029637	574.021565	574.015600	574.011353	574.008250
574.005803	574.003540	574.000975	573.997612	574.008362
574.181769	574.271625	574.351991	574.426873	574.498021
574.565706	574.630067	574.691218	574.749230	574.804139
574.855980	574.904842	574.950883	574.994300	575.035825
575.073999	575.110570	575.145105	575.177695	575.208432
575.237408	575.264728	575.290499	575.314832	575.337835
575.359611	575.380252	575.399847	575.418480	575.436236
575.453201	575.469464	575.485117	575.500243	575.514919
575.529206	575.543150	575.556779	575.570109	575.583140
575.595867	575.608278	575.620363	575.632116	575.643540
575.654652	575.665479	575.676061	575.686442	575.696671
575.706799	575.716884	575.726991	575.737198	575.747593

Row 10

574.135351	574.213197	574.281570	574.336273	574.378193
574.409098	574.430716	574.444531	574.451784	574.453504
574.450549	574.443652	574.433443	574.420469	574.405213
574.388100	574.369508	574.349774	574.329202	574.308067
574.286619	574.265084	574.243671	574.222570	574.201949
574.181957	574.162718	574.144331	574.126870	574.110384
574.094911	574.080482	574.067149	574.054997	574.044155
574.034801	574.027054	574.020900	574.016116	574.012359
574.009248	574.006433	574.003563	574.000318	573.996387
573.991287	574.086325	574.169864	574.251680	574.330176
574.404637	574.475156	574.541897	574.604955	574.664329
574.717994	574.772049	574.820756	574.866446	574.909406
574.949848	574.987922	575.023738	575.057390	575.088970
575.118581	575.146344	575.172392	575.196859	575.219877
575.241563	575.262020	575.281342	575.299617	575.316935
575.333392	575.349092	575.364145	575.378657	575.392721
575.406407	575.419765	575.432819	575.445574	575.458020
575.470134	575.481885	575.493244	575.504187	575.514706
575.524813	575.534538	575.543925	575.553023	575.561883
575.570553	575.579089	575.587556	575.596036	575.604632

Row 11

574.200833	574.087795	574.170531	574.236792	574.287775
574.326282	574.354561	574.374391	574.387200	574.394120
574.396067	574.393810	574.388005	574.379218	574.367937
574.354593	574.339564	574.323185	574.305758	574.287555
574.268825	574.249797	574.230684	574.211682	574.192967
574.174701	574.157021	574.140045	574.123865	574.108557
574.094181	574.080791	574.068445	574.057218	574.047194
574.038459	574.031055	574.024936	574.019950	574.015866
574.012422	574.009364	574.006472	574.003604	574.000812
573.998794	574.001980	574.004834	574.005138	574.001779
574.226158	574.305314	574.379727	574.449644	574.515020
574.575647	574.631611	574.683458	574.731810	574.777108
574.819618	574.859503	574.896869	574.931797	574.964376
574.994718	575.022971	575.049305	575.073898	575.096910
575.118479	575.138719	575.157726	575.175584	575.192385
575.208235	575.223259	575.237597	575.251387	575.264748

574.250858	574.234197	574.217251	574.200226	574.183309	574.201224	574.201303	574.199194	574.195097	574.189205
574.166676	574.150480	574.134856	574.119917	574.105756	574.181726	574.172905	574.163010	574.152329	574.141143
574.092451	574.080067	574.068663	574.058298	574.049024	574.129724	574.118322	574.107161	574.096431	574.086290
574.040879	574.033866	574.027932	574.022963	574.018795	574.076848	574.068177	574.060306	574.053233	574.046931
574.015247	574.012148	574.009367	574.006870	574.004815	574.041360	574.036467	574.032192	574.028474	574.025248
574.003730	574.004243	574.004671	574.003649	574.002060	574.022456	574.020046	574.017978	574.016223	574.014757
574.022428	574.114506	574.200032	574.279798	574.353822	574.013548	574.012547	574.011696	574.010955	574.010327
574.421234	574.481915	574.537370	574.588865	574.637003	574.009882	574.009763	574.010203	574.011497	574.013604
574.682071	574.724217	574.763521	574.800036	574.833831	574.015035	574.014276	574.011976	574.008439	574.003401
574.865027	574.893817	574.920439	574.945136	574.968116	574.006872	574.070749	574.128927	574.181141	574.226076
574.989545	575.009542	575.028195	575.045577	575.061771	574.262154	574.291702	574.318011	574.342338	574.365036
575.076886	575.091079	575.104541	575.117463	575.130006	574.386178	574.405714	574.423505	574.439280	574.452495
575.142273	575.154318	575.166147	575.177731	575.189015	574.462256	574.468538	574.473676	574.479691	574.486997
575.199923	575.210360	575.220225	575.229426	575.237905	574.495384	574.504548	574.514212	574.524134	574.534098
575.245663	575.252758	575.259281	575.265314	575.270912	574.543888	574.553237	574.561712	574.568405	574.571679
575.276103	575.280901	575.285342	575.289510	575.293562	574.570685	574.567289	574.563485	574.559779	574.555906
					574.551327	574.545330	574.536976	574.525069	574.509238

Row 13

575.126980	574.735966	574.230398	574.054350	574.121219
574.173788	574.213318	574.243452	574.266098	574.282309
574.293044	574.299153	574.301340	574.300187	574.296189
574.289774	574.281310	574.271121	574.259493	574.246686
574.232944	574.218500	574.203577	574.188392	574.173148
574.158037	574.143231	574.128883	574.115125	574.102065
574.089794	574.078382	574.067885	574.058347	574.049799
574.042250	574.035685	574.030047	574.025246	574.021163
574.017670	574.014650	574.012025	574.009786	574.008028
574.006921	574.006443	574.006033	574.005208	574.004031
574.002660	574.001179	573.999679	574.089299	574.177274
574.255045	574.320569	574.379968	574.435322	574.487086
574.535462	574.580552	574.622387	574.660961	574.696289
574.728495	574.757854	574.784733	574.809492	574.832412
574.853684	574.873428	574.891710	574.908569	574.924053
574.938264	574.951401	574.963746	574.975593	574.987165
574.998590	575.009913	575.021115	575.032139	575.042896
575.053271	575.063120	575.072276	575.080572	575.087891
575.094224	575.099682	575.104428	575.108595	575.112241
575.115353	575.117889	575.119823	575.121215	575.122267

Row 14

575.482438	575.156188	574.766049	574.260507	574.047434
574.106958	574.148730	574.183085	574.210191	574.230451
574.244998	574.254801	574.260563	574.262853	574.262160
574.258908	574.253454	574.246106	574.237135	574.226789
574.215304	574.202915	574.189855	574.176356	574.162641
574.148922	574.135393	574.122226	574.109573	574.097555
574.086275	574.075802	574.066188	574.057465	574.049643
574.042716	574.036653	574.031399	574.026879	574.023001
574.019670	574.016805	574.014349	574.012286	574.010643
574.009440	574.008592	574.007868	574.007065	574.006159
574.005245	574.004500	574.004267	574.005381	574.010768
574.078617	574.142527	574.206873	574.267565	574.324324
574.377225	574.426339	574.471647	574.513037	574.550392
574.583793	574.613689	574.640725	574.665469	574.688296
574.709421	574.728942	574.746882	574.763209	574.777886
574.790958	574.802681	574.813526	574.823986	574.834387
574.844869	574.855440	574.866037	574.876560	574.886879
574.896835	574.906224	574.914786	574.922216	574.928259
574.932880	574.936319	574.938920	574.940911	574.942343
574.943125	574.943093	574.942086	574.940071	574.937301

Row 15

575.800779	575.518712	575.195836	574.812329	574.326219
574.048731	574.085592	574.126291	574.157992	574.181627
574.199492	574.212671	574.221739	574.227224	574.229617
574.229335	574.226722	574.222060	574.215595	574.207551
574.198156	574.187648	574.176273	574.164284	574.151931
574.139451	574.127064	574.114967	574.103328	574.092286
574.081948	574.072387	574.063644	574.055737	574.048660
574.042389	574.036883	574.032086	574.027932	574.024346
574.021256	574.018597	574.016324	574.014412	574.012850
574.011613	574.010635	574.009802	574.009026	574.008299
574.007695	574.007415	574.007831	574.009724	574.014603
574.019562	574.017688	574.015254	574.079606	574.143845
574.203337	574.258259	574.308613	574.354144	574.394376
574.429150	574.459340	574.486277	574.510879	574.533604
574.554645	574.574052	574.591772	574.607661	574.621494
574.633102	574.642776	574.651442	574.660037	574.669018
574.678465	574.688290	574.698349	574.708480	574.718508
574.728236	574.737406	574.745642	574.752391	574.757040
574.759429	574.760163	574.760034	574.759439	574.758369
574.756574	574.753673	574.749221	574.742890	574.734920

Row 16

576.092713	575.843898	575.565995	575.248420	574.872556
574.388221	574.021608	574.075546	574.110643	574.135764
574.156519	574.172903	574.185029	574.193454	574.198713

Row 17

576.364791	576.142600	575.898106	575.624427	575.310431
574.935392	574.457374	574.041316	574.068075	574.091274
574.116029	574.135737	574.150589	574.161651	574.169563
574.174710	574.177368	574.177718	574.175886	574.172003
574.166256	574.158900	574.150247	574.140632	574.130386
574.119819	574.109218	574.098837	574.088897	574.079573
574.070985	574.063195	574.056212	574.050009	574.044531
574.039714	574.035491	574.031798	574.028573	574.025762
574.023315	574.021191	574.019353	574.017776	574.016432
574.015293	574.014326	574.013498	574.012789	574.012205
574.011792	574.011627	574.011800	574.012332	574.012974
574.013064	574.012005	574.009713	574.006209	574.001363
573.994941	573.986629	573.975987	573.988508	574.043955
574.079186	574.105048	574.130065	574.154201	574.177206
574.198877	574.219026	574.237444	574.253829	574.267505
574.275776	574.274757	574.273449	574.276103	574.281673
574.289157	574.297896	574.307439	574.317458	574.327698
574.337958	574.348060	574.357780	574.366317	574.369464
574.361542	574.350721	574.341873	574.334483	574.327512
574.319974	574.310799	574.298499	574.280077	574.249923

Row 18

576.621406	576.421582	576.203861	575.963349	575.692885
575.381416	575.010994	574.548696	574.000711	574.046003
574.079262	574.101726	574.118476	574.131843	574.142223
574.149886	574.155068	574.157853	574.158236	574.156240
574.152018	574.145863	574.138160	574.129324	574.119747
574.109790	574.099774	574.089992	574.080702	574.072105
574.064334	574.057434	574.051384	574.046111	574.041524
574.037527	574.034037	574.030983	574.028304	574.025952
574.023888	574.022079	574.020497	574.019118	574.017922
574.016884	574.015983	574.015196	574.014513	574.013936
574.013485	574.013184	574.013043	574.012995	574.012832
574.012211	574.010815	574.008481	574.005133	574.000681
573.995012	573.988014	573.979636	573.970107	573.961425
573.957476	573.963032	573.972400	573.982705	573.992886
574.002376	574.010787	574.025247	574.043390	574.059837
574.077742	574.074532	574.036828	574.036517	574.040894
574.048006	574.056852	574.066816	574.077483	574.088566
574.099891	574.111442	574.123553	574.137747	574.155403
574.119529	574.095820	574.080933	574.069363	574.058883
574.048047	574.035529	574.019773	573.999110	573.928381

Row 19

576.865654	576.685345	576.490264	576.276712	576.039609
575.771714	575.461971	575.090121	574.608059	574.010321
574.051408	574.070985	574.088248	574.103975	574.116693
574.126770	574.134515	574.139844	574.142492	574.142289
574.139344	574.134045	574.126921	574.118511	574.109290
574.099662	574.089980	574.080580	574.071771	574.063805
574.056827	574.050861	574.045824	574.041579	574.037976
574.034882	574.032193	574.029831	574.027742	574.025887
574.024235	574.022766	574.021459	574.020298	574.019269
574.018353	574.017536	574.016803	574.016144	574.015556
574.015039	574.014591	574.014181	574.013733	574.013097
574.012069	574.010458	574.008132	574.005013	574.001052
573.996229	573.990592	573.984351	573.978108	573.973238
573.971640	573.974385	573.980232	573.987514	573.995174
574.002561	574.009234	574.014877	574.019314	574.022683

574.049110	574.036215	574.059070	574.078305	574.092885	577.366190	577.212127	577.038422	576.839270	576.606584
574.105220	574.115745	574.123984	574.129143	574.130669	576.328561	575.986596	575.547121	574.940147	574.029541
574.128649	574.123712	574.116673	574.108263	574.099043	574.013515	574.036622	574.099460	574.134316	574.133326
574.089434	574.079796	574.070507	574.061965	574.054515	574.115841	574.098223	574.083696	574.070428	574.058663
574.048336	574.043401	574.039523	574.036456	574.033966	574.048205	574.035866	574.020177	574.005457	573.997549
574.031873	574.030055	574.028437	574.026973	574.025640	573.997526	574.002008	574.007546	574.012463	574.016324
574.024421	574.023307	574.022290	574.021362	574.020513	574.019194	574.021270	574.022744	574.023769	574.024464
574.019734	574.019014	574.018343	574.017710	574.017109	574.024915	574.025182	574.025308	574.025320	574.025235
574.016530	574.015953	574.015343	574.014629	574.013707	574.025061	574.024800	574.024449	574.024003	574.023452
574.012449	574.010737	574.008480	574.005628	574.002174	574.022785	574.021989	574.021051	574.019953	574.018684
573.998160	573.993717	573.989132	573.984948	573.982006	574.017233	574.015602	574.013805	574.011875	574.009868
573.981208	573.982954	573.986820	573.991980	573.997681	574.007864	574.005971	574.004319	574.003050	574.002294
574.003354	574.008573	574.013017	574.016427	574.018474	574.002145	574.002630	574.003704	574.005256	574.007130
574.018140	574.014047	574.008564	574.004746	574.003205	574.009151	574.011149	574.012968	574.014485	574.015620
574.003613	574.005526	574.008561	574.012412	574.016853	574.016366	574.016806	574.017112	574.017493	574.018134
574.021737	574.027009	574.032686	574.038449	574.041440	574.019153	574.020588	574.022420	574.024583	574.026978
574.036962	574.028936	574.021923	574.016395	574.011692	574.029479	574.031933	574.034156	574.035954	574.037172
574.007065	574.001830	573.995427	573.987501	573.978530	574.037765	574.037838	574.037597	574.037266	574.037036
					574.037057	574.037485	574.038518	574.040439	574.043617

Row 21

577.325400	577.178751	577.021613	576.851542	576.665354
576.458783	576.225886	575.957980	575.641750	575.254590
574.745020	573.986507	574.035958	574.055973	574.070191
574.084741	574.098629	574.110681	574.118982	574.122175
574.120468	574.115121	574.107494	574.098579	574.088989
574.079087	574.069164	574.059625	574.051043	574.043964
574.038640	574.034936	574.032468	574.030804	574.029595
574.028616	574.027740	574.026905	574.026090	574.025292
574.024514	574.023763	574.023042	574.022353	574.021694
574.021061	574.020448	574.019846	574.019247	574.018640
574.018012	574.017340	574.016588	574.015702	574.014611
574.013234	574.011497	574.009350	574.006773	574.003788
574.000472	573.996978	573.993575	573.990668	573.988766
573.988331	573.989553	573.992242	573.995958	574.000203
574.004535	574.008588	574.012055	574.014659	574.016072
574.015870	574.013966	574.011317	574.009226	574.008353
574.008784	574.010360	574.012858	574.016061	574.019774
574.023830	574.028064	574.032209	574.035602	574.036854
574.034881	574.030734	574.026191	574.022032	574.018256
574.014580	574.010697	574.006421	574.001870	573.997811

Row 22

577.543724	577.412176	577.271765	577.120416	576.955457
576.773382	576.569470	576.337162	576.066924	575.743665
575.340004	574.799658	574.039239	574.033528	574.046373
574.064425	574.082601	574.100598	574.113509	574.118116
574.115447	574.108397	574.099286	574.089326	574.079055
574.068625	574.058061	574.047737	574.038598	574.031677
574.027379	574.025308	574.024673	574.024738	574.025021
574.025270	574.025388	574.025356	574.025192	574.024925
574.024583	574.024191	574.023765	574.023316	574.022851
574.022369	574.021869	574.021345	574.020787	574.020187
574.019529	574.018792	574.017947	574.016954	574.015766
574.014335	574.012620	574.010599	574.008277	574.005695
574.002941	574.000162	573.997577	573.995471	573.994160
573.993901	573.994791	573.996729	573.999454	574.002640
574.005957	574.009110	574.011839	574.013911	574.015112
574.015299	574.014580	574.013446	574.012538	574.012306
574.012921	574.014363	574.016521	574.019245	574.022375
574.025742	574.029137	574.032255	574.034602	574.035549
574.034774	574.032668	574.029988	574.027265	574.024686
574.022237	574.019868	574.017624	574.015779	574.014954

Row 23

577.755599	577.638393	577.513776	577.379967	577.234684
577.074976	576.896957	576.695390	576.462970	576.188946
575.856395	575.436039	574.861887	573.974145	574.023077
574.043248	574.065272	574.095171	574.115998	574.120702
574.114117	574.103238	574.091629	574.080159	574.069081
574.058174	574.046668	574.034626	574.023900	574.016783
574.013973	574.014345	574.016245	574.018484	574.020479
574.022041	574.023167	574.023922	574.024384	574.024623
574.024696	574.024647	574.024505	574.024292	574.024020
574.023692	574.023310	574.022869	574.022363	574.021782
574.021112	574.020336	574.019433	574.018375	574.017134
574.015686	574.014012	574.012113	574.010010	574.007753
574.005431	574.003171	574.001144	573.999549	573.998586
573.998407	573.999064	574.000494	574.002531	574.004952
574.007519	574.010003	574.012199	574.013934	574.015078
574.015590	574.015583	574.015337	574.015206	574.015477
574.016305	574.017720	574.019670	574.022057	574.024752
574.027603	574.030417	574.032944	574.034868	574.035888
574.035889	574.035054	574.033751	574.032317	574.030960
574.029787	574.028889	574.028425	574.028692	574.030165

Row 24

577.961608	577.858165	577.748664	577.631567	577.504915

Row 25

578.162116	578.071977	577.977075	577.876093	577.767348
577.648686	577.517334	577.369696	577.201047	577.005059
576.772988	576.492166	576.142915	575.691344	575.060654
573.789625	573.976702	574.134681	574.186841	574.159061
574.115076	574.089687	574.075077	574.059095	574.046241
574.040016	574.028865	574.004742	573.979615	573.970183
573.976918	573.988876	573.999480	574.007392	574.013033
574.017036	574.019894	574.021952	574.023440	574.024518
574.025293	574.025840	574.026208	574.026431	574.026526
574.026504	574.026366	574.026111	574.025731	574.025220
574.024568	574.023766	574.022806	574.021681	574.020390
574.018938	574.017336	574.015613	574.013807	574.011976
574.010194	574.008551	574.007147	574.006084	574.005450
574.005303	574.005658	574.006479	574.007688	574.009171
574.010801	574.012451	574.014007	574.015380	574.016518
574.017423	574.018152	574.018813	574.019537	574.020444
574.021617	574.023094	574.024867	574.026892	574.029097
574.031386	574.033643	574.035743	574.037565	574.039026
574.040112	574.040892	574.041501	574.042103	574.042861
574.043937	574.045503	574.047767	574.050982	574.055450

Row 26

578.357306	578.280082	578.199363	578.114038	578.022676
577.923440	577.813970	577.691233	577.551314	577.389119
577.197925	576.968611	576.688205	576.336423	575.875044
575.215026	574.092418	574.262526	574.310449	574.190944
574.089307	574.071743	574.070778	574.044458	574.024472
574.036773	574.036756	573.990132	573.935472	573.925622
573.952339	573.977429	573.993863	574.004283	574.011139
574.015852	574.019204	574.021649	574.023466	574.024832
574.025868	574.026651	574.027235	574.027651	574.027919
574.028046	574.028034	574.027878	574.027573	574.027109
574.026480	574.025679	574.024702	574.023552	574.022237
574.020770	574.019176	574.017490	574.015758	574.014038
574.012398	574.010914	574.009666	574.008728	574.008163
574.008006	574.008262	574.008903	574.009869	574.011077
574.012431	574.013837	574.015210	574.016486	574.017629
574.018641	574.019560	574.020455	574.021411	574.022507
574.023803	574.025327	574.027080	574.029033	574.031133
574.033312	574.035487	574.037574	574.039499	574.041218
574.042731	574.044092	574.045400	574.046782	574.048382
574.050352	574.052866	574.056118	574.060337	574.065777

Row 27

578.547208	578.482544	578.415642	578.345592	578.271201
578.190923	578.102757	578.004132	577.891755	577.761424
577.607782	577.423959	577.200977	576.926588	576.583109
576.145121	575.575760	574.777290	574.556109	574.175819
573.957229	574.056935	574.095907	574.023092	573.960139
574.047422	574.093813	573.982037	573.834977	573.843116
573.933757	573.973918	573.993262	574.004109	574.011027
574.015812	574.019284	574.021884	574.023877	574.025431
574.026659	574.027635	574.028405	574.028999	574.029432
574.029708	574.029824	574.029775	574.029551	574.029142
574.028540	574.027742	574.026748	574.025567	574.024213
574.022710	574.021093	574.019404	574.017695	574.016025
574.014458	574.013063	574.011904	574.011037	574.010506
57				

578.731726 578.679268 578.625829 578.570697 578.512916
578.451215 578.383919 578.308850 578.223201 578.123409
578.005018 577.862563 577.689473 577.478083 577.220025
576.907827 576.538850 576.128084 575.727313 575.395921
575.176802 575.095370 575.032963 574.918126 574.802170
574.727312 574.628592 574.449544 574.204332 573.845661
573.953923 573.985856 573.999088 574.007027 574.012657
574.016870 574.020103 574.022638 574.024664 574.026311
574.027669 574.028795 574.029728 574.030487 574.031080
574.031506 574.031758 574.031823 574.031688 574.031340
574.030770 574.029974 574.028957 574.027729 574.026316
574.024749 574.023070 574.021332 574.019593 574.017915
574.016363 574.014999 574.013878 574.013044 574.012527
574.012340 574.012476 574.012909 574.013598 574.014490
574.015529 574.016656 574.017823 574.018993 574.020146
574.021279 574.022409 574.023567 574.024791 574.026119
574.027584 574.029203 574.030982 574.032912 574.034309
574.037124 574.039338 574.041577 574.043814 574.046037
574.048266 574.050534 574.052907 574.055473 574.058342
574.061639 574.065510 574.070120 574.075651 574.082298

Row 29

578.910658 578.870028 578.829673 578.789088 578.747554
578.704075 578.657289 578.605366 578.545895 578.475757
578.391039 578.287011 578.156599 577.992189 577.792313
577.557488 577.292493 577.010069 576.730611 576.473882
576.257756 576.083692 575.925873 575.762170 575.593498
575.420795 575.225794 574.984283 574.675661 574.253394
574.020715 574.009218 574.008477 574.011751 574.015471
574.018759 574.021519 574.023827 574.025775 574.027439
574.028876 574.030123 574.031200 574.032117 574.032871
574.033455 574.033852 574.034043 574.034009 574.033731
574.033196 574.032398 574.031345 574.030052 574.028550
574.026880 574.025095 574.023257 574.021432 574.019690
574.018098 574.016716 574.015593 574.014765 574.014252
574.014057 574.014167 574.014554 574.015181 574.016000
574.016964 574.018025 574.019144 574.020292 574.021450
574.022618 574.023805 574.025033 574.026331 574.027727
574.029247 574.030907 574.032716 574.034670 574.036756
574.038956 574.041246 574.043605 574.046017 574.048481
574.051008 574.053633 574.056410 574.059412 574.062733
574.066485 574.070798 574.075821 574.081717 574.088663

Row 30

579.083715 579.054487 579.026787 579.000324 578.974629
578.948991 578.922365 578.893265 578.859621 578.818639
578.764810 578.685795 578.579592 578.445949 578.285363
578.099878 577.894104 577.675852 577.454806 577.238782
577.029390 576.821145 576.616828 576.410855 576.198240
575.973243 575.724343 575.434546 575.079999 574.617021
574.076189 574.021413 574.015124 574.016375 574.018728
574.021117 574.023328 574.025327 574.027129 574.028762
574.030246 574.031594 574.032809 574.033885 574.034810
574.035564 574.036123 574.036459 574.036541 574.036343
574.035847 574.035044 574.033939 574.032555 574.030927
574.029108 574.027162 574.025164 574.023193 574.021328
574.019642 574.018199 574.017043 574.016205 574.015693
574.015502 574.015610 574.015986 574.016591 574.017380
574.018311 574.019342 574.020440 574.021580 574.022747
574.023938 574.025162 574.026436 574.027781 574.029222
574.030781 574.032476 574.034316 574.036305 574.038443
574.040702 574.043088 574.045580 574.048171 574.050659
574.053657 574.056590 574.059702 574.063054 574.066725
574.070812 574.075430 574.080712 574.086807 574.093877

Row 31

579.250545 579.232223 579.216670 579.203817 579.193464
579.185205 579.178344 579.171762 579.163746 579.146758
579.106863 579.043413 578.956476 578.846442 578.714325
578.562141 578.393210 578.212026 578.023264 577.829946
577.631490 577.422564 577.194259 576.955404 576.708634
576.447543 576.162192 575.837615 575.449773 574.949048
574.147654 574.008739 574.017911 574.020436 574.022009
574.023640 574.025324 574.026995 574.028628 574.030210
574.031732 574.033180 574.034536 574.035782 574.036893
574.037840 574.038586 574.039092 574.039314 574.039214
574.038764 574.037950 574.036776 574.035267 574.033468
574.031442 574.029270 574.027042 574.024854 574.022801
574.020968 574.019423 574.018210 574.017352 574.016848
574.016679 574.016815 574.017215 574.017837 574.018635
574.019569 574.020600 574.021699 574.022843 574.024020
574.025228 574.026474 574.027772 574.029143 574.030609
574.032192 574.033911 574.035780 574.037807 574.039994
574.042337 574.044829 574.047463 574.050231 574.053134
574.056177 574.059379 574.062771 574.066400 574.070332
574.074647 574.079448 574.084852 574.090995 574.098027

Row 32

579.410752 579.402756 579.398737 579.398863 579.403218
579.411737 579.424120 579.439685 579.452290 579.444603
579.415437 579.365014 579.293674 579.202015 579.091049
578.962348 578.818064 578.660669 578.492305 578.313821
578.123824 577.918132 577.689829 577.431411 577.157763
576.869777 576.558296 576.209569 575.801444 575.291609
574.573375 574.014284 574.024802 574.024795 574.025146
574.026116 574.027333 574.028695 574.030166 574.031708
574.033280 574.034841 574.036356 574.037792 574.039116
574.040287 574.041256 574.041969 574.042365 574.042389
574.041997 574.041167 574.039901 574.038228 574.036201
574.033900 574.031421 574.028877 574.026389 574.024074
574.022035 574.020349 574.019061 574.018185 574.017705
574.017587 574.017785 574.018248 574.018925 574.019770
574.020739 574.021797 574.022916 574.024076 574.025266
574.026484 574.027738 574.029043 574.030418 574.031889
574.033479 574.035210 574.037100 574.039164 574.041407
574.043834 574.046440 574.049220 574.052167 574.055272
574.058547 574.061988 574.065617 574.069465 574.073582
574.078034 574.082908 574.088310 574.094363 574.101206

Row 33

579.563916 579.565567 579.572348 579.584669 579.602917
579.627405 579.658290 579.693697 579.713979 579.714020
579.694150 579.654714 579.596142 579.519030 579.424207
579.312766 579.185992 579.045128 578.890956 578.723255
578.540292 578.338488 578.112309 577.854185 577.561580
577.253175 576.922940 576.558281 576.139866 575.634747
574.975898 574.060577 574.035564 574.027967 574.027786
574.028407 574.029216 574.030293 574.031637 574.033178
574.034835 574.036540 574.038241 574.039896 574.041466
574.042903 574.044145 574.045117 574.045737 574.045922
574.045609 574.044762 574.043378 574.041492 574.039170
574.036506 574.033621 574.030656 574.027764 574.025096
574.022783 574.020917 574.019544 574.018664 574.018242
574.018217 574.018522 574.019092 574.019867 574.020794
574.021830 574.022941 574.024098 574.025282 574.026486
574.027707 574.028956 574.030248 574.031608 574.033061
574.034637 574.036363 574.038263 574.040356 574.042654
574.045166 574.047890 574.050821 574.053950 574.057266
574.060758 574.064421 574.068256 574.072279 574.076520
574.081030 574.085881 574.091166 574.097001 574.103516

Row 34

579.709626 579.720137 579.736844 579.760400 579.791501
579.830867 579.879177 579.924637 579.950679 579.957629
579.945874 579.915798 579.867829 579.802473 579.720336
579.622105 579.508457 579.379875 579.236374 579.077173
578.900386 578.702785 578.479637 578.224487 577.928789
577.605126 577.261941 576.887621 576.465191 575.967524
575.343840 574.459244 574.018690 574.027563 574.030233
574.030553 574.030840 574.031644 574.032930 574.034543
574.036346 574.038239 574.040161 574.042069 574.043926
574.045682 574.047262 574.048568 574.049487 574.049887
574.049685 574.048821 574.047289 574.045132 574.042430
574.039298 574.035883 574.032362 574.028932 574.025796
574.023127 574.021042 574.019587 574.018739 574.018427
574.018555 574.019026 574.019756 574.020673 574.021721
574.022856 574.024042 574.025253 574.026472 574.027689
574.028905 574.030133 574.031393 574.032712 574.034123
574.035661 574.037360 574.039252 574.041361 574.043708
574.046304 574.049150 574.052240 574.055560 574.059091
574.062808 574.066689 574.070718 574.074886 574.079205
574.083707 574.088450 574.093516 574.099012 574.105065

Row 35

579.847497 579.865976 579.891594 579.925230 579.967887
580.020693 580.083036 580.133017 580.164367 580.177541
580.172943 580.150952 580.111944 580.056313 579.984459
579.896751 579.793448 579.674553 579.539631 579.387595
579.216495 579.023338 578.803909 578.552529 578.261619
577.929973 577.578780 577.199873 576.778017 576.289640
575.691394 574.870988 574.006575 574.033549 574.034272
574.032495 574.031943 574.032561 574.033935 574.035746
574.037778 574.039912 574.042086 574.044278 574.046465
574.048602 574.050607 574.052351 574.053667 574.054377
574.054335 574.053458 574.051741 574.049240 574.046057
574.042329 574.038228 574.033975 574.029830 574.026071
574.022941 574.020600 574.019087 574.018339 574.018224
574.018592 574.019306 574.020257 574.021365 574.022572
574.023835 574.025120 574.026401 574.027661 574.028891
574.030093 574.031282 574.032484 574.033733 574.035070
574.036539 574.038184 574.040043 574.042153 574.044537
574.047214 574.050186 574.053447 574.056975 574.060739
574.064701 574.068815 574.073041 574.077346 574.081714
574.086157 574.090716 574.095466 574.100511 574.105975

Row 36

579.977207	580.002661	580.036037	580.078411	580.131056
580.195481	580.266203	580.320380	580.356657	580.375495
580.377290	580.362392	580.331115	580.283738	580.220491
580.141505	580.046751	579.935925	579.808322	579.662681
579.497038	579.308573	579.093442	578.846543	578.561121
578.230407	577.875731	577.496710	577.079604	576.603937
576.034004	575.290678	574.077533	574.054372	574.038449
574.033068	574.032009	574.032826	574.034570	574.036760
574.039127	574.041546	574.043992	574.046481	574.049032
574.051622	574.054165	574.056496	574.058373	574.059522
574.059710	574.058822	574.056865	574.053931	574.050150
574.045674	574.040697	574.035482	574.030372	574.025769
574.022040	574.019410	574.017904	574.017378	574.017598
574.018328	574.019380	574.020621	574.021970	574.023374
574.024794	574.026200	574.027568	574.028876	574.030117
574.031291	574.032419	574.033532	574.034675	574.035899
574.037261	574.038815	574.040612	574.042696	574.045103
574.047855	574.050960	574.054408	574.058170	574.062202
574.066444	574.070828	574.075281	574.079736	574.084144
574.088491	574.092800	574.097142	574.101623	574.106372

Row 37

580.098514	580.129872	580.169740	580.219342	580.280161
580.354011	580.429795	580.487984	580.528879	580.552931
580.560521	580.551959	580.527499	580.487320	580.431516
580.360046	580.272680	580.168919	580.047888	579.908234
579.748003	579.564515	579.354209	579.112434	578.833092
578.508292	578.154465	577.779446	577.370982	576.911746
576.373554	575.700312	574.722869	574.055185	574.034040
574.030373	574.030584	574.032324	574.034837	574.037634
574.040437	574.043158	574.045850	574.048617	574.051547
574.054660	574.057882	574.061015	574.063706	574.065503
574.066024	574.065110	574.062827	574.059343	574.054830
574.049443	574.043365	574.036882	574.030446	574.024665
574.020133	574.017199	574.015844	574.015760	574.016530
574.017790	574.019291	574.020894	574.022528	574.024159
574.025763	574.027314	574.028785	574.030152	574.031400
574.032531	574.033568	574.034553	574.035544	574.036606
574.037812	574.039229	574.040922	574.042950	574.043558
574.048178	574.051422	574.055077	574.059113	574.063434
574.068048	574.072765	574.077504	574.082153	574.086618
574.090846	574.094845	574.098685	574.102484	574.106392

Row 38

580.211287	580.247427	580.292443	580.347646	580.414639
580.495423	580.574810	580.636867	580.682132	580.711048
580.723972	580.721181	580.702870	580.669141	580.619981
580.555229	580.474518	580.377218	580.262355	580.128526
579.973803	579.795622	579.590649	579.354591	579.081891
578.765224	578.416434	578.049164	577.652698	577.212783
576.708097	576.101511	575.312881	574.053060	574.019638
574.025212	574.027905	574.031164	574.034877	574.038526
574.041831	574.044797	574.047629	574.050591	574.053879
574.057569	574.061634	574.065883	574.069806	574.072607
574.073598	574.072578	574.069802	574.065619	574.060246
574.053796	574.046380	574.038233	574.029916	574.022401
574.016747	574.013544	574.012646	574.013395	574.015047
574.017053	574.019122	574.021141	574.023088	574.024967
574.026775	574.028495	574.030092	574.031531	574.032786
574.033854	574.034764	574.035570	574.036348	574.037183
574.038173	574.039396	574.040935	574.042864	574.045246
574.048117	574.051508	574.055405	574.059763	574.064503
574.069516	574.074665	574.079789	574.084718	574.089289
574.093397	574.097024	574.100254	574.103242	574.106171

Row 39

580.315515	580.355300	580.404096	580.463224	580.534309
580.619348	580.702062	580.767876	580.817324	580.850837
580.868752	580.871316	580.858678	580.830880	580.787835
580.729291	580.654795	580.563633	580.454771	580.326783
580.177774	580.005279	579.806148	579.576376	579.310849
579.002919	578.663151	578.306928	577.925087	577.506133
577.034329	576.485645	575.817567	574.927400	574.018460
574.020987	574.024372	574.029580	574.035003	574.039753
574.043541	574.046555	574.049275	574.052249	574.055832
574.060114	574.065153	574.070957	574.076863	574.081334
574.082956	574.081545	574.077936	574.072876	574.066560
574.058960	574.050031	574.039749	574.028651	574.018384
574.011055	574.007765	574.007980	574.010261	574.013283
574.016284	574.019005	574.021451	574.023703	574.025831
574.027861	574.029779	574.031537	574.033073	574.034338
574.035319	574.036051	574.036610	574.037100	574.037634
574.038326	574.039283	574.040602	574.042375	574.044683
574.047592	574.051135	574.055307	574.060056	574.065280
574.070841	574.076561	574.082227	574.087582	574.092363
574.096369	574.099551	574.102031	574.104043	574.105839

Row 40

580.411319	580.453641	580.504878	580.566294	580.639425
580.726180	580.812207	580.881703	580.935197	580.973112
580.995769	581.003393	580.996100	580.973890	580.936623
580.883991	580.815481	580.730331	580.627475	580.505481
580.362486	580.196110	580.003349	579.780431	579.522596
579.223746	578.896405	578.553996	578.188657	577.791155
577.349817	576.848567	576.262441	575.543819	574.560645
574.013140	574.019316	574.027880	574.035783	574.041882
574.045960	574.048578	574.050661	574.053312	574.057161
574.061986	574.067869	574.075736	574.085124	574.092696
574.095058	574.092331	574.087175	574.081147	574.073939
574.065205	574.054865	574.042083	574.026651	574.011525
574.001475	573.998725	574.001498	574.006551	574.011600
574.015789	574.019134	574.021924	574.024419	574.026770
574.029038	574.031200	574.033175	574.034854	574.036143
574.037008	574.037494	574.037712	574.037810	574.037941
574.038245	574.038848	574.039865	574.041409	574.043587
574.046493	574.050189	574.054682	574.059908	574.065737
574.071995	574.078474	574.084909	574.090936	574.096118
574.100077	574.102701	574.104213	574.105026	574.105503

Row 41

580.498950	580.542765	580.595195	580.657380	580.730682
580.816749	580.905766	580.978899	581.036346	581.078526
581.105754	581.118239	581.116077	581.099243	581.067564
581.020700	580.958105	580.878991	580.782277	580.666539
580.529946	580.370184	580.184364	579.968891	579.719279
579.430183	579.118364	578.791982	578.444371	578.068039
577.654100	577.191252	576.663544	576.044396	575.275035
574.123899	574.012625	574.026889	574.038239	574.045883
574.049683	574.051108	574.051480	574.053138	574.057666
574.063125	574.068599	574.078572	574.094815	574.109106
574.111907	574.104882	574.096753	574.090424	574.082657
574.072576	574.061770	574.047152	574.024522	573.999536
573.984624	573.984529	573.993133	574.003029	574.010774
574.016056	574.019735	574.022638	574.025242	574.027768
574.030293	574.032775	574.035071	574.036982	574.038329
574.039037	574.039174	574.038919	574.038490	574.038094
574.037900	574.038047	574.038663	574.039880	574.041838
574.044682	574.048520	574.053385	574.059200	574.065786
574.072919	574.080380	574.087900	574.095008	574.100958
574.104992	574.106844	574.106995	574.106284	574.105240

Row 42

580.578774	580.623140	580.675653	580.737281	580.809148
580.892557	580.983138	581.059888	581.121232	581.167591
581.199278	581.216498	581.219342	581.207771	581.181601
581.140478	581.083843	581.010901	580.920574	580.811451
580.681730	580.529150	580.350903	580.143523	579.902721
579.625448	579.331583	579.022917	578.693759	578.337892
577.948286	577.516550	577.031709	576.477049	575.820692
574.980308	574.013596	574.026571	574.044403	574.053450
574.055316	574.054819	574.051144	574.049673	574.057415
574.065437	574.064955	574.073859	574.105562	574.137278
574.138278	574.116980	574.103545	574.101487	574.093882
574.079463	574.071430	574.060824	574.025208	573.976574
573.952266	573.962420	573.984165	574.001773	574.012229
574.017694	574.020953	574.023575	574.026109	574.028748
574.031566	574.034497	574.037303	574.039617	574.041092
574.041580	574.041204	574.040274	574.039134	574.038064
574.037252	574.036835	574.036933	574.037692	574.039299
574.041973	574.045913	574.051213	574.057779	574.065323
574.073513	574.082160	574.091164	574.100042	574.107515
574.111918	574.112525	574.110466	574.107761	574.105166

Row 43

580.651251	580.695358	580.747016	580.807001	580.876166
580.955438	581.044609	581.124981	581.190195	581.240682
581.276764	581.298652	581.306440	581.300095	581.279436
581.244112	581.193571	581.127029	581.043422	580.941359
580.819068	580.674325	580.504376	580.305832	580.074525
579.812989	579.538924	579.249213	578.938888	578.602602
578.234508	577.828001	577.375086	576.864788	576.278651
575.575758	574.612229	574.016224	574.062380	574.067166
574.061528	574.062649	574.049804	574.034551	574.056298
574.080860	574.052208	574.041735	574.113219	574.198155
574.186466	574.116502			

574.413364 574.694388 575.406386 575.975972 576.447621

Row 44

580.716913 580.760091 580.810149 580.867664 580.933221
581.007388 581.090646 581.174379 581.243460 581.298055
581.338503 581.365030 581.377751 581.376647 581.361558
581.332155 581.287912 581.228068 581.151590 581.057116
580.942904 580.806757 580.645948 580.457118 580.236401
579.996337 579.743436 579.473587 579.182281 578.864678
578.515598 578.129435 577.699952 577.219816 576.679200
576.060424 575.316564 574.257277 574.128340 574.085002
574.054936 574.084971 574.061361 573.969088 574.048044
574.154637 573.993968 573.915252 574.099096 574.329990
574.247811 574.057594 574.035707 574.185763 574.161212
574.027755 574.026121 574.259928 574.097268 573.790305
573.739371 573.913322 573.995721 574.027327 574.030248
574.024876 574.023599 574.025293 574.027312 574.029874
574.033422 574.037973 574.043126 574.047608 574.049899
574.049428 574.046871 574.043440 574.040076 574.037193
574.034856 574.033033 574.031724 574.031023 574.031204
574.032791 574.036470 574.042841 574.051939 574.062740
574.073529 574.083888 574.096193 574.112817 574.130663
574.140114 574.133375 574.116508 574.106397 574.109519

Row 45

580.776336 580.818059 580.865963 580.920434 580.981820
581.050372 581.126173 581.208181 581.281142 581.339845
581.384653 581.415822 581.433492 581.437680 581.428262
581.404946 581.367250 581.314459 581.245583 581.159306
581.053918 580.927247 580.776571 580.598519 580.394916
580.178907 579.948218 579.698964 579.426818 579.127129
578.794949 578.425020 578.011783 577.549708 577.034551
576.465783 575.846135 575.163051 574.415953 574.166749
574.328611 574.600189 574.818178 575.020199 575.359447
575.690656 575.932176 576.099609 576.245043 576.338708
576.308015 576.185875 576.068148 575.988989 575.910372
575.826661 575.780564 575.777455 575.692266 575.533572
575.290532 574.886301 574.268985 574.075839 574.046326
574.023134 574.022007 574.026367 574.027167 574.029286
574.033206 574.038938 574.046802 574.054258 574.056763
574.055836 574.050722 574.044925 574.039971 574.036098
574.033005 574.030448 574.028306 574.026536 574.025367
574.025575 574.028389 574.035172 574.046693 574.061297
574.074195 574.082569 574.093233 574.116992 574.151500
574.173952 574.156454 574.111437 574.086216 574.123457

Row 46

580.830107 580.869991 580.915361 580.966444 581.023385
581.086190 581.154653 581.228226 581.303253 581.366076
581.415253 581.451078 581.473734 581.483285 581.479657
581.462619 581.431750 581.386404 581.325659 581.248258
581.152541 581.036362 580.896993 580.732837 580.554942
580.363855 580.155612 579.925478 579.670614 579.387469
579.071486 578.716834 578.316111 577.861225 577.350153
576.792847 576.232815 575.744262 575.409336 575.323860
575.445153 575.674810 575.949283 576.259167 576.607807
576.959753 577.276050 577.533266 577.715266 577.804378
577.796584 577.719970 577.616128 577.506858 577.390620
577.263882 577.131209 576.988239 576.815314 576.601851
576.338630 576.011324 575.612494 575.127637 574.490859
573.999172 574.016469 574.033038 574.024442 574.027321
574.031541 574.037397 574.050574 574.064867 574.070332
574.065185 574.054933 574.045446 574.038838 574.034315
574.030696 574.027493 574.024578 574.021588 574.018351
574.016027 574.016678 574.022856 574.037958 574.061308
574.080465 574.080198 574.076281 574.107904 574.179288
574.248783 574.205863 574.087770 573.996488 574.091132

Row 47

580.878806 580.916588 580.959200 581.006738 581.059191
581.116394 581.177949 581.243132 581.310762 581.376663
581.430223 581.470724 581.498404 581.513389 581.515675
581.505111 581.481361 581.443874 581.391820 581.324036
581.238934 581.134412 581.008750 580.869969 580.715983
580.542455 580.348450 580.132312 579.891624 579.623076
579.322190 578.982855 578.596573 578.151459 577.632339
577.033862 576.447738 576.070560 575.922885 575.958497
576.133585 576.401387 576.729712 577.103478 577.511085
577.930796 578.330575 578.669485 578.902623 579.002779
578.984284 578.893625 578.774727 578.646328 578.504736
578.340733 578.151975 577.941103 577.709137 577.454142
577.171307 576.855265 576.503933 576.116693 575.690949
575.221533 574.695236 574.026076 574.008721 574.026506
574.029813 574.026517 574.052736 574.084459 574.093263
574.078804 574.057721 574.042947 574.035850 574.031850
574.028068 574.024208 574.020889 574.017083 574.010603
574.003759 574.000196 574.002013 574.019474 574.063239
574.108366 574.087045 574.019032 574.055973 574.192162

Row 48

580.922987 580.958508 580.998260 581.042240 581.090329
581.142251 581.197509 581.255313 581.314494 581.373409
581.429364 581.474554 581.507288 581.527766 581.536076
581.532165 581.515813 581.486592 581.443807 581.386421
581.312965 581.223353 581.122110 581.001862 580.861637
580.701399 580.520428 580.317316 580.089886 579.835013
579.548259 579.223192 578.850014 578.412592 577.880881
577.188364 576.334866 576.172091 576.218495 576.375659
576.621900 576.941147 577.320800 577.752415 578.227922
578.733112 579.239157 579.689339 579.996711 580.098575
580.031433 579.891395 579.744848 579.604612 579.449452
579.255135 579.017749 578.751632 578.471651 578.182322
577.879371 577.557795 577.217964 576.864822 576.503850
576.137799 575.760958 575.344329 574.853437 574.203780
574.051700 573.973235 574.050409 574.127764 574.138297
574.096764 574.052726 574.032726 574.030598 574.029538
574.025659 574.020164 574.017179 574.015885 574.003312
573.987729 573.979953 573.968438 573.969951 574.054476
574.191320 574.199052 573.937815 575.046517 575.836180
576.467177 576.949569 577.333736 577.654344 577.911173

Row 49

580.963160 580.996343 581.033228 581.073740 581.117694
581.164755 581.214396 581.265841 581.318015 581.369496
581.418496 581.462891 581.500031 581.526034 581.540442
581.543326 581.534611 581.514032 581.481069 581.435491
581.380178 581.313885 581.226864 581.119041 580.991026
580.842843 580.673918 580.483041 580.268264 580.026693
579.754095 579.444129 579.086758 578.664527 578.142048
577.425283 576.320289 576.152371 576.398458 576.668438
576.979684 577.347116 577.727257 578.256715 578.799453
579.399370 580.042713 580.670400 581.088304 581.179852
580.994316 580.760324 580.583607 580.452923 580.306145
580.085718 579.790894 579.463561 579.138082 578.821150
578.500647 578.165997 577.820725 577.476760 577.144294
576.827668 576.524367 576.225203 575.917631 575.580396
575.153479 574.526592 574.052900 574.235440 574.229366
574.110664 574.019967 574.004819 574.027527 574.029716
574.025347 574.013517 574.008696 574.028164 574.001248
573.960279 573.958367 573.961378 573.810340 574.537549
575.278644 575.890074 576.436940 576.992310 577.517662
577.983154 578.370442 578.676167 578.912206 579.081369

Row 50

580.999786 581.030620 581.064694 581.101892 581.141995
581.184653 581.229353 581.275384 581.321810 581.367453
581.410897 581.450542 581.484698 581.511748 581.530338
581.539577 581.539167 581.529429 581.511176 581.485465
581.451231 581.396405 581.319967 581.222889 581.105698
580.968449 580.810685 580.631381 580.428845 580.200518
579.942624 579.649525 579.312470 578.917081 578.438267
577.833314 577.045460 576.163470 576.557334 576.884574
577.239339 577.643658 578.105384 578.630635 579.228851
579.915757 580.714443 581.459692 581.868000 581.983309
581.822956 581.480260 581.294907 581.227733 581.139290
580.888472 580.498547 580.087555 579.718380 579.388527
579.059255 578.703978 578.337776 577.987917 577.669531
577.386194 577.134739 576.908220 576.697428 576.489813
576.267963 576.019812 575.736940 575.364882 574.604797
574.095992 573.895477 573.936291 574.058544 574.027835
574.034630 574.004042 573.964240 574.064273 574.268970
574.811821 575.119394 575.321588 575.683074 576.160952
576.686653 577.219161 577.745658 578.260889 578.731102
579.122956 579.442797 579.696844 579.889638 580.022291

Row 51

581.033278 581.061790 581.093151 581.127223 581.163779
581.202482 581.242865 581.284309 581.326038 581.367109
581.406445 581.442878 581.475238 581.502469 581.523760
581.538673 581.547213 581.549833 581.547336 581.540223
581.515983 581.469571 581.402077 581.314304 581.206714
581.079385 580.931971 580.763642 580.572996 580.357908
580.115274 579.840600 579.527337 579.165935 578.743068
578.243498 577.660985 577.030149 576.697628 576.039525
577.414697 577.842736 578.327596 578.877162 579.505863
580.241416 581.136470 581.871745 582.282069 582.417287
582.300773 581.974851 581.844073 581.878789 581.797679
581.556888 581.128040 580.601891 580.202417 579.899661
579.585525 579.187678 578.755524 578.408382 578.099453
577.845624 577.639266 577.471639 577.334085 576.534336
577.113511 577.016831 576.920389 576.827008 576.534336
576.085268 575.331653 574.475176 574.172000 573.875123
573.997678 574.131055 574.186875 574.386868 574.911737
575.910315 576.388199 576.419792 576.706975 577.142101

577.652121 578.192767 578.738259 579.226916 579.639613
579.985129 580.268474 580.493072 580.661015 580.772723

576.885042 576.836400 577.466295 578.234813 578.991342
579.722101 580.338466 580.858288 581.297254 581.665671
581.970587 582.216860 582.407767 582.545364 582.630702

Row 52

581.063992 581.090240 581.119007 581.150150 581.183454
581.218613 581.255223 581.292772 581.330641 581.368111
581.404396 581.438687 581.470230 581.498404 581.522826
581.543427 581.560503 581.574707 581.586975 581.590931
581.572869 581.533435 581.473526 581.393825 581.294749
581.176410 581.038576 580.880622 580.701463 580.499459
580.272267 580.016663 579.728337 579.401869 579.031411
578.613247 578.151321 577.662174 577.158448 577.117330
577.509458 577.951172 578.446013 579.000339 579.626908
580.349333 581.212626 581.954344 582.373663 582.522416
582.429124 582.165731 582.152121 582.207346 582.132807
581.905355 581.503902 580.943912 580.552740 580.368437
580.104485 579.615305 579.118175 578.732941 578.439203
578.219444 578.059134 577.946250 577.872448 577.830441
577.811530 577.814510 577.850631 577.902276 577.861960
577.615751 576.902365 575.386804 574.121597 573.831329
574.185792 574.348919 574.337742 574.509530 574.649165
576.131145 577.028443 577.069586 577.379563 577.845250
578.389339 578.968896 579.503433 579.956995 580.340945
580.662219 580.925098 581.132272 581.285214 581.384219

Row 56

581.164683 581.182593 581.202148 581.223268 581.245850
581.269774 581.294910 581.321128 581.348313 581.376387
581.405341 581.435266 581.466397 581.499164 581.534237
581.572583 581.615515 581.664058 581.700527 581.716948
581.714033 581.692451 581.652816 581.595670 581.521465
581.430555 581.323186 581.199492 581.059503 580.903160
580.730359 580.541017 580.335178 580.113167 579.875749
579.624251 579.360515 579.086611 578.804343 578.515048
578.220324 577.962609 578.053201 578.565719 579.045791
579.505051 579.924148 580.278916 580.545854 580.716300
580.806196 580.846534 580.860273 580.842265 580.756731
580.572817 580.313461 580.040200 579.797388 579.590551
579.405343 579.252614 579.125181 578.990515 578.753803
578.469214 578.183811 577.919078 577.705936 577.681287
577.750326 577.926564 578.113219 578.292890 578.422252
578.849057 578.519653 578.548522 578.613388 578.734740
578.968612 579.221950 579.222378 578.941339 578.335592
577.346707 576.849349 577.403436 578.292237 579.148418
579.921919 580.561400 581.096791 581.546230 581.921541
582.230783 582.479543 582.671653 582.809616 582.894862

Row 53

581.092240 581.116294 581.142592 581.170997 581.201315
581.233287 581.266578 581.300784 581.335434 581.370011
581.403977 581.436823 581.468125 581.497616 581.525256
581.551297 581.576315 581.601213 581.626067 581.634539
581.621519 581.587892 581.534425 581.461722 581.370179
581.259955 581.130940 580.982713 580.841512 580.625176
580.413095 580.176182 579.911917 579.617641 579.291335
578.933177 578.547447 578.142505 577.727632 577.305563
577.524656 577.975816 578.469135 579.011605 579.608482
580.267960 580.995267 581.716310 582.150318 582.304156
582.208245 582.060881 582.138774 582.233483 582.178830
581.964249 581.576064 581.035761 580.689373 580.575641
580.330835 579.865724 579.321817 578.948890 578.688665
578.514799 578.406733 578.347793 578.332239 578.358912
578.408477 578.475361 578.600727 578.893187 579.045511
578.435260 577.276456 575.713251 574.485323 574.567819
575.074011 575.693032 576.028305 576.113500 575.958210
575.978323 577.311400 577.406832 577.819312 578.361337
578.967341 579.569496 580.084400 580.522356 580.892723
581.201757 581.453573 581.650791 581.794868 581.886246

Row 57

581.185405 581.201391 581.218872 581.237785 581.258056
581.279605 581.302354 581.326238 581.351226 581.377334
581.404661 581.433418 581.463971 581.496882 581.532963
581.573326 581.619446 581.671234 581.708677 581.726614
581.725732 581.706684 581.670083 581.616488 581.546395
581.460231 581.358349 581.241030 581.108492 580.960913
580.798469 580.621388 580.430026 580.224959 580.007057
579.777514 579.537778 579.289356 579.033593 578.717644
578.505013 578.233621 578.055897 578.307902 578.781440
579.208102 579.583114 579.891385 580.120998 580.269431
580.345538 580.363959 580.335004 580.258065 580.126334
579.939921 579.716372 579.493611 579.292640 579.103820
578.906356 578.644856 578.355270 577.996646 577.693981
577.714119 577.815226 577.957044 578.093378 578.243689
578.402858 578.579880 578.767454 578.934897 579.051000
579.123827 579.168848 579.205969 579.256230 579.338880
579.474031 579.641520 579.592782 579.268921 578.609683
577.551283 576.750260 577.240778 578.256491 579.209596
580.028553 580.698697 581.255315 581.719578 582.105217
582.421563 582.675094 582.870297 583.010178 583.096574

Row 54

581.118289 581.140225 581.164172 581.190011 581.217576
581.246654 581.276984 581.308265 581.340162 581.372330
581.404442 581.436234 581.467552 581.498414 581.529067
581.560040 581.592182 581.626672 581.658670 581.670436
581.661532 581.632733 581.584725 581.518063 581.433149
581.330198 581.209222 581.070002 580.912075 580.734715
580.536942 580.317564 580.075313 579.809149 579.518806
579.205533 578.872635 578.524990 578.167162 577.803822
577.478298 577.922585 578.407647 578.929368 579.483350
580.064060 580.653795 581.200989 581.600098 581.762755
581.759013 581.747064 581.836385 581.975873 581.946918
581.740695 581.348206 580.866500 580.555723 580.427830
580.214624 579.785624 579.358543 579.051754 578.848437
578.737937 578.693805 578.687680 578.717195 578.827077
578.937878 578.877291 578.581843 578.309358 577.856922
577.271415 576.727739 576.267296 576.324806 576.596769
576.966178 577.335679 577.554467 577.452945 577.005582
575.958035 576.894440 577.484272 578.086287 578.734081
579.411700 580.015007 580.526896 580.961261 581.327434
581.631798 581.878696 582.070982 582.210348 582.297506

Row 58

581.204692 581.218802 581.234268 581.251042 581.269076
581.288320 581.308739 581.330322 581.353095 581.377149
581.402661 581.429927 581.459400 581.491733 581.527824
581.568876 581.616459 581.669653 581.707696 581.726660
581.727225 581.710044 581.675743 581.624909 581.558092
581.475792 581.378462 581.266511 581.140316 581.000239
580.846663 580.680032 580.500899 580.309982 580.108189
579.896603 579.676411 579.448746 579.214506 578.974163
578.727473 578.472655 578.213975 578.140890 578.508191
578.920217 579.270036 579.546520 579.743242 579.861403
579.908118 579.891170 579.814282 579.676531 579.488650
579.278652 579.055007 578.748453 578.399442 577.981938
577.669642 577.774675 577.867179 577.988966 578.096440
578.230499 578.369259 578.510167 578.652550 578.803527
578.968560 579.150884 579.335575 579.478682 579.580668
579.647760 579.689240 579.716236 579.739604 579.767413
579.801209 579.822188 579.728757 579.365009 578.667798
577.666895 576.621697 576.981545 578.125495 579.179463
580.053983 580.761123 581.343396 581.825765 582.224272
582.549755 582.809716 583.009376 583.152284 583.240701

Row 55

581.142370 581.162260 581.183965 581.207384 581.232384
581.258800 581.286440 581.315093 581.344545 581.374598
581.405099 581.435983 581.467315 581.499341 581.532545
581.567696 581.605893 581.648595 581.683688 581.698072
581.692503 581.667690 581.624267 581.562774 581.483630
581.387120 581.273372 581.142356 580.993872 580.827566
580.642955 580.439501 580.216744 579.974535 579.713349
579.434600 579.140731 578.834780 578.519298 578.194140
577.870452 577.753131 578.274360 578.774274 579.286482
579.797403 580.285152 580.711676 581.027831 581.207199
581.281607 581.319897 581.374772 581.442067 581.426541
581.219491 580.865659 580.509302 580.229429 580.025313
579.813241 579.539218 579.271356 579.056135 578.917626
578.895748 578.939136 578.983563 578.671699 578.372276
578.092705 577.797780 577.540530 577.584767 577.674454
577.706902 577.684001 577.660416 577.717299 577.887838
578.166632 578.494212 578.566737 578.355594 577.824433

Row 59

581.222689 581.234963 581.248458 581.263142 581.278982
581.295956 581.314057 581.333313 581.353793 581.375635
581.399067 581.424437 581.452248 581.483194 581.518215
581.558540 581.605758 581.658914 581.697196 581.716715
581.718155 581.702181 581.669443 581.620570 581.556168
581.476813 581.383055 581.275415 581.154403 581.020528
580.874329 580.716404 580.547443 580.368255 580.179770
579.983011 579.779008 579.568656 579.352511 579.130490
578.901303 578.661146 578.417571 578.153819 577.762482
578.651555 578.995576 579.250515 579.414620 579.493430
579.501080 579.440015 579.308649 579.097183 578.673737
578.280950 577.849792 577.576306 577.829445 578.056860
578.184928 578.311470 578.428143 578.542191 578.654107
578.769293 578.889846 579.016556 579.151976 579.300721
579.467642 579.654578 579.817930 579.941359 580.028700
580.084489 580.114197 580.123457 580.116439 580.093272

580.045388	579.946056	579.737798	579.342810	578.708731	581.227329	581.198018	581.138043	581.044572	580.912873
577.792661	576.505853	576.800446	577.913827	579.067568	580.735899	580.504076	580.205411	579.825747	579.348562
580.007023	580.756784	581.368281	581.871213	582.284418	578.753810	578.018206	577.246579	576.960132	578.045877
582.620474	582.888028	583.093091	583.239784	583.330798	579.231384	580.182443	580.927055	581.522861	582.002670
					582.387039	582.689683	582.920015	583.084512	583.187521

Row 60

581.239532	581.250001	581.261560	581.274184	581.287855
581.302564	581.318328	581.335194	581.353258	581.372685
581.393726	581.416750	581.442272	581.470990	581.503828
581.541986	581.586995	581.638683	581.676844	581.696446
581.698184	581.682746	581.650815	581.603071	581.540184
581.462811	581.371592	581.267156	581.150123	581.021123
580.880817	580.729920	580.595226	580.399618	580.222067
580.037587	579.847156	579.651570	579.451240	579.245888
579.034051	578.812155	578.591530	578.389968	578.135078
578.440232	578.775575	579.019533	579.146041	579.172074
579.130640	579.021470	578.576710	577.744074	577.916658
577.999619	578.121650	578.260759	578.431118	578.595297
578.730880	578.849494	578.957539	579.059012	579.157670
579.257570	579.362444	579.475704	579.601376	579.744313
579.909730	580.087859	580.230295	580.336098	580.408484
580.450549	580.465266	580.454855	580.419515	580.355356
580.251234	580.084559	579.818966	579.409838	578.812116
577.960596	576.602655	576.565985	577.628576	578.878619
579.894184	580.692046	581.335580	581.860792	582.289915
582.637489	582.913394	583.124468	583.275418	583.369365

Row 61

581.255350	581.264042	581.273691	581.284277	581.295786
581.308221	581.321605	581.335997	581.351501	581.368287
581.386607	581.406821	581.429425	581.455079	581.484648
581.519244	581.560268	581.608680	581.646353	581.665556
581.666997	581.651394	581.619476	581.571980	581.509653
581.433237	581.343467	581.241070	581.126766	581.001286
580.865390	580.719888	580.565661	580.403668	580.234946
580.060565	579.881556	579.698766	579.512656	579.323073
579.128999	578.928218	578.739816	578.576856	578.435562
578.230787	578.631011	578.886569	578.962205	578.882572
578.574140	577.694782	578.124708	578.281537	578.421838
578.548075	578.680995	578.824258	578.972954	579.113742
579.238744	579.349070	579.447823	579.537541	579.621773
579.705997	579.794929	579.893373	580.006445	580.139723
580.299237	580.459917	580.583436	580.672698	580.730170
580.757810	580.756956	580.727825	580.668584	580.573978
580.433576	580.230113	579.939160	579.530706	578.968344
578.194094	577.062405	576.283436	577.252400	578.617454
579.721463	580.572276	581.249582	581.798041	582.243776
582.603411	582.888098	583.105519	583.260969	583.357989

Row 62

581.270270	581.277210	581.284972	581.293534	581.302885
581.313026	581.323981	581.335806	581.348600	581.362518
581.377794	581.394752	581.413839	581.435643	581.460930
581.490673	581.526091	581.568679	581.605489	581.623789
581.624307	581.607794	581.575033	581.526836	581.464036
581.387475	581.297988	581.196399	581.083521	580.960170
580.827186	580.685459	580.535950	580.379703	580.217845
580.051570	579.882075	579.710414	579.537257	579.362704
579.186381	579.009187	578.857859	578.740147	578.648330
578.579332	578.555151	578.920006	578.844089	578.221143
578.089982	578.384593	578.565963	578.729540	578.885597
579.035231	579.180491	579.319438	579.452475	579.576927
579.690310	579.792489	579.884832	579.969109	580.047165
580.120935	580.193309	580.274367	580.371377	580.490577
580.638471	580.779124	580.884927	580.958396	581.001305
581.014757	580.999054	580.953327	580.874919	580.758560
580.595485	580.372792	580.073433	579.676518	579.155782
578.471235	577.541509	576.151582	576.686947	578.317490
579.497844	580.401919	581.113143	581.685161	582.147825
582.519775	582.813429	583.037319	583.197330	583.297410

Row 63

581.284415	581.289631	581.295528	581.302082	581.309275
581.317104	581.325584	581.334755	581.344698	581.355542
581.367478	581.380777	581.395810	581.413064	581.433172
581.456931	581.485331	581.519573	581.554071	581.570939
581.569861	581.551628	581.517087	581.467142	581.402734
581.324821	581.234356	581.132263	581.019442	580.896778
580.765173	580.625582	580.479042	580.326685	580.169750
580.009605	579.847742	579.685632	579.524328	579.364035
579.204586	579.053231	578.941406	578.873907	578.846441
578.868766	578.951771	578.962728	578.834216	578.617281
578.676878	578.818811	578.837966	579.152090	579.318688
579.472348	579.613463	579.745066	579.868145	579.982220
580.086631	580.181462	580.267574	580.346285	580.419173
580.488038	580.554986	580.622577	580.699637	580.799899
580.929805	581.051233	581.140148	581.198466	581.227368

Row 64

581.297912	581.301432	581.305490	581.310055	581.315099
581.320606	581.326574	581.333022	581.340000	581.347596
581.355945	581.365247	581.375776	581.387895	581.402077
581.418917	581.439146	581.463640	581.491986	581.506860
581.503456	581.482606	581.445237	581.392363	581.325067
581.244460	581.151634	581.047627	580.933414	580.809927
580.678107	580.538956	580.393582	580.243207	580.089178
579.933036	579.776679	579.622381	579.472071	579.325683
579.181393	579.056574	578.982514	578.971444	578.997055
579.010812	579.040325	579.053028	579.032716	579.017499
579.081135	579.209694	579.370544	579.543110	579.705156
579.853578	579.989901	580.115656	580.231709	580.338317
580.435586	580.523882	580.603962	580.676925	580.744144
580.807255	580.868214	580.929422	580.993891	581.070732
581.177258	581.280185	581.352858	581.396638	581.412196
581.399542	581.357960	581.285850	581.180505	581.037877
580.852399	580.616965	580.323122	579.961494	579.522561
578.999035	578.395799	577.780944	577.296569	577.794446
578.946453	579.909559	580.689534	581.310271	581.807671
582.204538	582.516103	582.752754	582.921583	583.027316

Row 65

581.310881	581.312741	581.314995	581.317598	581.320511
581.323700	581.327141	581.330823	581.334757	581.338979
581.343560	581.348610	581.354293	581.360831	581.368517
581.377724	581.388907	581.402609	581.419440	581.431486
581.424957	581.400483	581.359083	581.301917	581.230260
581.145428	581.048698	580.941241	580.824095	580.698202
580.564489	580.423979	580.277856	580.127454	579.974184
579.819615	579.665985	579.516953	579.377166	579.246711
579.119558	579.015724	578.954529	578.975899	579.022234
579.073024	579.128925	579.182802	579.234595	579.301822
579.046617	579.550450	579.702017	579.887854	580.040621
580.187948	580.319950	580.440879	580.551438	580.652127
580.743375	580.825719	580.899907	580.966918	581.027955
581.084463	581.138175	581.191195	581.246120	581.306204
581.383786	581.468548	581.525555	581.555414	581.558335
581.533962	581.481335	581.398797	581.283874	581.133163
580.942264	580.705836	580.417790	580.071681	579.661444
579.182993	578.637175	578.060837	577.528445	577.522652
578.650902	579.594352	580.396753	581.045136	581.560910
581.970365	582.290735	582.533546	582.706530	582.814761

Row 66

581.323447	581.323690	581.324181	581.324862	581.325678
581.326573	581.327497	581.328404	581.329260	581.330043
581.330747	581.331389	581.332008	581.332673	581.333486
581.334584	581.336137	581.338350	581.341443	581.344862
581.334331	581.305086	581.258246	581.195168	581.117396
581.026545	580.924159	580.811571	580.689862	580.559902
580.422515	580.278680	580.129691	579.977105	579.822393
579.666695	579.511843	579.362800	579.231624	579.128676
579.031941	579.000427	578.992095	578.978217	579.041453
579.128035	579.218588	579.314475	579.418159	579.537355
579.680315	579.848825	580.023608	580.188415	580.341422
580.482047	580.610521	580.727427	580.833409	580.929600
581.014951	581.091708	581.160068	581.220915	581.275299
581.324454	581.369833	581.413163	581.456508	581.502343
581.554033	581.617784	581.659719	581.676304	581.667310
581.632064	581.569427	581.477746	581.354784	581.197670
581.002878	580.766282	580.483273	580.148942	579.758270
579.306061	578.785553	578.233345	577.669874	577.152505
578.341082	579.286342	580.067437	580.724115	581.259035
581.681083	582.010134	582.258999	582.436028	582.546585

Row 67

581.335729	581.334407	581.333188	581.332001	581.330771
581.329420	581.327868	581.326031	581.323826	581.321168
581.317974	581.314156	581.309627	581.304296	581.298065
581.290825	581.282457	581.272820	581.261751	581.249050
581.231699	581.196361	581.142396	581.071419	580.985368
580.886325	580.776238	580.6		

581.691092 581.728429 581.755987 581.760016 581.739846
581.694502 581.622693 581.522772 581.392702 581.230021
581.031836 580.794840 580.515335 580.189188 579.811534
579.375689 578.878114 578.358126 577.793750 577.096927
578.046217 579.008985 579.767702 580.388984 580.905188
581.331111 581.668844 581.923874 582.105058 582.217935

582.090334 582.086577 582.072224 582.046915 582.009947
581.960118 581.895515 581.815322 581.738001 581.662993
581.581306 581.477996 581.348482 581.190994 581.003776
580.785065 580.533055 580.246710 579.938339 579.619844
579.301282 578.994075 578.713198 578.483200 578.354996
578.428338 578.714190 579.071774 579.429566 579.765399
580.070294 580.339437 580.570155 580.761480 580.913995

Row 68

581.347844 581.345020 581.342158 581.339172 581.335968
581.332444 581.328489 581.323981 581.318786 581.312757
581.305729 581.297513 581.287893 581.276615 581.263379
581.247831 581.229547 581.208034 581.182728 581.153012
581.118251 581.074464 581.011314 580.929911 580.832796
580.722804 580.602566 580.474004 580.338099 580.195036
580.044618 579.887028 579.723826 579.558438 579.396057
579.233742 579.062237 579.047146 579.088426 579.125824
579.134806 579.118704 579.087662 579.050780 579.074731
579.212879 579.372593 579.544917 579.727563 579.921202
580.127481 580.328886 580.512650 580.680056 580.832010
580.969332 581.092852 581.203397 581.301762 581.388686
581.464862 581.530957 581.587644 581.635616 581.675610
581.708413 581.734868 581.755865 581.772324 581.785123
581.794976 581.802528 581.814292 581.806600 581.776028
581.721302 581.640977 581.533401 581.396680 581.230561
581.026874 580.788608 580.510765 580.189727 579.820833
579.397046 578.939944 578.468476 577.954637 577.327315
577.831230 578.795133 579.516396 580.094505 580.572354
580.968182 581.289859 581.541367 581.726127 581.848723

Row 72

581.396783 581.388776 581.380257 581.371087 581.361108
581.350137 581.337960 581.324328 581.308946 581.291463
581.271456 581.248411 581.221698 581.190535 581.153944
581.110688 581.059195 580.997441 580.922820 580.831973
580.720660 580.583889 580.417003 580.219012 579.997674
579.770116 579.556788 579.371110 579.198100 579.018943
579.128508 579.255254 579.357123 579.445299 579.522180
579.585158 579.630599 579.656146 579.660383 579.641441
579.596436 579.521399 579.411264 579.261198 579.078119
579.172147 579.517130 579.856857 580.173776 580.472701
580.744535 580.977892 581.179675 581.355028 581.507756
581.640695 581.755980 581.855235 581.939712 582.010383
582.067998 582.113136 582.146225 582.167564 582.177318
582.175513 582.162008 582.136454 582.098229 582.046345
581.979316 581.894995 581.791496 581.686837 581.583522
581.474599 581.352852 581.211418 581.044688 580.849245
580.624501 580.372820 580.099172 579.810593 579.515799
579.225229 578.951806 578.712829 578.533475 578.450204
578.500184 578.680168 578.939793 579.231167 579.525717
579.806951 580.064756 580.293007 580.488509 580.650323

Row 69

581.359905 581.355651 581.351225 581.346526 581.341441
581.335843 581.329593 581.322530 581.314472 581.305211
581.294504 581.282063 581.267548 581.250548 581.230565
581.206997 581.179113 581.146046 581.106791 581.060244
581.005297 580.941022 580.865019 580.769860 580.657895
580.533261 580.399810 580.260065 580.114750 579.963153
579.803654 579.634697 579.457684 579.277196 579.103886
579.099513 579.156017 579.189990 579.215736 579.289646
579.221694 579.192155 579.143279 579.079145 579.048636
579.228564 579.429013 579.639011 579.856291 580.080727
580.310553 580.521710 580.711222 580.881392 581.034008
581.170518 581.292149 581.399965 581.494899 581.577768
581.649301 581.710160 581.760963 581.802306 581.834770
581.858924 581.875319 581.884459 581.886754 581.882423
581.871329 581.852688 581.834080 581.815575 581.775433
581.711998 581.623667 581.508754 581.365457 581.191824
580.985736 580.744864 580.466596 580.147823 579.784858
579.385078 578.981170 578.572950 578.148677 577.665720
577.779143 578.682759 579.324903 579.842601 580.276599
580.641843 580.944658 581.188206 581.375217 581.590209

Row 73

581.409602 581.400551 581.390902 581.380509 581.369203
581.356791 581.343043 581.327695 581.310429 581.290868
581.268559 581.242947 581.213353 581.178931 581.138619
581.091065 581.034527 580.966718 580.884586 580.783962
580.659036 580.501652 580.301141 580.048751 579.753751
579.449744 579.174148 578.988704 579.101549 579.235058
579.356175 579.466194 579.562727 579.646611 579.718216
579.775822 579.816790 579.838564 579.838808 579.814928
579.763484 579.679405 579.554538 579.374454 579.106652
579.050276 579.532060 579.310300 580.276526 580.589386
580.867117 581.102732 581.304742 581.479073 581.629939
581.760395 581.872695 581.968524 582.049153 582.115543
582.168414 582.208291 582.235530 582.250333 582.252752
582.242673 582.219794 582.183583 582.133220 582.067517
581.984813 581.882846 581.759562 581.633072 581.507170
581.375973 581.233661 581.074906 580.895462 580.692760
580.466365 580.218167 579.952339 579.675169 579.394956
579.122130 578.869750 578.654422 578.497132 578.421669
578.446035 578.568705 578.767252 579.012465 579.278613
579.545664 579.799226 580.029980 580.232703 580.405207

Row 70

581.372018 581.366417 581.360519 581.354209 581.347355
581.339810 581.331405 581.321945 581.311204 581.298917
581.284770 581.268386 581.226983 581.200725 581.172988
581.169692 581.132847 581.088930 581.036435 580.973648
580.898769 580.810236 580.707280 580.590558 580.458295
580.313700 580.163006 580.009849 579.854184 579.693755
579.525117 579.340787 579.142839 579.032629 579.142853
579.238645 579.298698 579.333453 579.350586 579.349596
579.327274 579.281428 579.211419 579.115850 578.984992
579.226978 579.471326 579.719983 579.970780 580.223308
580.470950 580.691114 580.885983 581.058781 581.212044
581.347769 581.467549 581.572681 581.664233 581.743093
581.810016 581.865644 581.910541 581.945199 581.970051
581.985463 581.991723 581.988994 581.977261 581.956216
581.925090 581.882398 581.830064 581.786144 581.737228
581.665732 581.569777 581.447620 581.297500 581.117600
580.906024 580.660753 580.379575 580.059924 579.709360
579.353522 579.001404 578.661219 578.343919 578.076083
578.112934 578.684988 579.187339 579.626451 580.011223
580.345386 580.630272 580.866590 581.055479 581.199080

Row 74

581.422806 581.412825 581.402175 581.390707 581.378246
581.364590 581.349504 581.332711 581.313885 581.292636
581.268493 581.240887 581.209118 581.172318 581.129398
581.078967 581.019226 580.947792 580.861413 580.755488
580.623132 580.453249 580.226206 579.908052 579.495375
579.075495 579.048119 579.214243 579.356811 579.475480
579.582963 579.681913 579.771758 579.851605 579.920189
579.975400 580.014543 580.034795 580.033405 580.007534
579.953743 579.866908 579.737937 579.548417 579.257009
578.999026 579.591694 580.034103 580.393398 580.708205
580.985328 581.218874 581.418189 581.589518 581.737175
581.864232 581.972930 582.064924 582.141444 582.203403
582.251464 582.286084 582.307541 582.315948 582.311250
582.293213 582.261402 582.215143 582.153469 582.075055
581.978132 581.860386 581.720290 581.576879 581.433212
581.284272 581.125242 580.951808 580.760573 580.549476
580.318169 580.068266 579.803483 579.529681 579.254893
578.989356 578.745605 578.538514 578.384827 578.301092
578.299179 578.381429 578.539687 578.757274 579.011221
579.277483 579.536893 579.777079 579.991306 580.176722

Row 71

581.384281 581.377426 581.370160 581.362355 581.353865
581.344522 581.334133 581.322472 581.309276 581.294231
581.276962 581.257015 581.233836 581.206742 581.174885
581.137206 581.092379 581.038743 580.974244 580.896398
580.802378 580.689378 580.555564 580.401747 580.232934
580.057852 579.884175 579.715904 579.550228 579.381271
579.208383 579.056844 579.153107 579.246490 579.332013
579.404743 579.457172 579.487882 579.497980 579.486698
579.451644 579.390006 579.299261 579.178532 579.032666
579.214750 579.500829 579.790705 580.074708 580.352489
580.613976 580.841821 581.041002 581.215697 581.369126
581.503753 581.621483 581.723807 581.811904 581.886719
581.949012 581.999402 582.038386 582.066359 582.083613

Row 75

581.436450 581.425655 581.414138 581.401748 581.388308
581.373613 581.357428 581.339473 581.319421 581.296882
581.271389 581.242378 581.209160 581.170888 581.126502
581.074662 581.013643 580.941169 580.854151 580.748206
580.616715 580.448638 580.222006 579.868816 579.454919
579.399045 579.436379 579.520323 579.617709 579.714316
579.807963 579.897787 579.982305 580.059633 580.127488
580.183054 580.223113 580.244377 580.243797 580.218679
580.166362 580.083273 579.962982 579.792370 579.543939
579.161128 579.744182 580.186358 580.532746 580.833215
581.101115 581.327660 581.521136 581.687396 581.830459
581.953185 582.057653 582.145398 582.217549 582.274932

582.318129	582.347517	582.363291	582.365473	582.353914	582.167288	582.250571	582.318579	582.371678	582.410106
582.328277	582.288018	582.232349	582.160196	582.070139	582.433974	582.443260	582.437807	582.417314	582.381323
581.960338	581.828459	581.674544	581.518518	581.361167	582.329204	582.260128	582.173043	582.066633	581.939276
581.198178	581.025448	580.839314	580.636854	580.416230	581.788980	581.622187	581.452269	581.277519	581.095544
580.177033	579.920608	579.650346	579.371896	579.093246	580.903596	580.698596	580.477122	580.235367	579.969116
578.824599	578.578003	578.366693	578.204038	578.102051	579.673823	579.345147	578.980623	578.583301	578.166206
578.069949	578.114366	578.240957	578.447657	578.710651	577.752835	577.371428	577.046520	576.786602	576.573218
578.994881	579.273689	579.532093	579.763044	579.964080	576.372347	576.145953	575.833043	576.091900	577.074925
					577.758824	578.278034	578.689981	579.025190	579.302177

Row 76

581.450575	581.439084	581.426835	581.413677	581.399435
581.383909	581.366864	581.348029	581.327084	581.303652
581.277286	581.247449	581.213492	581.174624	581.129875
581.078033	581.017568	580.946512	580.862280	580.761374
580.638898	580.487762	580.297975	580.065185	579.861237
579.771069	579.763647	579.804299	579.869782	579.946552
580.028083	580.110859	580.192159	580.269263	580.339088
580.398019	580.442002	580.466962	580.469416	580.446993
580.398484	580.323227	580.220007	580.085871	579.914926
579.684749	580.024207	580.394551	580.695368	580.964800
581.214079	581.429016	581.613771	581.773082	581.910297
582.027845	582.127518	582.210642	582.278197	582.330888
582.369194	582.393400	582.403614	582.399772	582.381637
582.348783	582.300575	582.236138	582.154315	582.053616
581.932154	581.787582	581.623425	581.458493	581.290926
581.116976	580.933030	580.735792	580.522511	580.291279
580.041385	579.773739	579.491367	579.199845	578.907494
578.625056	578.364763	578.138854	577.957925	577.829712
577.759460	577.754642	577.840287	578.055385	578.363241
578.693199	579.008709	579.295368	579.548513	579.767809

Row 80

581.512303	581.499158	581.485262	581.470492	581.454713
581.437770	581.419493	581.399688	581.378141	581.354612
581.328836	581.300516	581.269330	581.234932	581.196957
581.155043	581.108858	581.058165	581.002920	580.943452
580.880740	580.816796	580.755046	580.700376	580.658375
580.633815	580.629344	580.645279	580.680353	580.732664
580.800342	580.881832	580.975859	581.071080	581.150609
581.214009	581.261221	581.292340	581.307675	581.307847
581.293976	581.267990	581.233048	581.194015	581.158186
581.150163	581.181127	581.247785	581.342304	581.456635
581.584700	581.722359	581.860656	581.984112	582.092123
582.184880	582.262628	582.325594	582.373948	582.407775
582.427067	582.431705	582.421451	582.395936	582.354643
582.296889	582.221801	582.128286	582.014993	581.880269
581.724499	581.562020	581.394662	581.220813	581.038370
580.844767	580.636938	580.411214	580.163122	579.887058
579.575858	579.220513	578.811296	578.343901	577.832776
577.315958	576.840625	576.454220	576.184520	575.978201
575.759064	575.497657	575.213783	575.378975	576.714784
577.528701	578.111037	578.556751	578.911369	579.200507

Row 77

581.465211	581.453141	581.440293	581.426519	581.411651
581.395494	581.377825	581.358383	581.336867	581.312923
581.286137	581.256017	581.221978	581.183321	581.139202
581.088601	581.030270	580.962683	580.883965	580.791843
580.683697	580.557081	580.412124	580.259670	580.131389
580.057023	580.036877	580.057115	580.103873	580.166978
580.239894	580.318347	580.399018	580.478690	580.553688
580.619545	580.670204	580.699101	580.705175	580.687627
580.645484	580.578491	580.492798	580.395843	580.302220
580.261347	580.402495	580.636594	580.871315	581.098970
581.321450	581.521521	581.695432	581.846368	581.976763
582.088469	582.182897	582.261114	582.323907	582.371835
582.405259	582.424364	582.429169	582.419527	582.395120
582.355445	582.299792	582.227214	582.136489	582.026075
581.894048	581.738039	581.568289	581.397596	581.222777
581.040521	580.847526	580.640626	580.416964	580.174233
579.911043	579.627479	579.325902	579.011833	578.694483
578.386279	578.101092	577.851454	577.645587	577.485637
577.368111	577.286443	577.254397	577.526024	577.959164
578.374464	578.746083	579.070603	579.350484	579.589825

Row 81

581.529047	581.515743	581.501721	581.486871	581.471069
581.454181	581.436056	581.416531	581.395424	581.372540
581.347666	581.320578	581.291040	581.258817	581.223688
581.185467	581.144046	581.099456	581.051960	581.002191
580.951336	580.901331	580.854974	580.815813	580.787645
580.773768	580.776342	580.796236	580.833327	580.887016
580.956692	581.042044	581.141491	581.233072	581.309788
581.371516	581.418291	581.450323	581.468045	581.472200
581.463974	581.445174	581.418418	581.387208	581.355641
581.335995	581.348968	581.392390	581.461056	581.549207
581.651736	581.764507	581.884123	581.999416	582.100545
582.187356	582.259821	582.317951	582.361747	582.391159
582.406073	582.406280	582.391473	582.361218	582.314949
582.251937	582.171272	582.071827	581.952225	581.811338
581.660019	581.502948	581.339373	581.167962	580.986854
580.793644	580.585301	580.357978	580.106643	579.824411
579.501328	579.122206	578.663616	578.097108	577.429024
576.732977	576.081940	575.562600	575.361431	575.252821
575.036006	575.134198	575.189304	575.103697	576.509814
577.399751	578.015207	578.476148	578.838198	579.131438

Row 78

581.480376	581.467840	581.454522	581.440281	581.424955
581.408361	581.390289	581.370498	581.348711	581.324607
581.297815	581.267901	581.234362	581.196609	581.153955
581.105601	581.050623	580.987976	580.916522	580.835155
580.743126	580.640898	580.532040	580.426159	580.339032
580.284440	580.266011	580.279210	580.316858	580.372334
580.440533	580.517628	580.600441	580.685758	580.769300
580.838084	580.887245	580.916546	580.925764	580.914754
580.883617	580.833098	580.765497	580.692692	580.640722
580.641344	580.724151	580.870649	581.044661	581.229192
581.419154	581.602848	581.764844	581.906598	582.029581
582.135028	582.223931	582.297067	582.355010	582.398161
582.426756	582.440877	582.440451	582.425253	582.394892
582.348796	582.286191	582.206074	582.107171	581.987894
581.846288	581.681571	581.510687	581.336869	581.157353
580.969157	580.769141	580.554079	580.320744	580.066060
579.787414	579.483317	579.154653	578.806509	578.449701
578.100378	577.776901	577.494763	577.260697	577.069113
576.903416	576.732138	576.458404	576.829883	577.512595
578.053300	578.496704	578.865260	579.173874	579.433292

Row 82

581.546283	581.532907	581.518855	581.504029	581.488320
581.471613	581.453781	581.434686	581.414183	581.392118
581.368331	581.342661	581.314955	581.285075	581.252917
581.218440	581.181701	581.142914	581.102520	581.061290
581.020429	580.981663	580.947253	580.919863	580.902252
580.896872	580.905548	580.929374	580.968872	581.024294
581.095977	581.184683	581.285197	581.373955	581.448598
581.509107	581.555602	581.588365	581.607882	581.614906
581.610536	581.596304	581.574223	581.546717	581.516329
581.488576	581.486849	581.512330	581.560738	581.627490
581.708251	581.799160	581.896783	581.997904	582.092865
582.174242	582.241809	582.295411	582.334912	582.360155
582.370926	582.366949	582.347849	582.313143	582.262218
582.194309	582.108473	582.003560	581.878513	581.741697
581.597698	581.446553	581.287700	581.120029	580.941892
580.751069	580.544649	580.318790	580.068250	579.785492
579.458834	579.068221	578.573780	577.880275	576.900343
575.864866	574.771288	574.790952	575.263713	575.592959
575.732719	575.795215	575.783772	575.623769	576.508382
577.397259	578.003307	578.454408	578.808680	579.096354

Row 79

581.496075	581.483183	581.469518	581.454948	581.439322
581.422472	581.404204	581.384301	581.362515	581.338564
581.312128	581.282840	581.250286	581.213999	581.173458
581.128088	581.077282	581.020440	580.957054	580.886893
580.810368	580.729174	580.647250	580.571502	580.510852
580.472917	580.460977	580.474004	580.508652	580.561079
580.627876	580.706246	580.793747	580.887329	580.970602
581.036291	581.084233	581.114375	581.126806	581.121861
581.100334	581.063892	581.015813	580.962222	580.922276
580.923825	580.976771	581.074991	581.203316	581.349568
581.506985	581.670383	581.820440	581.952850	582.068246

Row 83

581.563982	581.550611	581.536613	581.521903	581.506387
581.489968	581.472542	581.453999	581.43	

581.754848	581.826936	581.905372	581.987033	582.068794	581.870219	581.845510	581.833827	581.833553	581.842911
582.145060	582.208210	582.257671	582.293204	582.314563	581.860022	581.882947	581.909712	581.938337	581.966843
582.321467	582.313572	582.290453	582.251582	582.196312	581.993281	582.015760	582.032488	582.041833	582.042384
582.123845	582.033215	581.924420	581.804514	581.675830	582.033015	582.012931	581.981684	581.939162	581.885538
581.538993	581.394088	581.240682	581.077846	580.904148	581.821196	581.746649	581.662444	581.569092	581.467001
580.717598	580.515530	580.294365	580.049160	579.772760	581.356430	581.237467	581.110005	580.973737	580.828158
579.454057	579.073990	578.594421	577.915985	577.044693	580.672570	580.506098	580.327735	580.136431	579.931309
576.489260	576.180691	576.086908	576.155143	576.263371	579.712098	579.479987	579.238994	578.997453	578.768068
576.340479	576.381356	576.375514	576.275846	576.723331	578.564975	578.399143	578.275632	578.193934	578.150277
577.530595	578.076953	578.490920	578.821786	579.094239	578.140541	578.162724	578.218308	578.311545	578.444595
					578.610300	578.793188	578.978505	579.156941	579.323889

Row 84

581.582109	581.568812	581.554941	581.540423	581.525183
581.509140	581.492211	581.474312	581.455361	581.435280
581.414000	581.391467	581.367655	581.342573	581.316285
581.288933	581.260764	581.232164	581.203699	581.176152
581.150553	581.128185	581.110555	581.093312	581.096129
581.102578	581.120030	581.149641	581.192418	581.249372
581.321756	581.411376	581.509499	581.594850	581.666926
581.725883	581.771956	581.805482	581.826925	581.836898
581.836180	581.825712	581.806562	581.779830	581.746485
581.708515	581.687933	581.689491	581.709657	581.745038
581.792363	581.848507	581.910483	581.975387	582.040334
582.102404	582.158628	582.204382	582.236318	582.254120
582.257450	582.245918	582.219056	582.176304	582.116982
582.040480	581.950007	581.848110	581.736084	581.614861
581.484961	581.346475	581.199068	581.041977	580.873991
580.693407	580.497930	580.284492	580.048934	579.785456
579.485679	579.137113	578.721821	578.226366	577.707315
577.289719	577.015734	576.875296	576.836527	576.851804
576.883709	576.916284	576.944441	576.972052	577.219575
577.784573	578.221947	578.576901	578.872121	579.121598

Row 85

581.600625	581.587459	581.573776	581.559517	581.544619
581.529020	581.512656	581.495468	581.477400	581.458406
581.438453	581.417530	581.395655	581.372888	581.349345
581.325217	581.300794	581.276488	581.252860	581.230642
581.210752	581.194287	581.182494	581.176716	581.178311
581.188582	581.208720	581.239798	581.282820	581.338831
581.409082	581.495260	581.591559	581.675993	581.747329
581.805786	581.851633	581.885207	581.906930	581.917323
581.917006	581.906683	581.887102	581.858975	581.822870
581.781528	581.756871	581.751508	581.762439	581.786784
581.821738	581.864570	581.912617	581.963265	582.013922
582.062003	582.104941	582.140241	582.165575	582.178914
582.178673	582.163821	582.133947	582.098227	582.030324
581.958225	581.874067	581.778962	581.673871	581.559512
581.436300	581.304321	581.163323	581.012697	580.851471
580.678267	580.491252	580.288031	580.065511	579.819718
579.545691	579.237893	578.892879	578.518574	578.148818
577.832756	577.599831	577.453064	577.378659	577.354986
577.363019	577.393174	577.447861	577.551027	577.766667
578.086391	578.407885	578.697037	578.950994	579.173050

Row 86

581.619488	581.606501	581.593058	581.579109	581.564606
581.549501	581.533751	581.517315	581.500163	581.482276
581.463650	581.444308	581.424303	581.403731	581.382743
581.361561	581.340492	581.319950	581.300471	581.282724
581.267515	581.255782	581.248566	581.246969	581.252111
581.265074	581.286875	581.318459	581.360728	581.414607
581.481135	581.561580	581.654390	581.738267	581.809108
581.867181	581.912773	581.946211	581.967872	581.978189
581.977642	581.966746	581.946005	581.915857	581.876592
581.834189	581.808435	581.798862	581.803146	581.818957
581.843959	581.875819	581.912221	581.950865	581.989468
582.025774	582.057575	582.082759	582.099388	582.105783
582.100621	582.083004	582.052493	582.009088	581.953158
581.885335	581.806387	581.717104	581.618187	581.510178
581.393406	581.267955	581.133644	580.990021	580.836349
580.671599	580.494426	580.303158	580.095798	579.870115
579.623979	579.356350	579.069644	578.773820	578.489004
578.239754	578.043666	577.906178	577.822748	577.783776
577.780076	577.807200	577.868291	577.975933	578.144982
578.365593	578.603867	578.834970	579.048730	579.242425

Row 87

581.638653	581.625887	581.612723	581.599124	581.585053
581.570478	581.555371	581.539710	581.523484	581.506697
581.489371	581.471552	581.453320	581.434795	581.416150
581.397620	581.379516	581.362238	581.346284	581.332255
581.320857	581.312886	581.309213	581.310753	581.318426
581.333127	581.355703	581.386941	581.427584	581.478348
581.539952	581.613123	581.698499	581.782096	581.852629
581.910400	581.955708	581.988864	582.010201	582.020071
582.018841	582.006871	581.984485	581.951921	581.909298

Row 88

581.658078	581.645564	581.632710	581.619489	581.605876
581.591852	581.577401	581.562519	581.547211	581.531498
581.515421	581.499046	581.482469	581.465827	581.449301
581.433131	581.417621	581.403145	581.390158	581.379195
581.370867	581.365851	581.364877	581.368698	581.378069
581.393720	581.416334	581.446534	581.484875	581.531836
581.587801	581.652993	581.727329	581.807831	581.878204
581.935739	581.980742	582.013506	582.034322	582.043475
582.041238	582.027851	582.003501	581.968278	581.926331
581.893341	581.870947	581.858626	581.855389	581.859967
581.870903	581.886625	581.905490	581.925817	581.945918
581.964125	581.978822	581.988489	581.991742	581.987382
581.974440	581.952204	581.920234	581.878348	581.826589
581.765175	581.694433	581.614743	581.526471	581.429927
581.325326	581.212762	581.092200	580.963469	580.826273
580.680212	580.524820	580.359636	580.184336	579.998516
579.804259	579.602315	579.397161	579.195262	579.005116
578.835679	578.694241	578.585013	578.509060	578.465341
578.452196	578.468622	578.514789	578.591273	578.696816
578.826131	578.970455	579.120633	579.269550	579.412642

Row 89

581.677718	581.665479	581.652956	581.640133	581.626993
581.613528	581.599736	581.585622	581.571208	581.556527
581.541634	581.526608	581.511557	581.496624	581.481995
581.467904	581.454638	581.442545	581.432032	581.423571
581.417689	581.414958	581.415986	581.421392	581.431788
581.447757	581.469830	581.498472	581.534054	581.576835
581.626906	581.684106	581.747854	581.816870	581.886080
581.943437	581.988125	582.020419	582.040574	582.048819
582.045349	582.030314	582.003791	581.967534	581.933925
581.906923	581.887382	581.875336	581.870286	581.871380
581.877533	581.887500	581.899937	581.913441	581.926587
581.937959	581.946185	581.949972	581.948145	581.939677
581.923729	581.899662	581.867053	581.825682	581.775508
581.716635	581.649265	581.573657	581.490076	581.398762
581.299901	581.193601	581.079894	580.958727	580.829987
580.693523	580.549195	580.396960	580.236991	580.069875
579.896871	579.720252	579.543595	579.371865	579.211031
579.067183	578.945448	578.849233	578.780093	578.738179
578.722964	578.733857	578.770391	578.831779	578.915969
579.018927	579.134958	579.257965	579.382659	579.505108

Row 90

581.697530	581.685582	581.673406	581.660991	581.648330
581.635423	581.622277	581.608911	581.595354	581.581651
581.567866	581.554087	581.540427	581.527031	581.514082
581.501803	581.490462	581.480375	581.471906	581.465464
581.461501	581.460499	581.462960	581.469389	581.480274
581.496071	581.517175	581.543908	581.576482	581.614970
581.659249	581.708907	581.763111	581.820410	581.878495
581.933670	581.978045	582.009820	582.029219	582.036423
582.031568	582.014728	581.988613	581.961066	581.935440
581.913763	581.897105	581.885813	581.879725	581.878309
581.880783	581.886181	581.893421	581.901348	581.908770
581.914495	581.917363	581.916277	581.910234	581.898356
581.879910	581.854328	581.821208	581.780314	581.731554
581.674958	581.610644	581.538784	581.459576	581.373212
581.279861	581.179650	580.072667	580.958964	580.838573
580.711539	580.577972	580.438116	580.292463	580.141890
579.987836	579.832479	579.678856	579.530813	579.392717
579.268931	579.163225	579.078336	579.015851	578.976377
578.959877	578.965959	578.993943	579.042655	579.110049
579.192985	579.287435	579.389080	579.493943	579.598787

Row 91

581.717473

582.002704	581.990118	581.972427	581.952662	581.933289	581.878732	581.896443	581.910772	581.921264	581.927764
581.916051	581.902008	581.891647	581.885008	581.881789	581.930428	581.929694	581.926196	581.920662	581.913817
581.881439	581.883224	581.886284	581.889676	581.892414	581.906301	581.898617	581.891107	581.883948	581.877161
581.893499	581.891955	581.886852	581.877337	581.862654	581.870630	581.864122	581.857312	581.849804	581.841157
581.842168	581.815371	581.781893	581.741493	581.694052	581.830904	581.818567	581.803682	581.785807	581.764541
581.639554	581.578059	581.509686	581.434585	581.352917	581.739530	581.710474	581.677135	581.639337	581.596965
581.264843	581.170510	581.070055	580.963611	580.851323	581.549961	581.498319	581.442084	581.381341	581.316215
580.733386	580.610079	580.481838	580.349334	580.213569	581.246867	581.173495	581.096340	581.015685	580.931875
580.075990	579.938574	579.803856	579.674863	579.554892	580.845323	580.756534	580.666113	580.574793	580.483440
579.447199	579.354643	579.279428	579.222990	579.186060	580.393063	580.304807	580.219926	580.139740	580.065583
579.168795	579.170915	579.191733	579.230070	579.284125	579.998726	579.940315	579.891303	579.852412	579.824103
579.351421	579.428959	579.513535	579.602097	579.692009	579.806565	579.799718	579.803214	579.816459	579.838625
					579.868694	579.905504	579.947813	579.994370	580.043970

Row 92

581.737508	581.726171	581.714703	581.703106	581.691387
581.679560	581.667646	581.655677	581.643695	581.631759
581.619940	581.608333	581.597050	581.586230	581.576037
581.566665	581.558336	581.551303	581.545846	581.542269
581.540895	581.542060	581.546097	581.553328	581.564049
581.578511	581.596902	581.619323	581.645766	581.676074
581.709902	581.746665	581.785475	581.825087	581.863869
581.899853	581.930905	581.955053	581.970911	581.978054
581.977145	581.969747	581.957917	581.943763	581.929127
581.915423	581.903593	581.894150	581.887242	581.882718
581.880199	581.879133	581.878842	581.878564	581.877487
581.874781	581.869626	581.861236	581.848886	581.831928
581.809810	581.782082	581.748406	581.708550	581.662382
581.609860	581.551009	581.485912	581.414688	581.337481
581.254448	581.165755	581.071578	580.972110	580.867584
580.758293	580.644632	580.527147	580.406594	580.284005
580.160744	580.038561	579.919570	579.806185	579.700964
579.606407	579.524738	579.457731	579.406627	579.372131
579.354466	579.353425	579.368396	579.398328	579.441707
579.496567	579.560600	579.631351	579.706430	579.783689

Row 93

581.757599	581.746570	581.735454	581.724256	581.712990
581.701673	581.690331	581.679000	581.667728	581.656572
581.645608	581.634928	581.624460	581.614876	581.605789
581.597554	581.590373	581.584466	581.580076	581.577464
581.576899	581.578656	581.583004	581.590194	581.600449
581.613942	581.630788	581.651015	581.674548	581.701175
581.730522	581.762011	581.794834	581.827928	581.859986
581.889525	581.915024	581.935143	581.948970	581.956220
581.957307	581.953235	581.945374	581.935195	581.924058
581.913067	581.903014	581.894376	581.887342	581.881856
581.877662	581.874345	581.871376	581.868140	581.863974
581.858189	581.850100	581.839044	581.824407	581.805633
581.782245	581.753846	581.720133	581.680889	581.635980
581.585350	581.529007	581.467010	581.399460	581.326491
581.248261	581.164949	581.076762	580.983937	580.886764
580.785603	580.680916	580.573303	580.463545	580.352641
580.241849	580.132689	580.026931	579.926526	579.833501
579.749821	579.677244	579.617205	579.570749	579.538507
579.520706	579.517196	579.527457	579.550603	579.585386
579.630235	579.683339	579.742771	579.806627	579.873149

Row 94

581.777712	581.766988	581.756216	581.745406	581.734573
581.723741	581.712937	581.702201	581.691581	581.681138
581.670945	581.661089	581.651677	581.642830	581.634668
581.627410	581.621173	581.616172	581.612616	581.610723
581.610718	581.612825	581.617257	581.624207	581.631635
581.646258	581.661530	581.679629	581.700435	581.723713
581.749087	581.776020	581.803802	581.831546	581.858218
581.882693	581.903868	581.920802	581.932866	581.939855
581.942029	581.940044	581.934828	581.927416	581.918801
581.909829	581.901141	581.893150	581.886049	581.879834
581.874333	581.869237	581.864130	581.858520	581.851866
581.843598	581.833145	581.819952	581.803496	581.783304
581.758965	581.730132	581.696536	581.657977	581.614331
581.565535	581.511589	581.452541	581.388480	581.319536
581.245867	581.167665	581.085155	580.998607	580.908345
580.814766	580.718365	580.619759	580.519714	580.419172
580.319263	580.221308	580.126793	580.037315	579.954507
579.879939	579.815020	579.760919	579.718506	579.688322
579.670581	579.665172	579.671668	579.689336	579.717161
579.753879	579.798049	579.848132	579.902594	579.959983

Row 95

581.797817	581.787391	581.776953	581.766514	581.756095
581.745718	581.735417	581.725230	581.715207	581.705408
581.695904	581.686779	581.678131	581.670072	581.662731
581.656249	581.650781	581.646498	581.643576	581.642200
581.642555	581.644820	581.649162	581.655727	581.664625
581.675927	581.689645	581.705720	581.724011	581.744274
581.766151	581.789162	581.812695	581.836021	581.858319

Row 96

581.817887	581.807750	581.797631	581.787547	581.777516
581.767567	581.757730	581.748047	581.738566	581.729346
581.720454	581.711969	581.703983	581.696598	581.689929
581.684101	581.679252	581.675525	581.673073	581.672047
581.672600	581.674874	581.678997	581.685075	581.693182
581.703353	581.715568	581.729748	581.745740	581.763307
581.782120	581.801755	581.821694	581.841339	581.860039
581.877132	581.892000	581.904137	581.913204	581.919073
581.921836	581.921781	581.919345	581.915042	581.909398
581.902891	581.895909	581.888727	581.881494	581.874242
581.866889	581.859257	581.851091	581.842073	581.831843
581.820017	581.806198	581.789998	581.771045	581.748999
581.723557	581.694462	581.661508	581.624541	581.583458
581.538209	581.488790	581.435244	581.377655	581.316146
581.250881	581.182061	581.109931	581.034784	580.956969
580.876902	580.795078	580.712078	580.628588	580.545395
580.463397	580.383582	580.307015	580.234800	580.168035
580.107765	580.054927	580.010305	579.974500	579.947899
579.930668	579.922750	579.923867	579.933535	579.951082
579.975681	580.006391	580.042198	580.082073	580.125012

Row 97

581.837896	581.828037	581.818224	581.808473	581.798808
581.789254	581.779845	581.770621	581.761629	581.752925
581.744573	581.736646	581.729229	581.722414	581.716302
581.711006	581.706644	581.703339	581.701218	581.700409
581.701032	581.703200	581.707010	581.712536	581.719823
581.728878	581.739664	581.752087	581.765993	581.781159
581.797288	581.814013	581.830896	581.847448	581.863148
581.877479	581.889965	581.900220	581.907981	581.913138
581.915737	581.915969	581.914133	581.910590	581.905720
581.899877	581.893355	581.886368	581.879037	581.871392
581.863374	581.854846	581.845603	581.835390	581.823914
581.810857	581.795892	581.778693	581.758950	581.736374
581.710709	581.681736	581.649278	581.613203	581.573423
581.529895	581.482623	581.431650	581.377059	581.318974
581.257558	581.193013	581.125584	581.055564	580.983300
580.909198	580.833732	580.757452	580.680989	580.605056
580.503444	580.458012	580.388669	580.323342	580.262947
580.208348	580.160319	580.119512	580.086425	580.061385
580.044537	580.035842	580.035076	580.041848	580.055611
580.075691	580.101319	580.131662	580.165868	580.203095

Row 98

581.857823	581.848229	581.838705	581.829269	581.819942
581.810754	581.801736	581.792927	581.784373	581.776126
581.768248	581.760804	581.753872	581.747534	581.741881
581.737010	581.733023	581.730026	581.728124	581.727421
581.728015	581.729991	581.733422	581.738357	581.744819
581.752796	581.762236	581.773042	581.785063	581.798094
581.811872	581.826079	581.840347	581.854276	581.867444
581.879443	581.889900	581.898511	581.905067	581.909470
581.911736	581.911985	581.910422	581.907298	581.902887
581.897445	581.891193	581.884293	581.876839	581.868854
581.860293	581.851047	581.840952	581.829802	581.817355
581.803351	581.787519	581.769587	581.749296	581.726403
581.700692	581.671978	581.640110	581.604978	581.566509
581.524672	581.479473	581.430960	581.379218	581.324369
581.266574	581.206034	581.142991	581.077732	581.010593
580.941964	580.872294	580.802095	580.731943	580.662480
580.594403	580.528460	580.465428	580.406094	580.351226
580.301546	580.257699	580.220228	580.189550	580.165943
580.149532	580.140291	580.138042	580.142468	

581.826029 581.838049 581.850066 581.861749 581.872757
581.882761 581.891463 581.898620 581.904061 581.907695
581.909519 581.909603 581.908084 581.905136 581.900951
581.895715 581.889588 581.882690 581.875091 581.866806
581.857798 581.847978 581.837213 581.825334 581.812145
581.797428 581.780961 581.762518 581.741882 581.718850
581.693242 581.664901 581.633703 581.599555 581.562401
581.522219 581.479023 581.432862 581.383823 581.332028
581.277636 581.220841 581.161881 581.101032 581.038616
580.975003 580.910612 580.845916 580.781438 580.717753
580.655477 580.595259 580.537771 580.483682 580.433641
580.388257 580.348070 580.313537 580.285009 580.262720
580.246783 580.237180 580.233770 580.236295 580.244390
580.257603 580.275411 580.297241 580.322500 580.350587

Row 100

581.897359 581.888254 581.879257 581.870385 581.861661

581.853113 581.844771 581.836670 581.828852 581.821362
581.814250 581.807574 581.801394 581.795776 581.790790
581.786509 581.783007 581.780358 581.778634 581.777904
581.778226 581.779650 581.782210 581.785922 581.790779
581.796749 581.803769 581.811741 581.820534 581.829980
581.839876 581.849988 581.860054 581.869800 581.878945
581.887222 581.894389 581.900249 581.904655 581.907525
581.908840 581.908639 581.907006 581.904061 581.899935
581.894760 581.888651 581.881692 581.873933 581.865381
581.856003 581.845725 581.834438 581.822002 581.808255
581.793020 581.776111 581.757341 581.736529 581.713507
581.688124 581.660252 581.629787 581.596655 581.560813
581.522249 581.480983 581.437070 581.390595 581.341679
581.290478 581.237181 581.182016 581.125246 581.067178
581.008157 580.948573 580.888858 580.829488 580.770975
580.713862 580.658719 580.606123 580.556649 580.510849
580.469240 580.432277 580.400347 580.373747 580.352678
580.337238 580.327418 580.323106 580.324093 580.330079
580.340690 580.355492 580.374008 580.395738 580.420173

Streamlines

Number of Streamlines = 250

Streamline #1

Coordinates of Streamline:

Start x: 9986.660000 y: 9520.860000
End x: 10066.256172 y: 9498.851440

Streamline #2

Coordinates of Streamline:

Start x: 9992.838983 y: 9528.603390
End x: 10063.576820 y: 9500.518384

Streamline #3

Coordinates of Streamline:

Start x: 9999.017966 y: 9536.346780
End x: 10067.396066 y: 9501.263794

Streamline #4

Coordinates of Streamline:

Start x: 10005.196949 y: 9544.090169
End x: 10063.098177 y: 9509.789366

Streamline #5

Coordinates of Streamline:

Start x: 10011.375932 y: 9551.833559
End x: 10071.354468 y: 9505.912666

Streamline #6

Coordinates of Streamline:

Start x: 10017.554915 y: 9559.576949
End x: 10076.967850 y: 9504.755105

Streamline #7

Coordinates of Streamline:

Start x: 10023.733898 y: 9567.320339
End x: 10088.296201 y: 9527.386344

Streamline #8

Coordinates of Streamline:

Start x: 10029.912881 y: 9575.063729
End x: 10083.505496 y: 9534.394417

Streamline #9

Coordinates of Streamline:

Start x: 10036.091864 y: 9582.807119
End x: 10086.778762 y: 9538.543457

Streamline #10

Coordinates of Streamline:

Start x: 10042.270847 y: 9590.550508
End x: 10091.361757 y: 9533.844880

Streamline #11

Coordinates of Streamline:

Start x: 10048.449831 y: 9598.293898
End x: 10096.936774 y: 9540.596087

Streamline #12

Coordinates of Streamline:

Start x: 10054.628814 y: 9606.037288
End x: 10101.177915 y: 9535.677014

Streamline #13

Coordinates of Streamline:

Start x: 10060.807797 y: 9613.780678
End x: 10107.715539 y: 9565.539023

Streamline #14

Coordinates of Streamline:

Start x: 10066.986780 y: 9621.524068
End x: 10111.674767 y: 9571.334767

Streamline #15

Coordinates of Streamline:

Start x: 10073.165763 y: 9629.267458
End x: 10117.847473 y: 9568.667547

Streamline #16

Coordinates of Streamline:

Start x: 10079.344746 y: 9637.010847
End x: 10127.907594 y: 9569.003882

Streamline #17

Coordinates of Streamline:

Start x: 10085.523729 y: 9644.754237
End x: 10140.261638 y: 9592.843090

Streamline #18

Coordinates of Streamline:

Start x: 10091.702712 y: 9652.497627
End x: 10135.384215 y: 9601.381092

Streamline #19

Coordinates of Streamline:

Start x: 10097.881695 y: 9660.241017
End x: 10141.841346 y: 9598.874689

Streamline #20

Coordinates of Streamline:

Start x: 10104.060678 y: 9667.984407
End x: 10149.900947 y: 9599.674099

Streamline #21

Coordinates of Streamline:

Start x: 10110.239661 y: 9675.727797

End x: 10164.842351 y: 9623.903700

Streamline #22

Coordinates of Streamline:
 Start x: 10116.418644 y: 9683.471186
 End x: 10167.648239 y: 9626.407905

Streamline #23

Coordinates of Streamline:
 Start x: 10122.597627 y: 9691.214576
 End x: 10167.036335 y: 9630.437083

Streamline #24

Coordinates of Streamline:
 Start x: 10128.776610 y: 9698.957966
 End x: 10184.614851 y: 9645.808390

Streamline #25

Coordinates of Streamline:
 Start x: 10134.955593 y: 9706.701356
 End x: 10181.306193 y: 9657.974085

Streamline #26

Coordinates of Streamline:
 Start x: 10141.134576 y: 9714.444746
 End x: 10184.728445 y: 9663.442161

Streamline #27

Coordinates of Streamline:
 Start x: 10147.313559 y: 9722.188136
 End x: 10190.490319 y: 9661.883886

Streamline #28

Coordinates of Streamline:
 Start x: 10153.492542 y: 9729.931525
 End x: 10210.208129 y: 9683.385939

Streamline #29

Coordinates of Streamline:
 Start x: 10159.671525 y: 9737.674915
 End x: 10205.983286 y: 9688.909699

Streamline #30

Coordinates of Streamline:
 Start x: 10165.850508 y: 9745.418305
 End x: 10212.178560 y: 9685.888837

Streamline #31

Coordinates of Streamline:
 Start x: 10172.029492 y: 9753.161695
 End x: 10219.400893 y: 9687.318867

Streamline #32

Coordinates of Streamline:
 Start x: 10178.208475 y: 9760.905085
 End x: 10228.179848 y: 9715.920917

Streamline #33

Coordinates of Streamline:
 Start x: 10184.387458 y: 9768.648475
 End x: 10232.030152 y: 9721.595126

Streamline #34

Coordinates of Streamline:
 Start x: 10190.566441 y: 9776.391864
 End x: 10236.939754 y: 9721.023996

Streamline #35

Coordinates of Streamline:
 Start x: 10196.745424 y: 9784.135254
 End x: 10258.813736 y: 9748.431586

Streamline #36

Coordinates of Streamline:
 Start x: 10202.924407 y: 9791.878644
 End x: 10255.383386 y: 9749.789635

Streamline #37

Coordinates of Streamline:

Start x: 10209.103390 y: 9799.622034
 End x: 10264.107757 y: 9747.261818

Streamline #38

Coordinates of Streamline:
 Start x: 10215.282373 y: 9807.365424
 End x: 10280.201767 y: 9766.910048

Streamline #39

Coordinates of Streamline:
 Start x: 10221.461356 y: 9815.108814
 End x: 10276.732533 y: 9777.984635

Streamline #40

Coordinates of Streamline:
 Start x: 10227.640339 y: 9822.852203
 End x: 10280.033990 y: 9780.745462

Streamline #41

Coordinates of Streamline:
 Start x: 10233.819322 y: 9830.595593
 End x: 10280.906684 y: 9783.203796

Streamline #42

Coordinates of Streamline:
 Start x: 10239.998305 y: 9838.338983
 End x: 10287.549617 y: 9779.834965

Streamline #43

Coordinates of Streamline:
 Start x: 10246.177288 y: 9846.082373
 End x: 10280.582171 y: 9781.745035

Streamline #44

Coordinates of Streamline:
 Start x: 10252.356271 y: 9853.825763
 End x: 10300.177691 y: 9807.393088

Streamline #45

Coordinates of Streamline:
 Start x: 10258.535254 y: 9861.569153
 End x: 10302.603881 y: 9811.044681

Streamline #46

Coordinates of Streamline:
 Start x: 10264.714237 y: 9869.312542
 End x: 10303.307536 y: 9814.164302

Streamline #47

Coordinates of Streamline:
 Start x: 10270.893220 y: 9877.055932
 End x: 10309.810216 y: 9810.824645

Streamline #48

Coordinates of Streamline:
 Start x: 10277.072203 y: 9884.799322
 End x: 10308.105605 y: 9815.045221

Streamline #49

Coordinates of Streamline:
 Start x: 10283.251186 y: 9892.542712
 End x: 10312.153969 y: 9812.135964

Streamline #50

Coordinates of Streamline:
 Start x: 10289.430169 y: 9900.286102
 End x: 10311.939304 y: 9812.396838

Streamline #51

Coordinates of Streamline:
 Start x: 10295.609153 y: 9908.029492
 End x: 10329.698660 y: 9838.516767

Streamline #52

Coordinates of Streamline:
 Start x: 10301.788136 y: 9915.772881
 End x: 10327.354502 y: 9839.397436

Streamline #53

Coordinates of Streamline:
Start x: 10307.967119 y: 9923.516271
End x: 10332.472877 y: 9846.106231

Streamline #54

Coordinates of Streamline:
Start x: 10314.146102 y: 9931.259661
End x: 10327.724388 y: 9843.117440

Streamline #55

Coordinates of Streamline:
Start x: 10320.325085 y: 9939.003051
End x: 10328.386602 y: 9843.322290

Streamline #56

Coordinates of Streamline:
Start x: 10326.504068 y: 9946.746441
End x: 10326.392818 y: 9843.114946

Streamline #57

Coordinates of Streamline:
Start x: 10332.683051 y: 9954.489831
End x: 10331.996763 y: 9844.523299

Streamline #58

Coordinates of Streamline:
Start x: 10338.862034 y: 9962.233220
End x: 10324.862305 y: 9839.645213

Streamline #59

Coordinates of Streamline:
Start x: 10345.041017 y: 9969.976610
End x: 10327.595802 y: 9845.139970

Streamline #60

Coordinates of Streamline:
Start x: 10351.220000 y: 9977.720000
End x: 10281.386841 y: 9945.419637

Streamline #61

Coordinates of Streamline:
Start x: 10352.300000 y: 9973.150000
End x: 10332.011090 y: 9844.781774

Streamline #62

Coordinates of Streamline:
Start x: 10362.693265 y: 9969.654490
End x: 10330.584673 y: 9848.714910

Streamline #63

Coordinates of Streamline:
Start x: 10373.086531 y: 9966.158980
End x: 10334.394653 y: 9851.398316

Streamline #64

Coordinates of Streamline:
Start x: 10383.479796 y: 9962.663469
End x: 10362.574694 y: 9880.395391

Streamline #65

Coordinates of Streamline:
Start x: 10393.873061 y: 9959.167959
End x: 10369.894176 y: 9878.403103

Streamline #66

Coordinates of Streamline:
Start x: 10404.266327 y: 9955.672449
End x: 10436.480921 y: 9879.050388

Streamline #67

Coordinates of Streamline:
Start x: 10414.659592 y: 9952.176939
End x: 10440.749289 y: 9876.155040

Streamline #68

Coordinates of Streamline:
Start x: 10425.052857 y: 9948.681429
End x: 10441.784741 y: 9876.427113

Streamline #69

Coordinates of Streamline:
Start x: 10435.446122 y: 9945.185918
End x: 10443.561323 y: 9879.515030

Streamline #70

Coordinates of Streamline:
Start x: 10445.839388 y: 9941.690408
End x: 10442.250428 y: 9876.032942

Streamline #71

Coordinates of Streamline:
Start x: 10456.232653 y: 9938.194898
End x: 10450.607073 y: 9880.979511

Streamline #72

Coordinates of Streamline:
Start x: 10466.625918 y: 9934.699388
End x: 10446.608443 y: 9876.688599

Streamline #73

Coordinates of Streamline:
Start x: 10477.019184 y: 9931.203878
End x: 10470.452565 y: 9866.246291

Streamline #74

Coordinates of Streamline:
Start x: 10487.412449 y: 9927.708367
End x: 10476.216251 y: 9862.092351

Streamline #75

Coordinates of Streamline:
Start x: 10497.805714 y: 9924.212857
End x: 10475.993567 y: 9860.678694

Streamline #76

Coordinates of Streamline:
Start x: 10508.198980 y: 9920.717347
End x: 10479.034122 y: 9862.193829

Streamline #77

Coordinates of Streamline:
Start x: 10518.592245 y: 9917.221837
End x: 10508.891408 y: 9848.695557

Streamline #78

Coordinates of Streamline:
Start x: 10528.985510 y: 9913.726327
End x: 10507.948449 y: 9850.124142

Streamline #79

Coordinates of Streamline:
Start x: 10539.378776 y: 9910.230816
End x: 10512.427262 y: 9848.753300

Streamline #80

Coordinates of Streamline:
Start x: 10549.772041 y: 9906.735306
End x: 10515.026974 y: 9847.758284

Streamline #81

Coordinates of Streamline:
Start x: 10560.165306 y: 9903.239796
End x: 10539.468912 y: 9829.808349

Streamline #82

Coordinates of Streamline:
Start x: 10570.558571 y: 9899.744286
End x: 10539.850641 y: 9830.340446

Streamline #83

Coordinates of Streamline:
Start x: 10580.951837 y: 9896.248776
End x: 10557.881144 y: 9814.135932

Streamline #84

Coordinates of Streamline:
Start x: 10591.345102 y: 9892.753265
End x: 10569.792675 y: 9819.066802

Streamline #85

Coordinates of Streamline:
Start x: 10601.738367 y: 9889.257755
End x: 10574.578556 y: 9818.301666

Streamline #86

Coordinates of Streamline:
Start x: 10612.131633 y: 9885.762245
End x: 10596.911067 y: 9811.500863

Streamline #87

Coordinates of Streamline:
Start x: 10622.524898 y: 9882.266735
End x: 10600.801107 y: 9808.715016

Streamline #88

Coordinates of Streamline:
Start x: 10632.918163 y: 9878.771224
End x: 10619.475461 y: 9804.075637

Streamline #89

Coordinates of Streamline:
Start x: 10643.311429 y: 9875.275714
End x: 10628.202752 y: 9800.162620

Streamline #90

Coordinates of Streamline:
Start x: 10653.704694 y: 9871.780204
End x: 10628.272132 y: 9801.577929

Streamline #91

Coordinates of Streamline:
Start x: 10664.097959 y: 9868.284694
End x: 10656.380608 y: 9795.895773

Streamline #92

Coordinates of Streamline:
Start x: 10674.491224 y: 9864.789184
End x: 10659.358252 y: 9799.242922

Streamline #93

Coordinates of Streamline:
Start x: 10684.884490 y: 9861.293673
End x: 10657.098558 y: 9795.534782

Streamline #94

Coordinates of Streamline:
Start x: 10695.277755 y: 9857.798163
End x: 10689.058777 y: 9787.394706

Streamline #95

Coordinates of Streamline:
Start x: 10705.671020 y: 9854.302653
End x: 10688.219862 y: 9789.276801

Streamline #96

Coordinates of Streamline:
Start x: 10716.064286 y: 9850.807143
End x: 10694.941294 y: 9787.268714

Streamline #97

Coordinates of Streamline:
Start x: 10726.457551 y: 9847.311633
End x: 10710.032138 y: 9782.171356

Streamline #98

Coordinates of Streamline:
Start x: 10736.850816 y: 9843.816122
End x: 10716.291843 y: 9779.933460

Streamline #99

Coordinates of Streamline:
Start x: 10747.244082 y: 9840.320612
End x: 10711.919061 y: 9782.962660

Streamline #100

Coordinates of Streamline:
Start x: 10757.637347 y: 9836.825102
End x: 10744.879274 y: 9770.983367

Streamline #101

Coordinates of Streamline:
Start x: 10768.030612 y: 9833.329592
End x: 10748.811218 y: 9769.636986

Streamline #102

Coordinates of Streamline:
Start x: 10778.423878 y: 9829.834082
End x: 10771.404693 y: 9764.577217

Streamline #103

Coordinates of Streamline:
Start x: 10788.817143 y: 9826.338571
End x: 10774.755420 y: 9760.497009

Streamline #104

Coordinates of Streamline:
Start x: 10799.210408 y: 9822.843061
End x: 10776.900519 y: 9763.397354

Streamline #105

Coordinates of Streamline:
Start x: 10809.603673 y: 9819.347551
End x: 10806.864204 y: 9755.273421

Streamline #106

Coordinates of Streamline:
Start x: 10819.996939 y: 9815.852041
End x: 10808.150067 y: 9759.394176

Streamline #107

Coordinates of Streamline:
Start x: 10830.390204 y: 9812.356531
End x: 10808.397777 y: 9758.807771

Streamline #108

Coordinates of Streamline:
Start x: 10840.783469 y: 9808.861020
End x: 10833.977016 y: 9752.076079

Streamline #109

Coordinates of Streamline:
Start x: 10851.176735 y: 9805.365510
End x: 10837.084450 y: 9749.669492

Streamline #110

Coordinates of Streamline:
Start x: 10861.570000 y: 9801.870000
End x: 10846.205880 y: 9746.901408

Streamline #111

Coordinates of Streamline:
Start x: 10871.850000 y: 9796.160000
End x: 10867.355561 y: 9739.555090

Streamline #112

Coordinates of Streamline:
Start x: 10879.318378 y: 9794.370135
End x: 10865.994177 y: 9738.521736

Streamline #113

Coordinates of Streamline:
Start x: 10886.786757 y: 9792.580270
End x: 10868.365556 y: 9740.349513

Streamline #114

Coordinates of Streamline:
Start x: 10894.255135 y: 9790.790405
End x: 10886.181875 y: 9734.122184

Streamline #115

Coordinates of Streamline:
Start x: 10901.723514 y: 9789.000541
End x: 10896.093889 y: 9732.752284

Streamline #116

Coordinates of Streamline:
Start x: 10909.191892 y: 9787.210676

End x: 10895.742521 y: 9731.124344
Streamline #117
Coordinates of Streamline:
Start x: 10916.660270 y: 9785.420811
End x: 10897.183785 y: 9733.091543
Streamline #118
Coordinates of Streamline:
Start x: 10924.128649 y: 9783.630946
End x: 10918.501373 y: 9719.496474
Streamline #119
Coordinates of Streamline:
Start x: 10931.597027 y: 9781.841081
End x: 10926.278025 y: 9726.089547
Streamline #120
Coordinates of Streamline:
Start x: 10939.065405 y: 9780.051216
End x: 10926.207908 y: 9723.798469
Streamline #121
Coordinates of Streamline:
Start x: 10946.533784 y: 9778.261351
End x: 10926.583008 y: 9725.701406
Streamline #122
Coordinates of Streamline:
Start x: 10954.002162 y: 9776.471486
End x: 10936.547020 y: 9722.088400
Streamline #123
Coordinates of Streamline:
Start x: 10961.470541 y: 9774.681622
End x: 10955.706734 y: 9719.269864
Streamline #124
Coordinates of Streamline:
Start x: 10968.938919 y: 9772.891757
End x: 10956.487401 y: 9716.608040
Streamline #125
Coordinates of Streamline:
Start x: 10976.407297 y: 9771.101892
End x: 10956.625140 y: 9718.134342
Streamline #126
Coordinates of Streamline:
Start x: 10983.875676 y: 9769.312027
End x: 10965.647316 y: 9715.498828
Streamline #127
Coordinates of Streamline:
Start x: 10991.344054 y: 9767.522162
End x: 10986.435688 y: 9712.273927
Streamline #128
Coordinates of Streamline:
Start x: 10998.812432 y: 9765.732297
End x: 10987.483660 y: 9709.260680
Streamline #129
Coordinates of Streamline:
Start x: 11006.280811 y: 9763.942432
End x: 10987.488731 y: 9710.357295
Streamline #130
Coordinates of Streamline:
Start x: 11013.749189 y: 9762.152568
End x: 10994.684926 y: 9708.952564
Streamline #131
Coordinates of Streamline:
Start x: 11021.217568 y: 9760.362703
End x: 11015.124902 y: 9704.989271
Streamline #132
Coordinates of Streamline:

Start x: 11028.685946 y: 9758.572838
End x: 11017.868741 y: 9702.179681
Streamline #133
Coordinates of Streamline:
Start x: 11036.154324 y: 9756.782973
End x: 11017.626391 y: 9702.815068
Streamline #134
Coordinates of Streamline:
Start x: 11043.622703 y: 9754.993108
End x: 11024.156899 y: 9702.107973
Streamline #135
Coordinates of Streamline:
Start x: 11051.091081 y: 9753.203243
End x: 11046.457295 y: 9698.546342
Streamline #136
Coordinates of Streamline:
Start x: 11058.559459 y: 9751.413378
End x: 11049.550819 y: 9695.119210
Streamline #137
Coordinates of Streamline:
Start x: 11066.027838 y: 9749.623514
End x: 11047.706212 y: 9695.393251
Streamline #138
Coordinates of Streamline:
Start x: 11073.496216 y: 9747.833649
End x: 11051.505246 y: 9697.096918
Streamline #139
Coordinates of Streamline:
Start x: 11080.964595 y: 9746.043784
End x: 11073.040758 y: 9690.665130
Streamline #140
Coordinates of Streamline:
Start x: 11088.432973 y: 9744.253919
End x: 11080.038289 y: 9688.471085
Streamline #141
Coordinates of Streamline:
Start x: 11095.901351 y: 9742.464054
End x: 11078.204935 y: 9687.737766
Streamline #142
Coordinates of Streamline:
Start x: 11103.369730 y: 9740.674189
End x: 11081.389569 y: 9689.590711
Streamline #143
Coordinates of Streamline:
Start x: 11110.838108 y: 9738.884324
End x: 11101.938334 y: 9683.217121
Streamline #144
Coordinates of Streamline:
Start x: 11118.306486 y: 9737.094459
End x: 11109.785041 y: 9681.182640
Streamline #145
Coordinates of Streamline:
Start x: 11125.774865 y: 9735.304595
End x: 11108.188459 y: 9680.651004
Streamline #146
Coordinates of Streamline:
Start x: 11133.243243 y: 9733.514730
End x: 11112.741021 y: 9681.387486
Streamline #147
Coordinates of Streamline:
Start x: 11140.711622 y: 9731.724865
End x: 11132.466496 y: 9675.646413
Streamline #148

Coordinates of Streamline:
Start x: 11148.180000 y: 9729.935000
End x: 11137.558738 y: 9673.335702

Streamline #149

Coordinates of Streamline:
Start x: 11155.648378 y: 9728.145135
End x: 11138.943801 y: 9674.001730

Streamline #150

Coordinates of Streamline:
Start x: 11163.116757 y: 9726.355270
End x: 11165.191236 y: 9669.792133

Streamline #151

Coordinates of Streamline:
Start x: 11170.585135 y: 9724.565405
End x: 11165.453698 y: 9667.415039

Streamline #152

Coordinates of Streamline:
Start x: 11178.053154 y: 9722.775541
End x: 11166.959136 y: 9666.761154

Streamline #153

Coordinates of Streamline:
Start x: 11185.521892 y: 9720.985676
End x: 11190.632839 y: 9665.051739

Streamline #154

Coordinates of Streamline:
Start x: 11192.990270 y: 9719.195811
End x: 11192.180209 y: 9661.849940

Streamline #155

Coordinates of Streamline:
Start x: 11200.458649 y: 9717.405946
End x: 11195.050702 y: 9660.197189

Streamline #156

Coordinates of Streamline:
Start x: 11207.927027 y: 9715.616081
End x: 11215.968030 y: 9658.113856

Streamline #157

Coordinates of Streamline:
Start x: 11215.395405 y: 9713.826216
End x: 11218.383051 y: 9656.712224

Streamline #158

Coordinates of Streamline:
Start x: 11222.863784 y: 9712.036351
End x: 11222.633864 y: 9654.362775

Streamline #159

Coordinates of Streamline:
Start x: 11230.332162 y: 9710.246486
End x: 11228.253672 y: 9652.730000

Streamline #160

Coordinates of Streamline:
Start x: 11237.800541 y: 9708.456622
End x: 11246.680213 y: 9644.360114

Streamline #161

Coordinates of Streamline:
Start x: 11245.268919 y: 9706.666757
End x: 11253.877371 y: 9641.030967

Streamline #162

Coordinates of Streamline:
Start x: 11252.737297 y: 9704.876892
End x: 11255.165067 y: 9647.352911

Streamline #163

Coordinates of Streamline:
Start x: 11260.205676 y: 9703.087027
End x: 11259.382091 y: 9645.424680

Streamline #164

Coordinates of Streamline:
Start x: 11267.674054 y: 9701.297162
End x: 11265.347865 y: 9643.671607

Streamline #165

Coordinates of Streamline:
Start x: 11275.142432 y: 9699.507297
End x: 11276.100358 y: 9632.670371

Streamline #166

Coordinates of Streamline:
Start x: 11282.610811 y: 9697.717432
End x: 11286.664570 y: 9632.470200

Streamline #167

Coordinates of Streamline:
Start x: 11290.079189 y: 9695.927568
End x: 11286.676887 y: 9638.379088

Streamline #168

Coordinates of Streamline:
Start x: 11297.547568 y: 9694.137703
End x: 11291.112543 y: 9636.800249

Streamline #169

Coordinates of Streamline:
Start x: 11305.015946 y: 9692.347838
End x: 11296.674938 y: 9635.262993

Streamline #170

Coordinates of Streamline:
Start x: 11312.484324 y: 9690.557973
End x: 11303.489368 y: 9633.559469

Streamline #171

Coordinates of Streamline:
Start x: 11319.952703 y: 9688.768108
End x: 11309.683752 y: 9631.988730

Streamline #172

Coordinates of Streamline:
Start x: 11327.421081 y: 9686.978243
End x: 11315.022277 y: 9630.631637

Streamline #173

Coordinates of Streamline:
Start x: 11334.889459 y: 9685.188378
End x: 11321.812104 y: 9628.988851

Streamline #174

Coordinates of Streamline:
Start x: 11342.357838 y: 9683.398514
End x: 11328.448116 y: 9627.405989

Streamline #175

Coordinates of Streamline:
Start x: 11349.826216 y: 9681.608649
End x: 11334.596531 y: 9625.968683

Streamline #176

Coordinates of Streamline:
Start x: 11357.294595 y: 9679.818784
End x: 11342.319511 y: 9624.129395

Streamline #177

Coordinates of Streamline:
Start x: 11364.762973 y: 9678.028919
End x: 11349.474017 y: 9622.412515

Streamline #178

Coordinates of Streamline:
Start x: 11372.231351 y: 9676.239054
End x: 11357.444616 y: 9620.466183

Streamline #179

Coordinates of Streamline:
Start x: 11379.699730 y: 9674.449189
End x: 11366.763636 y: 9618.219305

Streamline #180

Coordinates of Streamline:

Start x: 11387.168108 y: 9672.659324
End x: 11375.722128 y: 9616.113635

Streamline #181

Coordinates of Streamline:

Start x: 11394.636486 y: 9670.869459
End x: 11386.147550 y: 9613.812737

Streamline #182

Coordinates of Streamline:

Start x: 11402.104865 y: 9669.079595
End x: 11396.046709 y: 9611.752615

Streamline #183

Coordinates of Streamline:

Start x: 11409.573243 y: 9667.289730
End x: 11406.507992 y: 9609.769768

Streamline #184

Coordinates of Streamline:

Start x: 11417.041622 y: 9665.499865
End x: 11417.628030 y: 9598.311666

Streamline #185

Coordinates of Streamline:

Start x: 11424.510000 y: 9663.710000
End x: 11428.055374 y: 9606.347494

Streamline #186

Coordinates of Streamline:

Start x: 11426.790000 y: 9663.710000
End x: 11428.416949 y: 9597.433489

Streamline #187

Coordinates of Streamline:

Start x: 11428.395781 y: 9669.740469
End x: 11437.387905 y: 9603.344137

Streamline #188

Coordinates of Streamline:

Start x: 11430.001563 y: 9675.770937
End x: 11444.363726 y: 9600.667849

Streamline #189

Coordinates of Streamline:

Start x: 11431.607344 y: 9681.801406
End x: 11450.720122 y: 9598.830147

Streamline #190

Coordinates of Streamline:

Start x: 11433.213125 y: 9687.831875
End x: 11463.426767 y: 9607.580675

Streamline #191

Coordinates of Streamline:

Start x: 11434.818906 y: 9693.862344
End x: 11477.734640 y: 9619.035041

Streamline #192

Coordinates of Streamline:

Start x: 11436.424688 y: 9699.892812
End x: 11487.832630 y: 9642.764943

Streamline #193

Coordinates of Streamline:

Start x: 11438.030469 y: 9705.923281
End x: 11493.364318 y: 9653.290935

Streamline #194

Coordinates of Streamline:

Start x: 11439.636250 y: 9711.953750
End x: 11497.154780 y: 9677.871433

Streamline #195

Coordinates of Streamline:

Start x: 11441.242031 y: 9717.984219
End x: 11500.456775 y: 9686.397955

Streamline #196

Coordinates of Streamline:

Start x: 11442.847813 y: 9724.014687
End x: 11506.935387 y: 9705.697246

Streamline #197

Coordinates of Streamline:

Start x: 11444.453594 y: 9730.045156
End x: 11508.859145 y: 9711.715366

Streamline #198

Coordinates of Streamline:

Start x: 11446.059375 y: 9736.075625
End x: 11531.886812 y: 9705.976965

Streamline #199

Coordinates of Streamline:

Start x: 11447.665156 y: 9742.106094
End x: 11514.261962 y: 9740.168147

Streamline #200

Coordinates of Streamline:

Start x: 11449.270938 y: 9748.136563
End x: 11516.438846 y: 9743.825574

Streamline #201

Coordinates of Streamline:

Start x: 11450.876719 y: 9754.167031
End x: 11516.014192 y: 9744.379934

Streamline #202

Coordinates of Streamline:

Start x: 11452.482500 y: 9760.197500
End x: 11518.512675 y: 9751.419958

Streamline #203

Coordinates of Streamline:

Start x: 11454.088281 y: 9766.227969
End x: 11526.146375 y: 9770.167083

Streamline #204

Coordinates of Streamline:

Start x: 11455.694063 y: 9772.258437
End x: 11521.807273 y: 9772.287990

Streamline #205

Coordinates of Streamline:

Start x: 11457.299844 y: 9778.288906
End x: 11514.761749 y: 9773.228705

Streamline #206

Coordinates of Streamline:

Start x: 11458.905625 y: 9784.319375
End x: 11516.176005 y: 9777.272789

Streamline #207

Coordinates of Streamline:

Start x: 11460.511406 y: 9790.349844
End x: 11517.454572 y: 9781.348263

Streamline #208

Coordinates of Streamline:

Start x: 11462.117188 y: 9796.380312
End x: 11526.798321 y: 9781.225107

Streamline #209

Coordinates of Streamline:

Start x: 11463.722969 y: 9802.410781
End x: 11530.161672 y: 9795.500520

Streamline #210

Coordinates of Streamline:

Start x: 11465.328750 y: 9808.441250
End x: 11529.153074 y: 9806.795114

Streamline #211

Coordinates of Streamline:

Start x: 11466.934531 y: 9814.471719

End x: 11523.739685 y: 9804.980591

Streamline #212

Coordinates of Streamline:
Start x: 11468.540313 y: 9820.502188
End x: 11524.926188 y: 9808.230712

Streamline #213

Coordinates of Streamline:
Start x: 11470.146094 y: 9826.532656
End x: 11525.733594 y: 9811.314915

Streamline #214

Coordinates of Streamline:
Start x: 11471.751875 y: 9832.563125
End x: 11526.889473 y: 9815.915481

Streamline #215

Coordinates of Streamline:
Start x: 11473.357656 y: 9838.593594
End x: 11536.504981 y: 9816.600120

Streamline #216

Coordinates of Streamline:
Start x: 11474.963438 y: 9844.624062
End x: 11539.619192 y: 9831.959001

Streamline #217

Coordinates of Streamline:
Start x: 11476.569219 y: 9850.654531
End x: 11531.921331 y: 9834.756423

Streamline #218

Coordinates of Streamline:
Start x: 11478.175000 y: 9856.685000
End x: 11533.004954 y: 9838.799094

Streamline #219

Coordinates of Streamline:
Start x: 11479.780781 y: 9862.715469
End x: 11533.653051 y: 9842.067968

Streamline #220

Coordinates of Streamline:
Start x: 11481.386563 y: 9868.745938
End x: 11534.390981 y: 9846.159776

Streamline #221

Coordinates of Streamline:
Start x: 11482.992344 y: 9874.776406
End x: 11540.788604 y: 9843.375308

Streamline #222

Coordinates of Streamline:
Start x: 11484.598125 y: 9880.806875
End x: 11545.609149 y: 9843.338718

Streamline #223

Coordinates of Streamline:
Start x: 11486.203906 y: 9886.837344
End x: 11548.719178 y: 9863.712918

Streamline #224

Coordinates of Streamline:
Start x: 11487.809688 y: 9892.867812
End x: 11549.561075 y: 9871.436212

Streamline #225

Coordinates of Streamline:
Start x: 11489.415469 y: 9898.898281
End x: 11541.007266 y: 9873.113446

Streamline #226

Coordinates of Streamline:
Start x: 11491.021250 y: 9904.928750
End x: 11550.324904 y: 9873.394405

Streamline #227

Coordinates of Streamline:

Start x: 11492.627031 y: 9910.959219
End x: 11548.559413 y: 9874.710793

Streamline #228

Coordinates of Streamline:
Start x: 11494.232813 y: 9916.989687
End x: 11548.713821 y: 9879.477352

Streamline #229

Coordinates of Streamline:
Start x: 11495.838594 y: 9923.020156
End x: 11551.686671 y: 9876.334893

Streamline #230

Coordinates of Streamline:
Start x: 11497.444375 y: 9929.050625
End x: 11553.321605 y: 9875.241206

Streamline #231

Coordinates of Streamline:
Start x: 11499.050156 y: 9935.081094
End x: 11559.462395 y: 9875.104417

Streamline #232

Coordinates of Streamline:
Start x: 11500.655938 y: 9941.111563
End x: 11556.970232 y: 9875.334910

Streamline #233

Coordinates of Streamline:
Start x: 11502.261719 y: 9947.142031
End x: 11582.842108 y: 9897.802857

Streamline #234

Coordinates of Streamline:
Start x: 11503.867500 y: 9953.172500
End x: 11588.947706 y: 9910.014869

Streamline #235

Coordinates of Streamline:
Start x: 11505.473281 y: 9959.202969
End x: 11593.482033 y: 9921.363788

Streamline #236

Coordinates of Streamline:
Start x: 11507.079063 y: 9965.233437
End x: 11597.143117 y: 9932.041010

Streamline #237

Coordinates of Streamline:
Start x: 11508.684844 y: 9971.263906
End x: 11600.214430 y: 9942.039959

Streamline #238

Coordinates of Streamline:
Start x: 11510.290625 y: 9977.294375
End x: 11602.914204 y: 9951.568866

Streamline #239

Coordinates of Streamline:
Start x: 11511.896406 y: 9983.324844
End x: 11604.436745 y: 9958.701362

Streamline #240

Coordinates of Streamline:
Start x: 11513.502188 y: 9989.355313
End x: 11598.177974 y: 9971.884426

Streamline #241

Coordinates of Streamline:
Start x: 11515.107969 y: 9995.385781
End x: 11599.945055 y: 9978.563908

Streamline #242

Coordinates of Streamline:
Start x: 11516.713750 y: 10001.416250
End x: 11601.566988 y: 9984.534924

Streamline #243

Coordinates of Streamline:

Start x: 11518.319531 y: 10007.446719
End x: 11603.099877 y: 9990.161324

Streamline #244

Coordinates of Streamline:

Start x: 11519.925313 y: 10013.477188
End x: 11604.563610 y: 9995.540278

Streamline #245

Coordinates of Streamline:

Start x: 11521.531094 y: 10019.507656
End x: 11605.965991 y: 10000.716429

Streamline #246

Coordinates of Streamline:

Start x: 11523.136875 y: 10025.538125
End x: 11607.308543 y: 10005.714568

Streamline #247

=====

Coordinates of Streamline:

Start x: 11524.742656 y: 10031.568594
End x: 11608.589078 y: 10010.550502

Streamline #248

Coordinates of Streamline:

Start x: 11526.348438 y: 10037.599063
End x: 11609.802938 y: 10015.235643

Streamline #249

Coordinates of Streamline:

Start x: 11527.954219 y: 10043.629531
End x: 11610.943620 y: 10019.779353

Streamline #250

Coordinates of Streamline:

Start x: 11529.560000 y: 10049.660000
End x: 11612.003127 y: 10024.190393

Particle Traces

Number of Particle-traces = 0

APPENDIX C-3

**GROUNDWATER MODELING OF
REMEDIAL ALTERNATIVES – AREA BCE**

**Area BCE Collection Trench
Modeling Summary**

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

Date: 10/19/99
Time: 16:49:55.00

Input File: PND4-2B2.WFL
Map File : C:\WINFLOW\BCC\CURRENT\BCCCLEAN.MAP

Model Entities

Number of Linesinks Defined by Infiltration Rate = 0

Number of Linesinks Defined by Head = 95

Line Sink #1

x1: 9455.809570 y1: 8852.379883
x2: 9532.019531 y2: 8919.309570
Discharge per length = 0.001115
Head in Center of Linesink = 573.999207
Total Linesink Discharge = 0.113122 [L3/T]

Line Sink #2

x1: 9758.330078 y1: 8921.110352
x2: 9856.000000 y2: 8920.000000
Discharge per length = 0.000284
Head in Center of Linesink = 573.999878
Total Linesink Discharge = 0.027703 [L3/T]

Line Sink #3

x1: 9933.679688 y1: 9097.740234
x2: 9962.000000 y2: 9176.000000
Discharge per length = 0.000666
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.055408 [L3/T]

Line Sink #4

x1: 10070.490234 y1: 9330.889648
x2: 10125.000000 y2: 9402.000000
Discharge per length = 0.000628
Head in Center of Linesink = 573.999939
Total Linesink Discharge = 0.056279 [L3/T]

Line Sink #5

x1: 10243.269531 y1: 9391.910156
x2: 10352.000000 y2: 9380.000000
Discharge per length = 0.001016
Head in Center of Linesink = 573.999573
Total Linesink Discharge = 0.111154 [L3/T]

Line Sink #6

x1: 10466.790039 y1: 9379.070313
x2: 10570.000000 y2: 9384.000000
Discharge per length = 0.001833
Head in Center of Linesink = 573.999939
Total Linesink Discharge = 0.189373 [L3/T]

Line Sink #7

x1: 10676.169922 y1: 9380.349609
x2: 10766.000000 y2: 9374.000000
Discharge per length = 0.001009
Head in Center of Linesink = 573.999451
Total Linesink Discharge = 0.090877 [L3/T]

Line Sink #8

x1: 10958.150391 y1: 9452.929688
x2: 11058.000000 y2: 9493.280273
Discharge per length = 0.000869
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.093565 [L3/T]

Line Sink #9

x1: 11164.320313 y1: 9533.219727
x2: 11264.900391 y2: 9559.000000
Discharge per length = 0.001627
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.168929 [L3/T]

Line Sink #10

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x1: 11274.799805 y1: 9557.620117
x2: 11375.000000 y2: 9548.629883
Discharge per length = 0.000041
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.004081 [L3/T]
Line Sink #11
x1: 11798.269531 y1: 9458.070313
x2: 11910.019531 y2: 9429.009766
Discharge per length = 0.002076
Head in Center of Linesink = 573.999756
Total Linesink Discharge = 0.239748 [L3/T]
Line Sink #12
x1: 12250.440430 y1: 9339.889648
x2: 12379.919922 y2: 9307.370117
Discharge per length = 0.000676
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.090251 [L3/T]
Line Sink #13
x1: 12609.480469 y1: 9251.900391
x2: 12842.719727 y2: 9201.009766
Discharge per length = 0.001033
Head in Center of Linesink = 573.999756
Total Linesink Discharge = 0.246709 [L3/T]
Line Sink #14
x1: 9238.709961 y1: 8655.839844
x2: 9162.280273 y2: 8589.679688
Discharge per length = 0.000440
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.044451 [L3/T]
Line Sink #15
x1: 8799.389648 y1: 8269.179688
x2: 8743.000000 y2: 8212.000000
Discharge per length = 0.001523
Head in Center of Linesink = 573.999573
Total Linesink Discharge = 0.122339 [L3/T]
Line Sink #16
x1: 9305.000000 y1: 7620.000000
x2: 9499.110352 y2: 7798.709961
Discharge per length = 0.000733
Head in Center of Linesink = 573.999695
Total Linesink Discharge = 0.193352 [L3/T]
Line Sink #17
x1: 10618.910156 y1: 8563.019531
x2: 10893.000000 y2: 8655.000000
Discharge per length = 0.000165
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.047842 [L3/T]
Line Sink #18
x1: 10298.349609 y1: 10053.889648
x2: 10275.230469 y2: 9945.990234
Discharge per length = 0.000099
Head in Center of Linesink = 579.000000
Total Linesink Discharge = 0.010963 [L3/T]
Line Sink #19
x1: 9915.799805 y1: 10113.259766
x2: 10032.509766 y2: 10055.139648
Discharge per length = 0.001139
Head in Center of Linesink = 578.999939
Total Linesink Discharge = 0.148451 [L3/T]
Line Sink #20
x1: 9803.790039 y1: 10170.790039
x2: 9702.000000 y2: 10222.000000
Discharge per length = 0.001866
Head in Center of Linesink = 578.999878
Total Linesink Discharge = 0.212583 [L3/T]
Line Sink #21
x1: 10341.650391 y1: 9900.759766
x2: 10457.000000 y2: 9838.719727
Discharge per length = -0.003623
Head in Center of Linesink = 579.000061
Total Linesink Discharge = -0.474524 [L3/T]
Line Sink #22
x1: 10574.030273 y1: 9781.690430
x2: 10679.879883 y2: 9750.730469
Discharge per length = -0.002832
Head in Center of Linesink = 578.999939
Total Linesink Discharge = -0.312298 [L3/T]
Line Sink #23
x1: 10795.110352 y1: 9720.509766
x2: 10904.009766 y2: 9693.559570
Discharge per length = -0.003601
Head in Center of Linesink = 579.000366
Total Linesink Discharge = -0.404015 [L3/T]
Line Sink #24
x1: 11634.080078 y1: 10079.360352
x2: 11606.690430 y2: 9965.889648
Discharge per length = 0.002655
Head in Center of Linesink = 576.999817
Total Linesink Discharge = 0.309948 [L3/T]
Line Sink #25
x1: 11447.019531 y1: 10428.690430
x2: 11581.000000 y2: 10397.530273
Discharge per length = 0.002303
Head in Center of Linesink = 575.000000
Total Linesink Discharge = 0.316786 [L3/T]

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Line Sink #26
x1: 11748.410156 y1: 10464.120117
x2: 11704.809570 y2: 10284.269531
Discharge per length = 0.001633
Head in Center of Linesink = 574.999939
Total Linesink Discharge = 0.302115 [L3/T]

Line Sink #27
x1: 11243.259766 y1: 9603.580078
x2: 11342.610352 y2: 9578.759766
Discharge per length = 0.000677
Head in Center of Linesink = 574.000061
Total Linesink Discharge = 0.069337 [L3/T]

Line Sink #28
x1: 9013.269531 y1: 8457.370117
x2: 9089.059570 y2: 8525.450195
Discharge per length = 0.000422
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.042982 [L3/T]

Line Sink #29
x1: 9089.059570 y1: 8526.740234
x2: 9159.709961 y2: 8588.400391
Discharge per length = 0.000422
Head in Center of Linesink = 573.999878
Total Linesink Discharge = 0.039614 [L3/T]

Line Sink #30
x1: 9009.419922 y1: 8452.230469
x2: 8938.759766 y2: 8398.280273
Discharge per length = 0.000469
Head in Center of Linesink = 573.999878
Total Linesink Discharge = 0.041676 [L3/T]

Line Sink #31
x1: 8870.679688 y1: 8337.900391
x2: 8936.190430 y2: 8394.419922
Discharge per length = 0.000540
Head in Center of Linesink = 573.999939
Total Linesink Discharge = 0.046750 [L3/T]

Line Sink #32
x1: 8801.959961 y1: 8269.179688
x2: 8868.759766 y2: 8335.969727
Discharge per length = 0.000659
Head in Center of Linesink = 573.999817
Total Linesink Discharge = 0.062255 [L3/T]

Line Sink #33
x1: 9242.559570 y1: 8657.120117
x2: 9319.639648 y2: 8726.490234
Discharge per length = 0.000477
Head in Center of Linesink = 573.999817
Total Linesink Discharge = 0.049506 [L3/T]

Line Sink #34
x1: 9322.209961 y1: 8727.780273
x2: 9385.150391 y2: 8788.150391
Discharge per length = 0.000562
Head in Center of Linesink = 573.999817
Total Linesink Discharge = 0.048991 [L3/T]

Line Sink #35
x1: 9386.440430 y1: 8789.440430
x2: 9453.240234 y2: 8851.099609
Discharge per length = 0.000706
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.064136 [L3/T]

Line Sink #36
x1: 9541.230469 y1: 8919.830078
x2: 9636.290039 y2: 8921.110352
Discharge per length = 0.001134
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.107778 [L3/T]

Line Sink #37
x1: 9641.429688 y1: 8919.830078
x2: 9753.190430 y2: 8919.830078
Discharge per length = 0.000632
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.070630 [L3/T]

Line Sink #38
x1: 9857.879883 y1: 8917.900391
x2: 9896.419922 y2: 9003.959961
Discharge per length = 0.000231
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.021783 [L3/T]

Line Sink #39
x1: 9895.139648 y1: 9006.530273
x2: 9931.110352 y2: 9093.889648
Discharge per length = 0.000503
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.047522 [L3/T]

Line Sink #40
x1: 9961.299805 y1: 9176.740234
x2: 10012.679688 y2: 9252.530273
Discharge per length = 0.000755
Head in Center of Linesink = 573.999756
Total Linesink Discharge = 0.069168 [L3/T]

Line Sink #41
x1: 10013.959961 y1: 9252.530273
x2: 10070.490234 y2: 9328.320313
Discharge per length = 0.000681
Head in Center of Linesink = 573.999939

Total Linesink Discharge = 0.064424 [L3/T]
 Line Sink #42
 x1: 10128.290039 y1: 9404.110352
 x2: 10234.269531 y2: 9391.910156
 Discharge per length = 0.000506
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.053987 [L3/T]
 Line Sink #43
 x1: 10356.309570 y1: 9379.070313
 x2: 10459.080078 y2: 9379.070313
 Discharge per length = 0.001626
 Head in Center of Linesink = 574.000061
 Total Linesink Discharge = 0.167106 [L3/T]
 Line Sink #44
 x1: 10573.410156 y1: 9384.209961
 x2: 10671.040039 y2: 9381.639648
 Discharge per length = 0.001591
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.155417 [L3/T]
 Line Sink #45
 x1: 10768.030273 y1: 9375.860352
 x2: 10857.950195 y2: 9411.820313
 Discharge per length = 0.000854
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.082696 [L3/T]
 Line Sink #46
 x1: 10859.230469 y1: 9413.110352
 x2: 10954.290039 y2: 9450.360352
 Discharge per length = 0.000868
 Head in Center of Linesink = 573.999573
 Total Linesink Discharge = 0.088570 [L3/T]
 Line Sink #47
 x1: 11061.559570 y1: 9494.679688
 x2: 11160.469727 y2: 9530.650391
 Discharge per length = 0.001205
 Head in Center of Linesink = 573.999207
 Total Linesink Discharge = 0.126869 [L3/T]
 Line Sink #48
 x1: 11378.849609 y1: 9547.349609
 x2: 11468.769531 y2: 9534.500000
 Discharge per length = 0.000299
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.027129 [L3/T]
 Line Sink #49
 x1: 11471.339844 y1: 9533.219727
 x2: 11549.700195 y2: 9521.650391
 Discharge per length = 0.001361
 Head in Center of Linesink = 574.000061
 Total Linesink Discharge = 0.107811 [L3/T]
 Line Sink #50
 x1: 11554.200195 y1: 9519.730469
 x2: 11667.240234 y2: 9492.750000
 Discharge per length = 0.001316
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.152973 [L3/T]
 Line Sink #51
 x1: 11671.089844 y1: 9490.190430
 x2: 11793.129883 y2: 9459.360352
 Discharge per length = 0.001968
 Head in Center of Linesink = 573.999023
 Total Linesink Discharge = 0.247664 [L3/T]
 Line Sink #52
 x1: 11913.879883 y1: 9427.250000
 x2: 12014.080078 y2: 9400.269531
 Discharge per length = 0.001620
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.168054 [L3/T]
 Line Sink #53
 x1: 12019.200195 y1: 9398.980469
 x2: 12124.530273 y2: 9370.719727
 Discharge per length = 0.001176
 Head in Center of Linesink = 573.999878
 Total Linesink Discharge = 0.128196 [L3/T]
 Line Sink #54
 x1: 12129.690430 y1: 9369.440430
 x2: 12244.019531 y2: 9342.459961
 Discharge per length = 0.000873
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.102558 [L3/T]
 Line Sink #55
 x1: 12383.389648 y1: 9304.559570
 x2: 12605.629883 y2: 9253.179688
 Discharge per length = 0.000559
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.127434 [L3/T]
 Line Sink #56
 x1: 9702.929688 y1: 7988.310059
 x2: 9885.410156 y2: 8158.950195
 Discharge per length = 0.000292
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.073072 [L3/T]
 Line Sink #57
 x1: 10111.750000 y1: 8335.509766
 x2: 10365.330078 y2: 8463.480469
 Discharge per length = 0.000179

Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.050858 [L3/T]
 Line Sink #58
 x1: 11216.139648 y1: 8669.660156
 x2: 11607.179688 y2: 8676.769531
 Discharge per length = 0.000181
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.070704 [L3/T]
 Line Sink #59
 x1: 11891.209961 y1: 8667.299805
 x2: 12412.599609 y2: 8627.009766
 Discharge per length = 0.000358
 Head in Center of Linesink = 573.999878
 Total Linesink Discharge = 0.187392 [L3/T]
 Line Sink #60
 x1: 9805.070313 y1: 10169.500000
 x2: 9914.259766 y2: 10116.830078
 Discharge per length = 0.001210
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.146699 [L3/T]
 Line Sink #61
 x1: 10035.009766 y1: 10050.040039
 x2: 10145.490234 y2: 9997.370117
 Discharge per length = 0.000751
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.091968 [L3/T]
 Line Sink #62
 x1: 10148.059570 y1: 9996.089844
 x2: 10254.679688 y2: 9944.700195
 Discharge per length = 0.000021
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.002461 [L3/T]
 Line Sink #63
 x1: 10298.349609 y1: 10057.750000
 x2: 10320.190430 y2: 10156.660156
 Discharge per length = 0.000567
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.057412 [L3/T]
 Line Sink #64
 x1: 10342.030273 y1: 10256.860352
 x2: 10320.190430 y2: 10157.950195
 Discharge per length = 0.002018
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.204447 [L3/T]
 Line Sink #65
 x1: 10257.250000 y1: 9940.849609
 x2: 10336.889648 y2: 9902.309570
 Discharge per length = -0.001226
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.108448 [L3/T]
 Line Sink #66
 x1: 10458.290039 y1: 9836.150391
 x2: 10571.330078 y2: 9783.490234
 Discharge per length = -0.004941
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.616176 [L3/T]
 Line Sink #67
 x1: 10681.169922 y1: 9749.440430
 x2: 10792.929688 y2: 9721.179688
 Discharge per length = -0.002871
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.330957 [L3/T]
 Line Sink #68
 x1: 10906.580078 y1: 9692.280273
 x2: 11014.490234 y2: 9664.019531
 Discharge per length = -0.004285
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.478008 [L3/T]
 Line Sink #69
 x1: 11017.059570 y1: 9661.450195
 x2: 11126.250000 y2: 9635.759766
 Discharge per length = -0.004671
 Head in Center of Linesink = 579.000122
 Total Linesink Discharge = -0.523903 [L3/T]
 Line Sink #70
 x1: 11130.099609 y1: 9633.190430
 x2: 11240.580078 y2: 9604.929688
 Discharge per length = -0.005662
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.645721 [L3/T]
 Line Sink #71
 x1: 11502.000000 y1: 9540.059570
 x2: 11527.690430 y2: 9636.400391
 Discharge per length = -0.002145
 Head in Center of Linesink = 577.000061
 Total Linesink Discharge = -0.213904 [L3/T]
 Line Sink #72
 x1: 11526.410156 y1: 9640.250000
 x2: 11549.530273 y2: 9735.309570
 Discharge per length = -0.000573
 Head in Center of Linesink = 577.000000
 Total Linesink Discharge = -0.056041 [L3/T]
 Line Sink #73
 x1: 11551.839844 y1: 9737.879883
 x2: 11577.530273 y2: 9841.929688

Discharge per length = 0.000180
 Head in Center of Linesink = 576.999695
 Total Linesink Discharge = 0.019261 [L3/T]
 Line Sink #74
 x1: 11577.139648 y1: 9846.429688
 x2: 11606.690430 y2: 9962.040039
 Discharge per length = 0.002189
 Head in Center of Linesink = 576.999756
 Total Linesink Discharge = 0.261167 [L3/T]
 Line Sink #75
 x1: 11586.139648 y1: 10396.240234
 x2: 11710.740234 y2: 10365.410156
 Discharge per length = 0.001056
 Head in Center of Linesink = 574.999878
 Total Linesink Discharge = 0.135493 [L3/T]
 Line Sink #76
 x1: 10057.320313 y1: 9484.559570
 x2: 10079.889648 y2: 9511.780273
 Discharge per length = 0.002562
 Head in Center of Linesink = 574.999939
 Total Linesink Discharge = 0.090600 [L3/T]
 Line Sink #77
 x1: 10081.219727 y1: 9513.389648
 x2: 10133.120117 y2: 9582.179688
 Discharge per length = 0.001536
 Head in Center of Linesink = 574.999756
 Total Linesink Discharge = 0.132372 [L3/T]
 Line Sink #78
 x1: 10133.769531 y1: 9582.299805
 x2: 10188.200195 y2: 9648.139648
 Discharge per length = 0.001743
 Head in Center of Linesink = 574.999878
 Total Linesink Discharge = 0.148897 [L3/T]
 Line Sink #79
 x1: 10189.080078 y1: 9648.160156
 x2: 10240.870117 y2: 9714.870117
 Discharge per length = 0.002053
 Head in Center of Linesink = 574.999573
 Total Linesink Discharge = 0.173400 [L3/T]
 Line Sink #80
 x1: 10242.179688 y1: 9717.219727
 x2: 10293.969727 y2: 9782.179688
 Discharge per length = 0.002193
 Head in Center of Linesink = 574.999695
 Total Linesink Discharge = 0.182211 [L3/T]
 Line Sink #81
 x1: 10293.089844 y1: 9782.019531
 x2: 10332.589844 y2: 9832.059570
 Discharge per length = 0.002281
 Head in Center of Linesink = 575.000000
 Total Linesink Discharge = 0.145446 [L3/T]
 Line Sink #82
 x1: 10330.839844 y1: 9832.940430
 x2: 10369.459961 y2: 9880.339844
 Discharge per length = 0.005961
 Head in Center of Linesink = 575.000000
 Total Linesink Discharge = 0.364458 [L3/T]
 Line Sink #83
 x1: 10434.700195 y1: 9874.629883
 x2: 10543.549805 y2: 9821.080078
 Discharge per length = 0.006823
 Head in Center of Linesink = 574.999329
 Total Linesink Discharge = 0.827650 [L3/T]
 Line Sink #84
 x1: 10543.549805 y1: 9820.349609
 x2: 10648.009766 y2: 9794.019531
 Discharge per length = 0.005711
 Head in Center of Linesink = 574.999634
 Total Linesink Discharge = 0.615274 [L3/T]
 Line Sink #85
 x1: 10650.790039 y1: 9792.110352
 x2: 10758.759766 y2: 9764.900391
 Discharge per length = 0.005079
 Head in Center of Linesink = 574.999634
 Total Linesink Discharge = 0.565486 [L3/T]
 Line Sink #86
 x1: 10760.959961 y1: 9764.459961
 x2: 10867.169922 y2: 9738.129883
 Discharge per length = 0.004941
 Head in Center of Linesink = 574.998657
 Total Linesink Discharge = 0.540721 [L3/T]
 Line Sink #87
 x1: 10869.799805 y1: 9737.250000
 x2: 10987.429688 y2: 9706.530273
 Discharge per length = 0.004875
 Head in Center of Linesink = 574.999756
 Total Linesink Discharge = 0.592666 [L3/T]
 Line Sink #88
 x1: 10990.070313 y1: 9705.650391
 x2: 11095.400391 y2: 9679.309570
 Discharge per length = 0.004879
 Head in Center of Linesink = 574.999939
 Total Linesink Discharge = 0.529680 [L3/T]
 Line Sink #89
 x1: 11096.719727 y1: 9677.849609

x2: 11191.519531 y2: 9655.900391
 Discharge per length = 0.005101
 Head in Center of Linesink = 574.999634
 Total Linesink Discharge = 0.496325 [L3/T]
 Line Sink #90
 x1: 11192.400391 y1: 9656.059570
 x2: 11283.690430 y2: 9634.110352
 Discharge per length = 0.003436
 Head in Center of Linesink = 574.999756
 Total Linesink Discharge = 0.322653 [L3/T]
 Line Sink #91
 x1: 11284.129883 y1: 9633.669922
 x2: 11381.559570 y2: 9610.849609
 Discharge per length = 0.001171
 Head in Center of Linesink = 575.000061
 Total Linesink Discharge = 0.117175 [L3/T]
 Line Sink #92
 x1: 11383.320313 y1: 9609.089844
 x2: 11479.879883 y2: 9588.030273
 Discharge per length = 0.000818
 Head in Center of Linesink = 575.000000
 Total Linesink Discharge = 0.080840 [L3/T]
 Line Sink #93
 x1: 11484.259766 y1: 9591.540039
 x2: 11503.580078 y2: 9674.049805
 Discharge per length = 0.002669
 Head in Center of Linesink = 574.999878
 Total Linesink Discharge = 0.226175 [L3/T]
 Line Sink #94
 x1: 11503.139648 y1: 9674.490234
 x2: 11526.839844 y2: 9773.679688
 Discharge per length = 0.003392
 Head in Center of Linesink = 574.999878
 Total Linesink Discharge = 0.345897 [L3/T]
 Line Sink #95
 x1: 11527.719727 y1: 9775.429688
 x2: 11552.299805 y2: 9874.629883
 Discharge per length = 0.003480
 Head in Center of Linesink = 575.000000
 Total Linesink Discharge = 0.355622 [L3/T]

Number of Ponds = 10

Pond #1
 Center of Pond -- x: 9863.690430 y: 9771.030273
 Radius = 357.489990
 Infiltration Rate = 0.000002
 Head at Center of Pond = 580.826355
 Total Pond Flux = 0.987672 [L3/T]
 Pond #2
 Center of Pond -- x: 10779.519531 y: 10159.440430
 Radius = 330.489990
 Infiltration Rate = 0.000003
 Head at Center of Pond = 581.766479
 Total Pond Flux = 0.936762 [L3/T]
 Pond #3
 Center of Pond -- x: 11295.660156 y: 9892.900391
 Radius = 240.630005
 Infiltration Rate = 0.000005
 Head at Center of Pond = 580.639282
 Total Pond Flux = 0.993212 [L3/T]
 Pond #4
 Center of Pond -- x: 9461.429688 y: 9236.889648
 Radius = 292.000000
 Infiltration Rate = 0.000002
 Head at Center of Pond = 580.704590
 Total Pond Flux = 0.658947 [L3/T]
 Pond #5
 Center of Pond -- x: 10127.879883 y: 10456.309570
 Radius = 196.600006
 Infiltration Rate = 0.000003
 Head at Center of Pond = 581.789063
 Total Pond Flux = 0.331497 [L3/T]
 Pond #6
 Center of Pond -- x: 11860.480469 y: 9758.450195
 Radius = 254.770004
 Infiltration Rate = 0.000011
 Head at Center of Pond = 583.122742
 Total Pond Flux = 2.222660 [L3/T]
 Pond #7
 Center of Pond -- x: 10427.480469 y: 9572.870117
 Radius = 70.000000
 Infiltration Rate = 0.000055
 Head at Center of Pond = 582.123901
 Total Pond Flux = 0.840502 [L3/T]
 Pond #8
 Center of Pond -- x: 10600.910156 y: 9607.610352
 Radius = 70.000000
 Infiltration Rate = 0.000041
 Head at Center of Pond = 582.063354
 Total Pond Flux = 0.629607 [L3/T]
 Pond #9
 Center of Pond -- x: 10761.839844 y: 9620.469727
 Radius = 40.000000

Infiltration Rate = 0.000041
 Head at Center of Pond = 580.373901
 Total Pond Flux = 0.206088 [L3/T]
 Pond #10
 Center of Pond -- x: 11421.280273 y: 9700.990234
 Radius = 64.430000
 Infiltration Rate = 0.000027
 Head at Center of Pond = 578.738953
 Total Pond Flux = 0.356032 [L3/T]

Number of Wells = 0

Reference Head = 582.000000 Defined at -- x: 10200.940430 y: 10653.509766

Calibration Targets

Target Head	Computed Head	Residual	Well Name
576.21	577.34	-1.1339	RFI-17
578.01	578.39	-0.3810	RFI-42
580.29	579.85	0.4383	RFI-43
581.32	581.57	-0.2517	RFI-33
581.18	582.17	-0.9922	PS-11
580.86	580.41	0.4527	PS-12
581.22	575.64	5.5765	RFI-32
582.32	576.43	5.8856	PS-13
581.05	580.65	0.3958	R-15
582.55	579.62	2.9290	RFI-36
580.27	578.86	1.4119	RFIPZ23
581.64	578.54	3.0977	RFI-51
579.29	578.78	0.5078	RFIPZ22
580.54	578.13	2.4123	R-11
580.23	578.87	1.3627	RFIPZ16
573.69	576.05	-2.3638	RFIPZ27
576.79	575.88	0.9057	RFIPZ18
575.54	575.03	0.5056	R-13
580.83	575.51	5.3223	R-08
576.77	575.40	1.3694	R-09
573.84	575.02	-1.1754	RFIPZ17
575.66	574.58	1.0762	RFIPZ21
573.61	574.05	-0.4423	RFIPZ19
573.50	574.05	-0.5455	RFIPZ20
582.05	582.01	0.0429	RFI-20
582.63	582.04	0.5860	PS-05
581.60	580.14	1.4571	PS-06
582.09	580.86	1.2273	PS-04
580.73	580.56	0.1722	RFI-31
580.19	579.34	0.8546	RFI-30
581.27	579.10	2.1719	RFIPZ26
580.81	578.26	2.5548	RFIPZ25
579.99	577.76	2.2281	RFI-29
579.92	576.18	3.7390	RFI-18
582.23	576.06	6.1749	PS-08
581.36	579.28	2.0827	RFIPZ24
580.20	576.72	3.4758	RFI-35
581.62	580.32	1.2998	PS-07
581.11	581.12	-0.0130	RFI-27
581.62	580.24	1.3775	PS-09
579.92	577.69	2.2268	RFI-28
573.68	574.04	-0.3566	RFI-34
573.55	574.04	-0.4871	RFI-45
582.42	581.03	1.3859	RFI-37

Number of Targets = 44
 Residual Mean = 1.331010
 Residual Standard Deviation = 1.901700
 Residual Sum of Squares = 237.074219
 Absolute Residual Mean = 1.701126
 Minimum Residual = -2.363824
 Maximum Residual = 6.174940
 Observed Range in Head = 9.130000
 Resid. Std./Range in Head = 0.208291

Aquifer Properties

.... Steady-State Flow Model

Permeability..... = 0.007820 [L/T]
 Porosity..... = 0.100000
 Elevation of Aquifer Top.... = 585.000000
 Elevation of Aquifer Bottom.. = 572.800000
 Uniform Regional Gradient... = 0.000000

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Number of nodes in the X-direction = 100
Number of nodes in the Y-direction = 105

Maximum X Coordinate = 11901.302297
Maximum Y Coordinate = 10901.187749

CONTOUR GRID - - - -

Row	1	2	3	4	5
575.	562398	575.542470	575.518005	575.489579	575.457716
575.	422906	575.385619	575.346309	575.305418	575.263366
575.	220543	575.177286	575.133863	575.090445	575.047088
575.	003710	574.960096	574.915902	574.870691	574.824008
574.	775481	574.724987	574.672858	574.620133	574.568845
574.	522341	574.485684	574.466242	574.474492	574.523517
574.	617183	574.730094	574.835946	574.927743	575.006276
575.	073999	575.133704	575.188275	575.240469	575.292503
575.	345712	575.400549	575.456836	575.514057	575.571563
575.	628691	575.684829	575.739460	575.792183	575.842728
575.	890955	575.936839	575.980450	576.021931	576.061467
576.	099269	576.135548	576.170503	576.204310	576.237155
576.	269028	576.300131	576.330471	576.360076	576.388953
576.	417101	576.444512	576.471183	576.497117	576.522325
576.	546835	576.570687	576.593398	576.616654	576.638916
576.	660813	576.682437	576.703882	576.725241	576.746602
576.	768043	576.789632	576.811427	576.833474	576.855807
576.	878451	576.901422	576.924734	576.948399	576.972433
576.	996859	577.021712	577.047042	577.072919	577.099430
577.	126686	577.154815	577.183964	577.214293	577.245973

Row 2				
575.415137	575.408164	575.395022	575.376679	575.353930
575.327454	575.297848	575.265655	575.231371	575.195447
575.158287	575.120238	575.081574	575.042487	575.003077
574.963333	574.923161	574.882580	574.841776	574.798162
574.754474	574.709906	574.665064	574.621159	574.580206
574.545226	574.504362	574.511308	574.524203	574.564172
574.629547	574.720870	574.788484	574.861394	574.925315
574.980689	575.029346	575.074218	575.118743	575.165822
575.216877	575.271894	575.330045	575.390224	575.451307
575.512264	575.572204	575.630400	575.686310	575.739586
575.790068	575.837752	575.882762	575.925308	575.965506
576.004073	576.040854	576.076247	576.110649	576.143694
576.176048	576.207613	576.238431	576.268515	576.297856
576.326432	576.354216	576.381189	576.407338	576.432668
576.457202	576.480979	576.504062	576.526527	576.548468
576.569988	576.591195	576.612202	576.633116	576.654038
576.675058	576.696252	576.717682	576.739392	576.761414
576.783764	576.806450	576.829472	576.852830	576.876526
576.900570	576.924989	576.949828	576.975153	577.001059
577.027666	577.055119	577.083590	577.113265	577.144347

Row 3				
575.265298	575.271688	575.270171	575.262129	575.248639
575.230581	575.208695	575.183621	575.155921	575.126093
575.094570	575.061722	575.027848	574.993173	574.957844
574.921931	574.885436	574.848323	574.810547	574.772121
574.733193	574.694145	574.655718	574.619134	574.586220
574.559497	574.524182	574.537981	574.500397	574.481163
574.628122	574.684837	574.743592	574.798657	574.847036
574.887904	574.922338	574.933648	574.987147	575.027548
575.076337	575.132381	575.193671	575.258214	575.324265
575.390346	575.455226	575.517928	575.577750	575.634267
575.687318	575.736959	575.783403	575.826966	575.868020
575.906948	575.944116	575.979851	576.014421	576.048034
576.080828	576.112886	576.144237	576.174871	576.204753
576.233833	576.262006	576.293388	576.315790	576.341257
576.365806	576.389479	576.412343	576.434489	576.456026
576.477076	576.497771	576.518243	576.538620	576.559021

Row	5	6	7	8	9
574.	961956	574.995426	575.017483	575.030283	575.035459
575.	034295	575.027825	575.016903	575.002252	574.984483
574.	964123	574.941618	574.917341	574.891603	574.864654
574.	836696	574.807899	574.778424	574.748455	574.718239
574.	688135	574.658667	574.630578	574.604870	574.582817
574.	565926	574.555807	574.553913	574.561124	574.577237
574.	600603	574.628224	574.656349	574.681154	574.699082
574.	706735	574.700732	574.680459	574.666776	574.688499
574.	738117	574.804232	574.879936	574.960827	575.043768
575.	126282	575.206307	575.282206	575.352875	575.417805
575.	477010	575.530882	575.580028	575.625160	575.667014
575.	706296	575.743643	575.779590	575.814549	575.848803
575.	882511	575.915729	575.948423	575.980504	576.011844
576.	042301	576.071739	576.100042	576.127127	576.152951
576.	177515	576.200867	576.223095	576.244328	576.264725
576.	284467	576.303749	576.322768	576.341712	576.360750
576.	380028	576.399556	576.419714	576.440243	576.461252
576.	482718	576.504591	576.526804	576.549280	576.571943
576.	594728	576.617600	576.640555	576.666339	576.689652
576.	710652	576.734957	576.760137	576.786508	576.814419

Row	6				
574.810078	574.857019	574.890848	574.914046	574.928515	
574.935739	574.936899	574.932963	574.924736	574.912900	
574.898035	574.880635	574.861119	574.839842	574.817101	
574.793156	574.768238	574.742576	574.716419	574.690076	
574.663941	574.638538	574.614549	574.592824	574.574376	
574.560314	574.551722	574.549452	574.553841	574.564423	
574.579753	574.597457	574.614497	574.627437	574.632439	
574.624677	574.596318	574.527421	574.435811	574.460314	
574.522511	574.603139	574.639397	574.789211	574.886204	
574.981818	575.073497	575.159107	575.237274	575.307553	

575.370270 575.426211 575.476364 575.521770 575.563448
575.602345 575.639296 575.674983 575.709912 575.744408
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576.080545 576.103664 576.125441 576.146030 576.165630
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576.486649 576.508961 576.531164 576.553283 576.575414
576.597729 576.620477 576.643978 576.668615 576.694812

Row 7

574.658586 574.719099 574.764699 574.798233 574.821921
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574.550216 574.542495 574.539551 574.541412 574.547499
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574.256550 574.364056 574.478547 574.595900 574.713025
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576.265262 576.286850 576.308823 576.331004 576.353206
576.375260 576.397030 576.418437 576.439475 576.460231
576.480888 576.501732 576.523146 576.545595 576.569604

Row 8

574.507292 574.582054 574.639452 574.683240 574.716069
574.739827 574.755979 574.765717 574.770035 574.769768
574.765621 574.758193 574.747996 574.735473 574.721007
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576.260418 576.281705 576.302295 576.322139 576.341301
576.359976 576.378491 576.397307 576.416994 576.438209

Row 9

574.356587 574.446515 574.515405 574.569359 574.611302
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Row 10

574.213630 574.312965 574.392402 574.456727 574.507935
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576.019832 576.040609 576.059686 576.076849 576.092072
576.105546 576.117695 576.129186 576.140909 576.153929

Row 11

574.076835 574.177192 574.269394 574.345443 574.406343
574.454565 574.492356 574.521530 574.543537 574.559532
574.570447 574.577051 574.579992 574.579825 574.577028
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575.972035 575.979849 575.986183 575.992161 575.999174

Row 12

574.474641 574.032356 574.145620 574.236172 574.307106
574.363389 574.408018 574.443213 574.470683 574.491706
574.507284 574.518239 574.525262 574.528935 574.529761
574.528184 574.524602 574.519385 574.512885 574.505442
574.497393 574.489068 574.480787 574.472842 574.465481
574.458880 574.453110 574.448113 574.443669 574.439385
574.434689 574.428852 574.421023 574.410299 574.395840
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574.243118 574.224844 574.217474 574.225312 574.253882
574.311672 574.411247 574.535782 574.639394 574.718347
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575.519346 575.523115 575.526861 575.531646 575.538318
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575.764003 575.785718 575.804017 575.818363 575.828516
575.834572 575.837016 575.836778 575.835277 575.834364

Row 13

574.921126 574.461776 574.022909 574.130987 574.210902
574.275050 574.326081 574.366909 574.399571 574.425393
574.445425 574.460543 574.471476 574.478833 574.483132
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574.467427 574.461113 574.454577 574.448085 574.441861
574.436061 574.430750 574.425885 574.421292 574.416662
574.411556 574.405428 574.397666 574.387662 574.374914
574.359160 574.340551 574.319813 574.298345 574.278193
574.261904 574.252370 574.252737 574.266463 574.297414
574.349522 574.423458 574.508387 574.587058 574.651490
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575.630250 575.653530 575.672104 575.685193 575.692386
575.693658 575.689436 575.680750 575.669366 575.657796

Row 14

575.295270 574.923768 574.459432 574.027264 574.118120
574.190460 574.246814 574.292762 574.330399 574.360796
574.385053 574.404132 574.418800 574.429680 574.437301
574.442125 574.444557 574.444963 574.443681 574.441028
574.437313 574.432837 574.427881 574.422705 574.417524
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574.388890 574.382956 574.375750 574.366882 574.356081
574.343293 574.328801 574.313319 574.298038 574.284610

574.275053	574.271636	574.276772	574.292894	574.322193	574.286288	574.283632	574.281584	574.280651	574.281433
574.365809	574.421923	574.483983	574.543216	574.593387	574.284573	574.290676	574.300216	574.313410	574.330093
574.631523	574.656110	574.665588	574.657299	574.626707	574.349596	574.370692	574.391659	574.410451	574.424905
574.575996	574.548241	574.557419	574.590363	574.638832	574.432876	574.432257	574.420949	574.439678	574.359255
574.697870	574.764037	574.834510	574.906512	574.977018	574.309427	574.253300	574.198627	574.151677	574.116662
575.042922	575.101686	575.151874	575.193074	575.225470	574.096773	574.095130	574.115652	574.164609	574.362305
575.249478	575.265576	575.274296	575.276337	575.272756	574.558548	574.673722	574.750032	574.802541	574.837120
575.265169	575.255753	575.246899	575.240677	575.238506	574.856303	574.860825	574.849987	574.821419	574.770127
575.241164	575.248964	575.261931	575.279910	575.302613	574.687778	574.582515	574.496320	574.437047	574.399458
575.329602	575.360223	575.393490	575.427968	575.461757	574.379884	574.376021	574.386344	574.409843	574.445943
575.492698	575.518770	575.538397	575.550526	575.554543	574.494545	574.556174	574.632217	574.724644	574.829340
575.550209	575.537748	575.518120	575.493432	575.467155	574.920688	574.982927	575.019418	575.033679	575.026592
					574.996504	574.938579	574.842416	574.686140	574.450236

Row 15

575.624570	575.307403	574.935154	574.470843	574.031047
574.111994	574.169617	574.220716	574.263404	574.298110
574.326318	574.349155	574.367386	574.381628	574.392420
574.400228	574.405453	574.408453	574.409549	574.409047
574.407245	574.404436	574.400902	574.396906	574.392670
574.388368	574.384101	574.379892	574.375678	574.371310
574.366565	574.361172	574.354851	574.347364	574.338588
574.328588	574.317694	574.306558	574.296178	574.287874
574.283214	574.283917	574.291713	574.308158	574.334298
574.370056	574.413399	574.460043	574.504626	574.542502
574.570368	574.585642	574.585346	574.564377	574.510489
574.362164	574.296051	574.311789	574.355979	574.417912
574.491744	574.573663	574.660655	574.749591	574.836449
574.916448	574.985722	575.042722	575.087685	575.121472
575.144925	575.158689	575.163253	575.159161	575.147390
575.129887	575.109842	575.091018	575.076490	575.068031
575.066355	575.071580	575.083550	575.101991	575.126561
575.156826	575.192153	575.231495	575.273081	575.314222
575.351633	575.382296	575.404094	575.415759	575.416507
575.405778	575.383280	575.349454	575.306444	575.259105

Row 16

575.922987	575.644876	575.329673	574.960894	574.506968
574.029634	574.090956	574.151070	574.199130	574.237489
574.269298	574.295729	574.317372	574.334823	574.348638
574.359292	574.367182	574.372644	574.375979	574.377475
574.377418	574.376103	574.373824	574.370860	574.367459
574.363822	574.360087	574.356321	574.352519	574.348601
574.344427	574.339819	574.334597	574.328626	574.321868
574.314442	574.306675	574.299135	574.292637	574.288219
574.287074	574.290453	574.299538	574.315242	574.337944
574.367108	574.400952	574.436456	574.469945	574.497869
574.517152	574.524942	574.517885	574.490859	574.434726
574.338785	574.224175	574.121749	574.060723	574.147732
574.245920	574.351872	574.463129	574.576974	574.688412
574.789115	574.872302	574.937189	574.985987	575.020910
575.043446	575.054392	575.054036	575.042411	575.019875
574.988359	574.952761	574.919724	574.894058	574.877678
574.870838	574.873192	574.884260	574.903589	574.930787
574.965498	575.007273	575.055251	575.107492	575.160134
575.207742	575.245560	575.270980	575.282870	575.280472
575.262809	575.228553	575.176542	575.107670	575.028446

Row 17

576.198639	575.950786	575.675610	575.363539	574.997949
574.538143	574.011151	574.087185	574.138719	574.178650
574.213937	574.243981	574.268904	574.289396	574.306089
574.319467	574.329910	574.337725	574.343176	574.346523
574.348040	574.348032	574.346820	574.344718	574.342014
574.338949	574.335705	574.332401	574.329088	574.325747
574.322307	574.318655	574.314675	574.310289	574.305499
574.300435	574.295390	574.290837	574.287426	574.285957
574.287313	574.292380	574.301923	574.316431	574.335920
574.359721	574.386346	574.413552	574.438644	574.458853
574.471537	574.474095	574.463642	574.436643	574.389261
574.321210	574.242430	574.166828	574.102162	574.051790
574.017835	574.080046	574.228872	574.380570	574.531797
574.665350	574.765889	574.838399	574.890185	574.925544
574.946677	574.954447	574.948721	574.928509	574.892333
574.840339	574.780193	574.726049	574.685540	574.659428
574.646611	574.645894	574.656313	574.677170	574.708018
574.748644	574.799018	574.859019	574.927356	574.998713
575.062674	575.111040	575.141616	575.154470	575.149354
575.124862	575.078008	575.003989	574.897994	574.765951

Row 18

576.456761	576.233622	575.989103	575.716725	575.406183
575.039048	574.579822	574.041463	574.080487	574.119707
574.160259	574.194178	574.222134	574.245460	574.264891
574.280890	574.293807	574.303900	574.311370	574.316428
574.319335	574.320420	574.320053	574.318607	574.316424
574.313798	574.310964	574.308096	574.305300	574.302617
574.300025	574.297453	574.294817	574.292056	574.289177

Row 19

576.700983	576.498891	576.279416	576.037841	575.767319
575.457418	575.091441	574.638622	573.990975	574.059439
574.109766	574.146885	574.177126	574.203072	574.225134
574.243678	574.259040	574.271397	574.280834	574.287474
574.291561	574.293477	574.293679	574.292627	574.290742
574.288379	574.285827	574.283320	574.281027	574.279042
574.277384	574.275998	574.274797	574.273703	574.272692
574.271832	574.271302	574.271389	574.272474	574.275003
574.279432	574.286163	574.295471	574.307413	574.321740
574.373838	574.354704	574.370993	574.385133	574.395449
574.400279	574.398054	574.387399	574.367380	574.338056
574.301254	574.260860	574.221889	574.189106	574.166466
574.157377	574.165294	574.194612	574.252674	574.355885
574.497823	574.602607	574.674835	574.724731	574.757028
574.773785	574.775383	574.760666	574.726334	574.664617
574.551727	574.326100	574.201445	574.121157	574.069826
574.042036	574.034876	574.046384	574.075091	574.119974
574.180631	574.257709	574.353925	574.477463	574.655689
574.793082	574.867450	574.908298	574.923682	574.915599
574.882456	574.818589	574.710503	574.520010	574.097380

Row 20

576.933923	576.750359	576.552315	576.336162	576.096932
575.827558	575.517291	575.146611	574.670662	574.008912
574.067686	574.102079	574.133489	574.162258	574.186880
574.207903	574.225760	574.240480	574.251916	574.260023
574.265031	574.267432	574.267841	574.266856	574.264989
574.262659	574.260211	574.257939	574.256086	574.254811
574.254163	574.254077	574.254422	574.255061	574.255911
574.256981	574.258384	574.260327	574.263095	574.267012
574.272397	574.279513	574.288506	574.299340	574.311747
574.325183	574.338835	574.351651	574.362421	574.369872
574.372765	574.369998	574.360745	574.344674	574.322280
574.295207	574.266276	574.239035	574.217124	574.203899
574.202444	574.215819	574.247426	574.301221	574.379366
574.470334	574.550950	574.612885	574.657269	574.685997
574.700068	574.699421	574.682775	574.647110	574.586430
574.490616	574.366176	574.258103	574.177777	574.121180
574.085312	574.068362	574.069128	574.086760	574.120720
574.170936	574.238172	574.324811	574.436557	574.577790
574.697308	574.770542	574.811514	574.827001	574.818933
574.786025	574.723585	574.621702	574.462465	574.242253

Row 21

577.157511	576.990688	576.811624	576.617393	576.404111
576.166435	575.896567	575.582020	575.201287	574.713560
574.051701	574.052392	574.090635	574.123383	574.150136
574.173513	574.194072	574.211478	574.225105	574.234577
574.240136	574.242530	574.242660	574.241326	574.239140
574.236566	574.233985	574.231755	574.230224	574.229646
574.230100	574.231472	574.233527	574.236018	574.238770
574.241721	574.244922	574.248520	574.252727	574.257780
574.263906	574.271273	574.279950	574.289857	574.300733
574.312119	574.323358	574.333632	574.342019	574.347567
574.349385	574.346738	574.339174	574.326690	574.309920
574.290265	574.269870	574.251373	574.237567	574.231153
574.234640	574.250344	574.280302	574.325687	574.384806
574.450262	574.511526	574.561954	574.599513	574.624001
574.635418	574.633353	574.616719	574.583577	574.531315
574.458918	574.374149	574.293699	574.228044	574.179590
574.148126	574.132986	574.133509	574.149128	574.179427
574.224226	574.283695	574.358317	574.447767	574.545195
574.631490	574.693296	574.730330	574.744818	

574.204864	574.207947	574.211976	574.216518	574.221271	574.098649	574.091946	574.077214	574.064089	574.065100
574.226101	574.231015	574.236123	574.241591	574.247604	574.080200	574.100435	574.119789	574.136597	574.150977
574.254331	574.261884	574.270288	574.279450	574.289337	574.163439	574.174473	574.184469	574.193729	574.202476
574.298968	574.308422	574.316870	574.323616	574.327966	574.210867	574.218994	574.226890	574.234525	574.241816
574.329296	574.327142	574.321298	574.311931	574.299668	574.248629	574.254797	574.260131	574.264452	574.267607
574.285729	574.271739	574.259720	574.251814	574.250111	574.269509	574.270160	574.269680	574.268327	574.266505
574.256511	574.272589	574.299356	574.336699	574.382458	574.264750	574.263708	574.264080	574.266557	574.271745
574.431896	574.479079	574.519351	574.550175	574.570412	574.280080	574.291739	574.306567	574.324021	574.343175
574.579453	574.576719	574.561449	574.532754	574.490164	574.362798	574.381509	574.397955	574.410964	574.419618
574.435180	574.373306	574.313029	574.261307	574.221660	574.423292	574.421653	574.414682	574.402721	574.386528
574.195351	574.182635	574.183365	574.197228	574.223855	574.367310	574.346665	574.326419	574.308374	574.294098
574.262851	574.313727	574.375516	574.445648	574.517938	574.284789	574.281242	574.283865	574.292720	574.307537
574.582767	574.632383	574.663855	574.676806	574.671191	574.327725	574.352343	574.380080	574.409260	574.437939
574.646509	574.601836	574.536705	574.453610	574.361984	574.464109	574.485959	574.502109	574.511727	574.514566
					574.510992	574.502036	574.489487	574.475932	574.464642

Row 23

577.581994	577.445103	577.299351	577.142653	576.972318
576.784807	576.575339	576.337251	576.060826	575.730619
575.318228	574.763950	574.039514	574.052441	574.078041
574.107233	574.135091	574.161242	574.181475	574.193135
574.197376	574.197021	574.194380	574.190748	574.186792
574.182821	574.179018	574.175840	574.174157	574.174811
574.178013	574.183249	574.189684	574.196583	574.203497
574.210239	574.216810	574.223314	574.229909	574.236755
574.243991	574.251701	574.259894	574.268480	574.277264
574.285938	574.294096	574.301260	574.306914	574.310562
574.311785	574.310308	574.306080	574.299346	574.290707
574.281138	574.271950	574.264686	574.260978	574.262399
574.270315	574.285728	574.309032	574.339667	574.375756
574.414105	574.450934	574.482939	574.507838	574.524251
574.531332	574.528484	574.515248	574.491417	574.457473
574.415324	574.368841	574.323167	574.282989	574.251454
574.230257	574.220143	574.221308	574.233625	574.256745
574.290100	574.332786	574.383223	574.438567	574.494186
574.544285	574.583867	574.610021	574.621512	574.617879
574.598956	574.564959	574.517184	574.459332	574.398725

Row 24

577.784732	577.661607	577.531016	577.391157	577.239722
577.073714	576.889178	576.680760	576.440959	576.158651
575.816115	575.382305	574.786038	573.985576	574.041538
574.073955	574.105750	574.142005	574.168828	574.180286
574.180691	574.176393	574.170874	574.165238	574.159937
574.154996	574.150028	574.145342	574.142609	574.143679
574.148920	574.157124	574.166661	574.176354	574.185628
574.194323	574.202494	574.210294	574.217899	574.225476
574.233155	574.241012	574.249056	574.257214	574.265328
574.273159	574.280396	574.286680	574.291639	574.294927
574.296273	574.295534	574.292753	574.288201	574.282416
574.276203	574.270596	574.266781	574.265992	574.269388
574.277922	574.292193	574.312273	574.337505	574.363387
574.396665	574.425745	574.451222	574.471216	574.484423
574.489987	574.487379	574.476358	574.457074	574.430323
574.397856	574.362483	574.327654	574.296665	574.272060
574.255488	574.247855	574.249532	574.260503	574.280438
574.308690	574.344200	574.385295	574.429455	574.473255
574.512818	574.544695	574.566502	574.576935	574.575485
574.562245	574.538002	574.504655	574.465793	574.426982

Row 25

577.981943	577.872028	577.755942	577.632124	577.498577
577.352735	577.191253	577.009710	576.802108	576.560024
576.271036	575.915288	575.455772	574.810390	574.027083
574.035651	574.068623	574.131029	574.169578	574.176337
574.167113	574.156119	574.147006	574.138900	574.132145
574.126688	574.120376	574.112561	574.106967	574.108168
574.116696	574.129423	574.143138	574.156157	574.167972
574.178614	574.188298	574.197275	574.205774	574.213986
574.222050	574.230048	574.237997	574.245847	574.253478
574.260708	574.267306	574.273009	574.277553	574.280705
574.282300	574.282286	574.280755	574.277980	574.274430
574.270765	574.267800	574.266449	574.267636	574.272204
574.280801	574.293768	574.311017	574.331930	574.355324
574.379556	574.402761	574.423148	574.439223	574.449865
574.454316	574.452145	574.443252	574.427937	574.407031
574.382009	574.354970	574.328374	574.304627	574.285732
574.273126	574.267699	574.269877	574.279697	574.298858
574.320713	574.350220	574.383848	574.419514	574.454651
574.486513	574.512625	574.531146	574.540982	574.541735
574.533671	574.517794	574.496058	574.471576	574.448595

Row 26

578.173989	578.076839	577.974757	577.866393	577.750025
577.623438	577.483781	577.327337	577.149200	576.942743
576.698717	576.403502	575.635449	575.556404	574.877092
573.906707	574.005576	574.143459	574.198126	574.184532
574.153095	574.133461	574.122201	574.110842	574.102259

Row 27

578.361075	578.276317	578.187833	578.094476	577.994764
577.886798	577.768132	577.635616	577.485164	577.311422
577.107246	576.862792	576.563769	576.187231	575.687426
574.938286	573.941694	574.225253	574.283457	574.202461
574.123829	574.103430	574.099003	574.079672	574.065623
574.072987	574.071737	574.039775	574.005801	574.007468
574.038860	574.071796	574.098064	574.118596	574.135201
574.149154	574.161268	574.172074	574.181937	574.191108
574.199760	574.207997	574.215864	574.223353	574.230410
574.236942	574.242831	574.247946	574.252169	574.255408
574.257626	574.258859	574.259240	574.259003	574.258492
574.258146	574.258473	574.260014	574.263285	574.268720
574.276609	574.287032	574.299811	574.314487	574.330329
574.346400	574.361655	574.375063	574.385707	574.392859
574.396020	574.394942	574.389653	574.380482	574.368084
574.353433	574.337766	574.322468	574.308920	574.298348
574.291729	574.289738	574.292739	574.300796	574.313679
574.330871	574.351569	574.374686	574.398897	574.422717
574.444653	574.463372	574.477857	574.487515	574.492235
574.492428	574.489062	574.483691	574.478431	574.475827

Row 28

578.543276	578.470571	578.395337	578.316615	578.233156
578.143341	578.045082	577.935689	577.811716	577.668736
577.501054	577.301243	577.059342	576.761135	576.384343
575.892539	575.223014	574.460148	574.473430	574.199111
574.027896	574.066335	574.093601	574.042726	574.001984
574.055628	574.082798	574.003068	573.906339	573.918763
573.997609	574.048143	574.080297	574.103240	574.121185
574.136068	574.148892	574.160252	574.170537	574.180011
574.188850	574.197167	574.205016	574.212405	574.219305
574.225653	574.231370	574.236368	574.240572	574.243932
574.246445	574.248169	574.249233	574.249851	574.250312
574.250975	574.252245	574.254539	574.258246	574.263679
574.271027	574.280315	574.291369	574.303803	574.317039
574.330353	574.342943	574.354016	574.362857	574.368897
574.371745	574.371222	574.367380	574.360514	574.351174
574.340141	574.328385	574.316975	574.306978	574.299362
574.294912	574.294187	574.297498	574.304904	574.316213
574.330993	574.348576	574.368085	574.388477	574.408618
574.427390	574.443810	574.457142	574.466985	574.473329
574.476596	574.477655	574.477825	574.478823	574.482650

Row 29

578.720552	578.659576	578.597260	578.532838	578.465286
578.393249	578.314959	578.228120	578.129785	578.016207
577.882678	577.723340	577.530957	577.296627	577.009637
576.658464	576.233815	575.741377	575.256368	574.862749
574.623312	574.627486	574.629989	574.527781	574.427935
574.421843	574.379906	574.225471	574.013896	573.830603
573.980335	574.037040	574.068715	574.091250	574.109233
574.124355	574.137471	574.149110	574.159629	574.169277
574.178226	574.186585	574.194414	574.201733	574.208528
574.214761	574.220379	574.225325	574.229556	574.233048
574.235819	574.237937	574.239526	574.240774	574.241928
574.243284	574.245165	574.247900	574.251782	574.257043
574.263808	574.272071	574.281670	574.292288	574.303463
574.314628	574.325161	574.334447	574.341929	574.347162
574.349847	574.349855	574.347247	574.342280	574.335407
574.327258	574.318594	574.310252	574.303067	574.297802
574.295087	574.295380	574.298939	574.305817	574.3

575.879983 575.729293 575.598610 575.453654 575.304871
575.161426 574.996886 574.780315 574.497152 574.093918
574.012029 574.041061 574.062968 574.082314 574.099230
574.113999 574.127031 574.138690 574.149263 574.158964
574.167943 574.176304 574.184104 574.191369 574.198095
574.204259 574.209827 574.214764 574.219043 574.222661
574.225644 574.228062 574.230033 574.231720 574.233337
574.235129 574.237361 574.240294 574.244162 574.249136
574.255303 574.262644 574.271016 574.280156 574.289695
574.299182 574.308131 574.316057 574.322527 574.327192
574.329823 574.330328 574.328770 574.325367 574.320492
574.314648 574.308441 574.302529 574.297571 574.294172
574.292839 574.293941 574.297694 574.304144 574.313170
574.324488 574.337669 574.352162 574.367337 574.382534
574.397124 574.410579 574.422533 574.432836 574.441592
574.449181 574.456264 574.463761 574.472807 574.484673

Row 31

579.059731 579.021158 578.983628 578.946766 578.910006
578.872522 578.833143 578.790244 578.741622 578.684364
578.614746 578.524737 578.405743 578.256872 578.078056
577.870967 577.640606 577.396817 577.153007 576.920803
576.703958 576.505435 576.317733 576.128306 575.933214
575.728386 575.500800 575.231738 574.898151 574.457447
574.065179 574.047599 574.058827 574.075116 574.090731
574.104834 574.117510 574.128980 574.139451 574.149093
574.158032 574.166354 574.174111 574.181329 574.188008
574.194136 574.199688 574.204641 574.208979 574.212705
574.215851 574.218482 574.220706 574.222669 574.224554
574.226571 574.228943 574.231887 574.235592 574.240197
574.245766 574.252278 574.259610 574.267545 574.275784
574.283964 574.291698 574.298600 574.304329 574.308611
574.311268 574.312235 574.311572 574.309460 574.306205
574.302211 574.297961 574.293977 574.290783 574.288862
574.288621 574.290360 574.294259 574.300360 574.308570
574.318668 574.330316 574.343086 574.356491 574.370030
574.383234 574.395719 574.407234 574.417701 574.427249
574.436224 574.445193 574.454922 574.466337 574.480462

Row 32

579.221155 579.193174 579.167418 579.143722 579.121765
579.101003 579.080580 579.059205 579.035002 579.005003
578.955968 578.882163 578.783406 578.659834 578.512298
578.342919 578.155672 577.956487 577.752054 577.547244
577.342241 577.130781 576.908687 576.683870 576.451997
576.206829 575.938010 575.630006 575.258878 574.777360
574.051596 574.035662 574.052382 574.068648 574.083322
574.096650 574.108800 574.119923 574.130167 574.139659
574.148495 574.156743 574.164443 574.171617 574.178267
574.184382 574.189943 574.194929 574.199328 574.203143
574.206403 574.209167 574.211530 574.213624 574.215610
574.217674 574.220010 574.222807 574.226231 574.230402
574.235378 574.241139 574.247586 574.254538 574.261746
574.268914 574.275726 574.281872 574.287074 574.291177
574.293860 574.295256 574.295356 574.294315 574.292377
574.289871 574.287183 574.284730 574.282932 574.282175
574.282790 574.285024 574.289025 574.294835 574.302386
574.311509 574.321941 574.333353 574.345370 574.357613
574.369731 574.381449 574.392595 574.403142 574.413226
574.423156 574.433416 574.444644 574.457597 574.473310

Row 33

579.376731 579.358851 579.344359 579.333310 579.325643
579.321123 579.319244 579.319094 579.318769 579.303033
579.264983 579.204702 579.122401 579.018590 578.894314
578.751399 578.592588 578.421320 578.240897 578.053134
577.856980 577.647731 577.417249 577.164825 576.903851
576.628838 576.330393 575.994325 575.597526 575.093221
574.339337 574.017996 574.047108 574.063288 574.076814
574.089261 574.100772 574.111437 574.121360 574.130632
574.139317 574.147462 574.155094 574.162228 574.168862
574.174984 574.180575 574.185610 574.190072 574.193959
574.197288 574.200111 574.202511 574.204607 574.206547
574.208498 574.210643 574.213156 574.216193 574.219873
574.224255 574.229332 574.235022 574.241172 574.247572
574.253969 574.260098 574.265702 574.270551 574.274469
574.277344 574.279138 574.279896 574.279744 574.278882
574.277575 574.276133 574.274894 574.274194 574.274349
574.275628 574.278235 574.282298 574.287858 574.294870
574.303206 574.312666 574.322997 574.333913 574.345126
574.356374 574.367458 574.378263 574.388791 574.399175
574.409688 574.420737 574.432855 574.446666 574.462851

Row 34

579.526114 579.517767 579.513933 579.514894 579.520870
579.531965 579.548075 579.568746 579.581673 579.573761
579.545246 579.496394 579.427586 579.339423 579.232845

579.109217 578.970295 578.817970 578.653724 578.477880
578.288874 578.082827 577.853512 577.592455 577.308025
577.010059 576.689810 576.334226 575.922626 575.417494
574.733865 574.033073 574.048830 574.059139 574.070954
574.082497 574.093300 574.103423 574.112959 574.121963
574.130466 574.138490 574.146047 574.153145 574.159777
574.165928 574.171572 574.176676 574.181210 574.185156
574.188519 574.191336 574.193680 574.195659 574.197413
574.199106 574.200911 574.203007 574.205555 574.208682
574.212463 574.216908 574.221949 574.227454 574.232323
574.239063 574.244710 574.249950 574.254588 574.258476
574.261519 574.263687 574.265016 574.265608 574.265626
574.265285 574.264837 574.264554 574.264713 574.265572
574.267354 574.270232 574.274317 574.279653 574.286213
574.293905 574.302578 574.312038 574.322069 574.332448
574.342981 574.353517 574.363981 574.374388 574.384860
574.395631 574.407046 574.419547 574.433650 574.449916

Row 35

579.668955 579.669483 579.675588 579.687783 579.706581
579.732457 579.765769 579.801989 579.820681 579.819762
579.79568 579.760448 579.702825 579.627256 579.534483
579.425435 579.301145 579.162537 579.010066 578.843273
578.660362 578.457915 578.230756 577.971798 577.674828
577.359122 577.022996 576.654466 576.235455 575.736065
575.098265 574.152167 574.048167 574.053616 574.065414
574.076256 574.086261 574.095767 574.104875 574.113591
574.121899 574.129794 574.137276 574.144344 574.150992
574.157198 574.162927 574.168130 574.172756 574.176762
574.180132 574.182885 574.185085 574.186834 574.188720
574.189557 574.190875 574.192415 574.194359 574.196860
574.200021 574.203871 574.208360 574.213360 574.218688
574.224132 574.229471 574.234502 574.239051 574.242988
574.246231 574.248754 574.250584 574.251803 574.252544
574.252980 574.253319 574.253784 574.254604 574.255994
574.258143 574.261201 574.265268 574.270392 574.276563
574.283716 574.291741 574.300491 574.309797 574.319491
574.329417 574.339463 574.349571 574.359758 574.370130
574.380882 574.392303 574.404759 574.418680 574.434529

Row 36

579.804913 579.813567 579.828771 579.851265 579.881858
579.921416 579.970752 580.013764 580.037744 580.043108
580.030231 579.999481 579.951260 579.886026 579.804310
579.706684 579.593669 579.465574 579.322249 579.162802
578.985331 578.786706 578.562401 578.306263 578.010050
577.681086 577.333921 576.957558 576.535946 576.043738
575.433753 574.574473 574.016364 574.047092 574.060897
574.070556 574.079493 574.088320 574.097008 574.105449
574.113570 574.121337 574.128745 574.135793 574.142477
574.148772 574.154630 574.159980 574.164738 574.168823
574.172188 574.174829 574.176800 574.178206 574.179188
574.179916 574.180586 574.181413 574.182615 574.184393
574.186895 574.190179 574.194205 574.198839 574.203882
574.209112 574.214305 574.219265 574.223833 574.227890
574.231363 574.234228 574.236503 574.238255 574.239590
574.240651 574.241608 574.242648 574.243963 574.245737
574.248135 574.251290 574.255297 574.260209 574.266030
574.272721 574.280202 574.288361 574.297068 574.306187
574.315591 574.325185 574.334918 574.344799 574.354908
574.365405 574.376525 574.388574 574.401909 574.416919

Row 37

579.933680 579.949620 579.972961 580.004652 580.045786
580.097614 580.158471 580.205585 580.234452 580.245505
580.239125 580.215668 580.175481 580.118912 580.046304
579.957949 579.854013 579.734402 579.598599 579.445464
579.273051 579.078434 578.857529 578.604858 578.331116
577.979040 577.625073 577.245154 576.824793 576.341769
575.755687 574.966853 574.019284 574.051051 574.058691
574.065094 574.072675 574.080891 574.089249 574.097475
574.105435 574.113082 574.120415 574.127450 574.134192
574.140619 574.146669 574.152242 574.157203 574.161416
574.164779 574.167264 574.168923 574.169867 574.170251
574.170256 574.170095 574.170017 574.170299 574.171218
574.172995 574.175735 574.179397 574.183818 574.188754
574.193946 574.199151 574.204173 574.208857 574.213098
574.216830 574.220030 574.222709 574.224918 574.226743
574.228301 574.229734 574.231201 574.232869 574.234899
574.237439 574.240613 574.244515 574.249202 574.254696
574.260977 574.267990 574.275653 574.283858 574.292491
574.301442 574.310618 574.319963 574.329467 574.339179
574.349220 574.359778 574.371108 574.383511 574.397317

Row 38

580.055004 580.077309 580.107712 580.147339 580.197529
580.259883 580.327691 580.378706 580.412123 580.428375

580.427834	580.410825	580.377633	580.328501	580.263615	580.755581	580.837228	580.902487	580.951857	580.985735
580.183058	580.086743	579.974314	579.845022	579.697585	581.004418	581.008108	580.996902	580.970780	580.929585
579.530048	579.339639	579.122601	578.873967	578.587173	580.872991	580.800469	580.711242	580.604228	580.477984
578.254982	577.898159	577.518525	577.103001	576.632311	580.330634	580.159788	579.962434	579.734792	579.472099
576.073321	575.354406	574.225444	574.066401	574.055738	579.168250	578.836066	578.489202	578.120087	577.719927
574.058493	574.065304	574.073287	574.081522	574.089635	577.277742	576.778595	576.199574	575.497641	574.558171
574.097469	574.104992	574.112238	574.119256	574.126078	574.020079	574.029866	574.042445	574.052831	574.061186
574.132689	574.139020	574.144931	574.150219	574.154649	574.068088	574.073962	574.079507	574.085735	574.093058
574.158039	574.160327	574.161576	574.161930	574.161563	574.100917	574.109246	574.119099	574.130224	574.139480
574.160665	574.159461	574.158235	574.157350	574.157208	574.143692	574.143119	574.140349	574.136793	574.132110
574.158156	574.160370	574.163799	574.168200	574.173242	574.126021	574.118524	574.108879	574.096990	574.085816
574.178591	574.183971	574.189179	574.194071	574.198555	574.079967	574.081490	574.088544	574.097909	574.107306
574.202575	574.206107	574.209158	574.211765	574.213995	574.115833	574.123422	574.130274	574.136571	574.142416
574.215944	574.217732	574.219500	574.221395	574.223564	574.147842	574.152824	574.157305	574.161215	574.164511
574.226146	574.229261	574.233005	574.237444	574.242616	574.167213	574.169411	574.171251	574.172900	574.174521
574.248519	574.255122	574.262361	574.270146	574.278373	574.176261	574.178257	574.180646	574.183569	574.187165
574.286936	574.295734	574.304692	574.313771	574.322981	574.191551	574.196795	574.202895	574.209768	574.217261
574.332400	574.342173	574.352511	574.363678	574.375959	574.225184	574.233322	574.241425	574.249168	574.256169
					574.262115	574.266939	574.270888	574.274376	574.277764

Row 39

580.168704	580.196392	580.232690	580.278857	580.336416
580.407238	580.479417	580.534165	580.571854	580.592910
580.597688	580.586475	580.559497	580.516906	580.458762
580.384994	580.295337	580.189260	580.065866	579.923793
579.761096	579.575126	579.362382	579.118299	578.836909
578.510390	578.154506	577.778689	577.371280	576.915990
576.386705	575.732589	574.810585	574.053489	574.043836
574.049253	574.057087	574.065442	574.073828	574.081945
574.089676	574.097045	574.104157	574.111134	574.118049
574.124904	574.131630	574.138058	574.143878	574.148689
574.152161	574.154193	574.154910	574.154527	574.153249
574.151259	574.148768	574.146083	574.143673	574.142152
574.142101	574.143821	574.147213	574.151874	574.157295
574.163029	574.168754	574.174267	574.179449	574.184227
574.188560	574.192429	574.195833	574.198793	574.201358
574.203607	574.205645	574.207597	574.209602	574.211801
574.214327	574.217302	574.220828	574.224984	574.228823
574.235365	574.241598	574.248474	574.255912	574.263812
574.272058	574.280533	574.289130	574.297767	574.306405
574.315068	574.323861	574.332965	574.342618	574.353083

Row 40

580.274693	580.306741	580.347711	580.398931	580.462026
580.539020	580.614480	580.672825	580.714565	580.740114
580.749806	580.743895	580.722551	580.685855	580.633771
580.566111	580.482489	580.382253	580.264418	580.127572
579.969792	579.788533	579.580495	579.341436	579.065878
578.746610	578.395338	578.026534	577.629997	577.192310
576.693684	576.100339	575.341870	574.184428	574.024074
574.038806	574.048408	574.057496	574.066281	574.074498
574.082100	574.089223	574.096099	574.102972	574.109982
574.117138	574.124393	574.131597	574.138309	574.143797
574.147435	574.149094	574.149088	574.147797	574.145455
574.142197	574.138164	574.133616	574.129133	574.125700
574.124367	574.125670	574.129374	574.134727	574.140904
574.147289	574.153527	574.159449	574.164983	574.170097
574.174770	574.178986	574.182733	574.186016	574.188862
574.191332	574.193520	574.195548	574.197551	574.199676
574.202041	574.204790	574.208027	574.211849	574.216329
574.221510	574.227401	574.233967	574.241132	574.248790
574.256807	574.265039	574.273337	574.281558	574.289593
574.297401	574.305041	574.312681	574.320558	574.328935

Row 41

580.372984	580.408364	580.452766	580.507522	580.574264
580.655001	580.733564	580.795403	580.841022	580.870824
580.885125	580.884146	580.868019	580.836764	580.790274
580.728280	580.650310	580.555636	580.443211	580.311603
580.158912	579.982678	579.779762	579.546183	579.276860
578.965195	578.621990	578.262990	577.879432	577.460445
576.991330	576.449940	575.797651	574.943184	574.020192
574.030691	574.039639	574.049688	574.059133	574.067480
574.074845	574.081522	574.087950	574.094603	574.101711
574.109207	574.117086	574.125424	574.133683	574.140426
574.144332	574.145312	574.144245	574.141863	574.138348
574.133698	574.127918	574.121025	574.113588	574.107271
574.104154	574.105254	574.109941	574.116700	574.124150
574.131479	574.138370	574.144764	574.150685	574.156162
574.161199	574.165780	574.169879	574.173470	574.176555
574.179175	574.181418	574.183411	574.185298	574.187227
574.189338	574.191764	574.194629	574.198047	574.202122
574.206925	574.212490	574.218797	574.225769	574.233284
574.241183	574.249289	574.257399	574.265292	574.272752
574.279639	574.285962	574.291899	574.297732	574.303752

Row 42

580.463696	580.501408	580.548035	580.604848	580.673392

Row 43

580.547055	580.586157	580.633882	580.691381	580.760032
580.841502	580.925920	580.994553	581.047586	581.085411
581.108318	581.116493	581.110012	581.088829	581.052754
581.001426	580.934282	580.850515	580.749025	580.628368
580.486690	580.321653	580.130339	579.909121	579.653472
579.357973	579.039520	578.706655	578.352896	577.971042
577.552673	577.087262	576.560217	575.947583	575.196353
574.093306	574.018886	574.037408	574.048023	574.055966
574.062133	574.066667	574.070361	574.075721	574.083950
574.092389	574.099911	574.111182	574.128146	574.143062
574.127207	574.142444	574.136792	574.132658	574.127027
574.119242	574.110784	574.098824	574.079773	574.059216
574.048737	574.052607	574.056020	574.078939	574.090993
574.100741	574.108862	574.116035	574.122641	574.128842
574.134686	574.140132	574.145067	574.149343	574.152843
574.155555	574.157586	574.159132	574.160407	574.161597
574.162851	574.164299	574.166086	574.168387	574.171394
574.175290	574.180202	574.186154	574.193047	574.200673
574.208787	574.217156	574.225517	574.233437	574.240256
574.245312	574.248386	574.249929	574.250701	574.251181

Row 44

580.623381	580.663019	580.710834	580.767815	580.835113
580.914070	580.999990	581.071974	581.128613	581.170301
581.197325	581.209866	581.207991	581.191639	581.160605
581.114511	581.052778	580.974585	580.878828	580.764067
580.628467	580.469728	580.284996	580.070745	579.822610
579.537242	579.234657	578.917218	578.579313	578.214885
577.817203	577.378419	576.888560	576.332802	575.682854
574.863748	574.019678	574.037523	574.044842	574.052071
574.057481	574.060329	574.059664	574.062583	574.074722
574.058605	574.087094	574.096903	574.127264	574.156823
574.158703	574.141422	574.131155	574.130223	574.124067
574.112122	574.105440	574.095733	574.064198	574.022378
574.003353	574.016015	574.040241	574.061444	574.076381
574.086719	574.094824	574.102046	574.108850	574.115383
574.121692	574.127709	574.133239	574.137992	574.141719
574.144351	574.146049	574.147117	574.147860	574.148495
574.149151	574.149925	574.150957	574.152459	574.154707
574.157990	574.162533	574.168412	574.175493	574.183459
574.191951	574.200747	574.209710	574.218381	574.225624
574.229994	574.230873	574.229238	574.226813	574.224245

Row 45

580.693071	580.732503	580.779548	580.835012	580.899789
580.974861	581.059698	581.135028	581.195244	581.240744
581.271821	581.288660	581.291329	581.279767	581.253768
581.212952	581.156742	581.084319	580.994584	580.886109
580.757075	580.605206	580.427681	580.221030	579.980979
579.709140	579.424078	579.123122	578.801291	578.453274
578.073362	577.655270	577.191695	576.673085	576.083973
575.390909	574.479136	574.030719	574.042920	574.049536
574.054454	574.058255	574.046130	574.038856	574.066215
574.091092	574.066507	574.060013	574.124986	574.197759
574.187462	574.130499	574.115276	574.134679	574.127706
574.097453	574.099774	574.115323	574.058676	573.960528
573.924692	573.970191	574.018456	574.049088	574.065260
57				

580.756582	580.795187	580.840768	580.893939	580.955338					
581.025595	581.105279	581.183908	581.247690	581.296978	580.958844	580.990347	581.026244	581.066564	581.111227
581.332076	581.353182	581.360377	581.353613	581.332696	581.159988	581.212382	581.267629	581.324541	581.381407
581.297263	581.246750	581.180358	581.097006	580.995284	581.432474	581.470721	581.496267	581.509246	581.509671
580.873388	580.729056	580.559477	580.361190	580.129981	581.497408	581.472145	581.433351	581.380214	581.311569
579.876859	579.610574	579.326901	579.021230	578.688635	581.225806	581.120853	581.001341	580.865652	580.709015
578.323895	577.921466	577.475411	576.979228	576.425071	580.531147	580.330996	580.106726	579.855616	579.573823
575.799578	575.063402	574.027933	574.053529	574.046365	579.255938	578.894111	578.476332	577.982602	577.375164
574.049053	574.073626	574.032396	573.973635	574.056351	576.572025	575.725004	575.452965	575.426042	575.561842
574.150089	574.017293	573.946646	574.109009	574.308117	575.828223	576.188943	576.616407	577.094098	577.608180
574.237354	574.074006	574.061456	574.173772	574.152550	578.138823	578.653957	579.101445	579.412337	579.542540
574.047950	574.057821	574.219925	574.086376	573.830408	579.520910	579.422558	579.305034	579.184231	579.046779
573.755937	573.928410	574.011184	574.048373	574.059555	578.875049	578.665541	578.427774	578.171805	577.900474
574.062286	574.067275	574.074251	574.081229	574.088276	577.610154	577.296468	576.959138	576.601400	576.226917
574.095704	574.103477	574.111209	574.117887	574.122368	575.837320	575.425429	574.937810	574.299923	574.037087
574.124290	574.124300	574.123467	574.122577	574.121858	574.046190	574.018689	574.069062	574.125264	574.137154
574.121150	574.120243	574.119147	574.118190	574.117977	574.110579	574.078125	574.061440	574.061166	574.067197
574.119244	574.122683	574.128729	574.137231	574.147141	574.071508	574.068390	574.057479	574.041979	574.023570
574.156963	574.166311	574.177009	574.190725	574.204657	574.009912	574.002619	573.997653	574.011549	574.078621
574.210901	574.203377	574.187135	574.175491	574.172855	574.169247	574.136125	573.925904	573.973969	574.939632
					575.765516	576.322937	576.759345	577.134395	577.444553

Row 47

580.814409	580.851693	580.895280	580.945605	581.003066
581.067985	581.140529	581.218718	581.286074	581.339144
581.378254	581.403623	581.415356	581.413431	581.397682
581.367776	581.323184	581.263137	581.186591	581.092162
580.978069	580.842055	580.681298	580.492307	580.274892
580.043539	579.797027	579.531312	579.241893	578.923906
578.572168	578.181168	577.745149	577.258631	576.718091
576.124836	575.483005	574.772511	574.162259	574.017001
574.016642	574.235292	574.358585	574.516680	574.894624
575.246902	575.470051	575.617519	575.773197	575.888114
575.850329	575.709395	575.590161	575.530053	575.464511
575.395189	575.380596	575.443179	575.383254	575.242332
575.009666	574.561981	574.034579	574.069971	574.058730
574.047046	574.051510	574.060522	574.067079	574.074100
574.082168	574.091209	574.101198	574.110178	574.115455
574.116278	574.114231	574.111556	574.109573	574.108321
574.107119	574.105311	574.102730	574.099821	574.097508
574.096959	574.099328	574.105571	574.115919	574.128608
574.139732	574.147366	574.156844	574.176003	574.202187
574.216885	574.199509	574.160354	574.136676	574.155952

Row 48

580.867061	580.902649	580.943871	580.990996	581.044223
581.103621	581.169054	581.240049	581.310433	581.367292
581.410419	581.440063	581.456364	581.459340	581.448867
581.424661	581.386242	581.332898	581.263632	581.177108
581.071575	580.944787	580.793896	580.615880	580.420861
580.212136	579.986304	579.738747	579.464820	579.160518
578.820741	578.438953	578.007062	577.518446	576.969287
576.370415	575.767455	575.229693	574.847597	574.760989
574.900243	575.142677	575.416641	575.732519	576.100716
576.467804	576.788425	577.047866	577.239333	577.343517
577.348670	577.282923	577.192807	577.100606	577.001945
576.894362	576.786826	576.673598	576.524635	576.328344
576.074273	575.741926	575.320960	574.788732	574.401190
574.016356	574.032553	574.050254	574.051576	574.058493
574.067741	574.077653	574.091738	574.105652	574.112393
574.110593	574.104441	574.098800	574.095762	574.094608
574.093492	574.090904	574.086424	574.080731	574.075272
574.071897	574.072322	574.078358	574.091895	574.111128
574.126172	574.127202	574.126900	574.152884	574.207308
574.253207	574.215487	574.119203	574.049486	574.145349

Row 49

580.915044	580.948673	580.987293	581.031039	581.079946
581.133899	581.192553	581.255227	581.320760	581.381381
581.428535	581.462473	581.483380	581.491326	581.486247
581.467923	581.435949	581.389685	581.328215	581.250270
581.154151	581.037634	580.897874	580.740522	580.569983
580.380000	580.168290	579.932825	579.670736	579.378142
579.049818	578.678619	578.254540	577.763412	577.187011
576.525218	575.887968	575.451153	575.248255	575.266693
575.456396	575.751172	576.107918	576.510481	576.945354
577.384885	577.794865	578.139396	578.382589	578.502426
578.509726	578.444452	578.347682	578.238767	578.116209
577.973460	577.809404	577.624419	577.415262	577.177742
576.906091	576.593702	576.237502	575.834350	575.375286
574.845152	574.197378	574.046314	574.027940	574.043626
574.052926	574.059020	574.081860	574.107651	574.116902
574.108382	574.093724	574.083434	574.080156	574.080772
574.081053	574.077993	574.070957	574.061201	574.050893
574.043231	574.040251	574.043989	574.061327	574.096033
574.126944	574.110971	574.070043	574.100785	574.209015
574.368507	574.265378	574.401790	575.245630	575.878177

Row 50

Row 51

580.998917	581.028202	581.061345	581.098297	581.138896
581.182827	581.229566	581.278324	581.327974	581.376993
581.423420	581.464572	581.494774	581.512830	581.518847
581.512797	581.494493	581.463539	581.419270	581.360673
581.287638	581.204006	581.102087	580.978311	580.833119
580.666271	580.476826	580.263085	580.022459	579.751190
579.443831	579.092232	578.683389	578.194274	577.576115
576.683520	574.961082	575.294390	575.467944	575.719613
576.066776	576.495383	576.989581	577.538722	578.135322
578.769419	579.417233	580.015263	580.433030	580.554397
580.449113	580.280772	580.136049	580.016464	579.879212
579.683120	579.425401	579.134160	578.835206	578.535381
578.227346	577.903784	577.566737	577.224884	576.886552
576.555655	576.228776	575.892740	575.531149	575.115253
574.548527	573.886027	574.054509	574.183582	574.190193
574.114623	574.046070	574.024253	574.037506	574.054825
574.068657	574.065580	574.046667	574.025926	573.990608
573.969553	573.962356	573.943317	573.900994	574.026258
574.362994	575.143391	575.719479	576.344815	576.924290
577.429358	577.844687	578.178444	578.442816	578.640059

Row 52

581.035680	581.062718	581.093140	581.126846	581.163629
581.203140	581.244851	581.288016	581.331623	581.374375
581.414675	581.450679	581.480393	581.501855	581.513339
581.513612	581.502463	581.479835	581.446588	581.403871
581.352624	581.283884	581.192359	580.078928	580.943932
580.787132	580.607664	580.403958	580.173586	579.912984
579.616944	579.277671	578.882887	578.411743	577.825258
577.046228	575.964574	575.110594	575.423068	575.769386
576.191934	576.686085	577.242894	577.858076	578.533046
579.273450	580.082046	580.869651	581.326965	581.466046
581.305586	581.021010	580.857453	580.773822	580.666558
580.448437	580.121333	579.762135	579.420776	579.101316
578.780517	578.441033	578.090871	577.748954	577.428384
577.133550	576.862020	576.606548	576.356935	576.097595
575.799782	575.438377	575.007790	574.405018	574.292102
574.105588	573.964482	573.953733	574.015479	574.041867
574.081537	574.078409	574.031699	574.021391	573.967766
573.921612	574.000449	574.037736	574.996422	575.560310
576.131940	576.680822	577.210364	577.732825	578.227128
578.654617	579.001033	579.275882	579.486421	579.634404

Row 53

581.069508	581.094313	581.122093	581.152717	581.185958
581.221468	581.258749	581.297129	581.335740	581.373515
581.409194	581.441382	581.468640	581.489612	581.503199
581.508699	581.505921	581.495186	581.477223	581.452947
581.415941	581.355643	581.272946	581.168529	581.042641
580.895035	580.724924	580.530874	580.310668	580.061058
579.777342	579.452644	579.076646	578.633405	578.098112
577.435156	576.602436	575.508718	575.286596	575.714872
576.207656	576.765013	577.379417	578.051274	578.789917
579.617488	580.578264	581.392925	581.853537	582.019262
581.914277	581.594441	581.452589	581.474972	581.418253
581.187506	58			

Row 54

581.100733	581.123349	581.148591	581.176314	581.206293
581.238200	581.271588	581.305881	581.340361	581.374180
581.406378	581.435939	581.461863	581.483274	581.499527
581.510318	581.515737	581.516271	581.512713	581.503255
581.472719	581.419467	581.344314	581.247788	581.130064
580.990907	580.829603	580.644882	580.434784	580.196465
579.925893	579.617379	579.262886	578.851143	578.366888
577.790997	577.099318	576.244112	575.059891	575.531579
576.106219	576.729206	577.397423	578.114195	578.892335
579.760198	580.771919	581.593015	582.068095	582.257546
582.191774	581.921696	581.872712	581.948125	581.890770
581.673444	581.271740	580.727862	580.335014	580.080085
579.797958	579.363009	578.921056	578.547850	578.247164
578.009988	577.825588	577.683608	577.575232	577.491682
577.423219	577.365344	577.320870	577.272861	577.146428
576.826845	576.104771	574.975104	574.156710	573.827268
574.333504	574.657822	574.747130	574.752377	574.934431
575.944950	576.749531	576.753308	577.038995	577.482775
578.005634	578.562729	579.111804	579.582873	579.981540
580.315605	580.589678	580.806752	580.968550	581.075417

Row 55

581.129644	581.150135	581.172954	581.197960	581.224940
581.253601	581.283562	581.314346	581.345384	581.376027
581.405578	581.433336	581.458660	581.481054	581.500246
581.516262	581.529472	581.540578	581.550548	581.548027
581.522694	581.475367	581.406699	581.317110	581.206732
581.075350	580.922347	580.746629	580.546522	580.319630
580.062634	579.771029	579.438791	579.058080	578.619086
578.109934	577.514904	576.805807	575.913053	575.156183
575.870283	576.570025	577.294007	578.046544	578.839380
579.693447	580.640297	581.491341	581.989921	582.198563
582.152533	581.962582	582.030425	582.131015	582.088334
581.885317	581.505203	580.960722	580.595069	580.459747
580.208096	579.728279	579.197685	578.814706	578.534355
578.333548	578.195006	578.104540	578.054484	578.039163
578.043690	577.606555	578.114123	578.240875	578.323794
578.225212	577.065487	575.399816	574.467301	574.492736
574.829746	575.130167	575.225703	575.298099	575.157542
575.512541	577.136895	577.222406	577.572200	578.067508
578.636303	579.231660	579.757571	580.204741	580.583439
580.900243	581.159345	581.363388	581.513829	581.611032

Row 56

581.156496	581.174930	581.195445	581.217905	581.242123
581.267847	581.294765	581.322500	581.350621	581.378658
581.406139	581.432624	581.457769	581.481385	581.503510
581.524463	581.544880	581.565722	581.585612	581.586572
581.565555	581.523240	581.460170	581.376696	581.272932
581.148706	581.003508	580.836432	580.646096	580.430549
580.187149	579.912419	579.601907	579.250087	578.850289
578.394446	577.871799	577.264988	576.541149	575.629660
575.461937	576.268496	577.065831	577.854225	578.647854
579.458237	580.284308	581.077898	581.611606	581.834948
581.800016	581.761298	581.899318	582.049887	582.031726
581.841227	581.468452	580.952058	580.629640	580.529772
580.300176	579.849175	579.331920	578.980218	578.740119
578.588527	578.503763	578.464354	578.465771	578.521285
578.592371	578.654276	578.721121	579.021720	578.454405
577.687034	576.473178	574.879059	574.657291	575.305567
575.888521	576.357296	576.594274	576.465736	575.940273
575.106128	577.095869	577.438548	577.920881	578.501830
579.136974	579.741831	580.256257	580.693771	581.063605
581.372029	581.623244	581.819966	581.963754	582.055172

Row 57

581.181505	581.197957	581.216277	581.236346	581.258003
581.281045	581.305226	581.330261	581.355845	581.381665
581.407436	581.432939	581.458068	581.482892	581.507705
581.533083	581.559921	581.589452	581.614590	581.618396
581.600971	581.562905	581.504671	581.426585	581.328769
581.211106	581.073206	580.914351	580.733446	580.528952
580.298820	580.040415	579.750451	579.424949	579.059156
578.647272	578.181601	577.650572	577.034691	576.295972
575.325351	575.784896	576.708333	577.546633	578.343599
579.112359	579.841820	580.487466	580.968318	581.229313
581.332324	581.404962	581.538231	581.715536	581.724864
581.541084	581.158332	580.726122	580.432930	580.280199
580.081661	579.692558	579.321869	579.047190	578.865305
578.779498	578.763806	578.775590	578.800133	578.968293
578.694539	578.083332	577.357911	576.615531	576.819742
575.747310	575.796258	575.876566	576.308343	576.770076
577.180209	577.567886	577.705124	577.460730	576.752048
575.474624	576.653143	577.478879	578.133294	578.816528
579.515032	580.123798	580.639658	581.076948	581.445286
581.751282	581.999470	582.192867	582.333312	582.421655

Row 58

581.204864	581.219401	581.235626	581.253436	581.272700
581.293259	581.314931	581.337517	581.360818	581.384655
581.408900	581.433512	581.458582	581.484384	581.511428
581.540511	581.572762	581.609626	581.636922	581.643046
581.628602	581.594126	581.540054	581.466694	581.374195
581.262512	581.131375	580.980256	580.808324	580.614412
580.396973	580.154038	579.883186	579.581500	579.245473
578.870760	578.451573	577.979441	577.440634	576.809691
576.028828	575.061317	576.212905	577.130245	577.948819
578.698637	579.374555	579.950254	580.390563	580.681591
580.855878	580.973405	581.078126	581.164238	581.158578
580.981987	580.676646	580.357142	580.094047	579.889034
579.682010	579.442434	579.218106	579.035712	578.907907
578.908606	578.995783	578.475729	577.774203	576.980379
576.115014	575.153436	575.581574	575.982499	576.425757
576.807385	577.025904	577.209696	577.462221	577.766223
578.112073	578.449523	578.471076	578.140858	577.384126
575.919501	576.341244	577.451888	578.245837	579.030813
579.776945	580.401980	580.928187	581.371939	581.744029
582.051849	582.300511	582.493487	582.632994	582.720221

Row 59

581.226737	581.239423	581.253638	581.269297	581.286299
581.304526	581.323852	581.344151	581.365315	581.387276
581.410032	581.433685	581.458480	581.484857	581.513494
581.545369	581.581809	581.623578	581.652119	581.660105
581.648105	581.616628	581.568101	581.496844	581.409048
581.302751	581.177808	581.033869	580.870351	580.686410
580.480920	580.252446	579.999217	579.719078	579.409395
579.066820	578.686826	578.262804	577.784324	577.233580
576.578040	575.754691	575.559887	575.596310	577.473893
578.239314	578.903281	579.456762	579.886570	580.192125
580.393457	580.521125	580.595666	580.612946	580.548544
580.387262	580.154178	579.902987	579.674399	579.474530
579.291368	579.152072	579.072103	578.817002	578.152157
577.439595	576.653863	575.658647	575.427825	575.690677
576.051738	576.425341	576.775779	577.117835	577.433766
577.693257	577.892667	578.067171	578.255859	578.475116
578.746886	579.009137	578.974143	578.601263	577.797900
576.327476	575.972891	577.356589	578.270440	579.154547
579.943143	580.593111	581.136075	581.591181	581.970887
582.283666	582.535387	582.730089	582.870432	582.957978

Row 60

581.247272	581.258163	581.270438	581.284032	581.298870
581.314869	581.331952	581.350053	581.369139	581.389227
581.410416	581.432915	581.457087	581.483492	581.512937
581.546530	581.585745	581.630275	581.659750	581.669186
581.659139	581.630113	581.582544	581.516781	581.433074
581.331546	581.212182	581.074802	580.919047	580.744359
580.549968	580.334873	580.097811	579.837217	579.551111
579.236899	578.890978	578.508038	578.079825	577.592903
577.024432	576.331347	575.421794	575.897023	576.913879
577.741603	578.434523	579.000704	579.437850	579.751748
579.959558	580.081183	580.126637	580.090891	579.757518
579.803431	579.597529	579.384982	579.194497	579.016732
578.470933	577.831837	577.135607	576.294165	575.099154
575.428213	575.802355	576.159423	576.467063	576.738012
577.031431	577.343483	577.663282	577.953899	578.197705
578.399384	578.564173	578.706722	578.844330	578.989744
579.155899	579.326733	579.253711	578.855810	578.039242
576.635506	575.494749	577.123080	578.203768	579.191232
580.027901	580.709296	581.273760	581.743853	582.134046
582.454110	582.710808	582.908823	583.051308	583.140216

Row 61

581.266603	581.275744	581.286137	581.297732	581.310475
581.324313	581.339208	581.355141	581.372136	581.390275
581.409729	581.430784	581.453884	581.479669	581.509025
581.543141	581.583573	581.629317	581.659431	581.669929
581.661368	581.634263	581.589072	581.526193	581.445939
581.348532	581.234082	581.102572	580.953850	580.787613
580.603397	580.400565	580.178280	579.935455	579.670660
579.381929	579.066436	578.719917	578.335698	577.902964
577.403332	576.802280	576.052246	575.059854	576.243253
577.200800	577.971461	578.586273	579.046082	579.364484
579.566554	579.674265			

582.538549 582.833969 583.059864 583.222102 583.324632

Row 62

581.284851 581.292282 581.300839 581.310482 581.321175
581.332889 581.345612 581.359361 581.374200 581.390256
581.407744 581.427001 581.448513 581.472962 581.501266
581.534639 581.574651 581.620355 581.650820 581.662000
581.654463 581.628746 581.585347 581.524718 581.447251
581.353269 581.243009 581.116614 580.974122 580.815459
580.640435 580.448731 580.239879 580.013221 579.767821
579.502304 579.214577 578.901352 578.557336 578.173794
577.735772 577.216178 576.587005 575.800735 575.393045
576.591217 577.516043 578.233381 578.730324 579.042615
579.225045 579.310097 579.326415 579.237116 578.142834
577.226969 576.308296 575.146044 575.476497 575.833968
576.157929 576.405483 576.649340 576.884769 577.101192
577.304726 577.510824 577.723834 577.944899 578.178680
578.432316 578.707903 578.953950 579.156065 579.320074
579.450102 579.549515 579.621324 579.667007 579.683910
579.660671 579.567923 579.345877 578.913274 578.206836
577.154376 575.468649 576.443272 577.861629 579.039973
579.992689 580.750821 581.368233 581.875697 582.292610
582.631864 582.902302 583.110063 583.259363 583.352967

Row 66

581.349246 581.350149 581.351669 581.353777 581.356452
581.359684 581.363485 581.367890 581.372975 581.378864
581.385744 581.393886 581.403659 581.415554 581.430211
581.448441 581.471254 581.499883 581.527938 581.537800
581.529343 581.503278 581.460360 581.401386 581.327180
581.238565 581.136343 581.021276 580.894077 580.755432
580.606022 580.446568 580.277853 580.100755 579.916265
579.725528 579.529870 579.330698 579.129136 578.925665
578.720822 578.522991 578.367343 578.251767 578.161273
578.182739 578.675784 578.721000 578.290471 577.435871
577.171900 577.275069 577.490292 577.718562 577.935525
578.136877 578.325381 578.502115 578.666361 578.818669
578.960042 579.091510 579.214261 579.329666 579.439296
579.545070 579.649386 579.755239 579.874669 580.020431
580.198991 580.368106 580.501867 580.602837 580.672475
580.711231 580.718510 580.692499 580.629867 580.525374
580.371528 580.158472 579.874289 579.505584 579.037890
578.456375 577.757201 577.105549 576.913128 578.076216
579.265762 580.214206 580.957011 581.552225 582.032311
582.417594 582.721639 582.953763 583.120389 583.225842

Row 63

581.302131 581.307887 581.314643 581.322369 581.331039
581.340641 581.351182 581.362700 581.375282 581.389081
581.404336 581.421401 581.440775 581.463143 581.489410
581.520759 581.558704 581.603087 581.633614 581.645090
581.638104 581.613226 581.571004 581.511955 581.436560
581.345250 581.238392 581.116283 580.979141 580.827106
580.660231 580.478489 580.281750 580.069757 579.842053
579.597859 579.335841 579.053729 578.747657 578.411019
578.032300 577.590573 577.070566 576.436392 575.541104
575.797464 577.065615 577.995515 578.534169 578.798801
578.945941 578.980419 577.785129 576.205197 575.277369
575.541772 576.006763 576.317062 576.574007 576.823551
577.054512 577.260124 577.451418 577.633111 577.806115
577.975018 578.147216 578.328501 578.523477 578.737429
578.976336 579.228511 579.439870 579.611210 579.746758
579.849377 579.920859 579.961780 579.970537 579.941417
579.861487 579.706372 579.437698 579.008061 578.367371
577.437588 575.973852 576.112944 577.611094 578.863068
579.885082 580.688118 581.335693 581.864248 582.296295
582.646547 582.924998 583.138562 583.292006 583.388498

Row 67

581.363728 581.363071 581.362899 581.363175 581.363871
581.364968 581.366459 581.368365 581.370733 581.373649
581.377255 581.381753 581.387426 581.394652 581.403923
581.415863 581.431243 581.450989 581.474080 581.482472
581.472330 581.444417 581.399582 581.338749 581.262903
581.173043 581.070149 580.955146 580.828900 580.692238
580.546003 580.391120 580.228643 580.059799 579.886016
579.709043 579.531174 579.355381 579.184743 579.021139
578.866404 578.744505 578.706525 578.771374 578.884982
578.830664 578.793708 578.685449 578.441246 578.120649
577.962475 577.997311 578.140432 578.327776 578.514655
577.620299 578.855697 579.011198 579.156628 579.292139
579.418256 579.535726 579.645493 579.748717 579.846803
579.941479 580.034897 580.129732 580.229330 580.346262
580.496507 580.641779 580.754438 580.836311 580.888280
580.910359 580.901671 580.860351 580.783376 580.666386
580.503587 580.287836 580.011022 579.664804 579.241982
578.740237 578.174635 577.623408 577.217567 577.836266
578.996213 579.963129 581.738980 581.357651 581.854421
582.251655 582.564300 582.802574 582.973478 583.081694

Row 64

581.318552 581.322663 581.327648 581.333481 581.340145
581.347633 581.355962 581.365183 581.375389 581.386739
581.399475 581.413944 581.430629 581.450178 581.473444
581.501527 581.535822 581.577256 581.607544 581.618916
581.611986 581.587364 581.545659 581.487465 581.413363
581.323900 581.219579 581.100849 580.968100 580.821668
580.661835 580.488841 580.302876 580.104071 579.892454
579.667863 579.429788 579.177070 578.907411 578.616569
578.296897 577.934134 577.528249 577.047547 576.342002
574.140883 576.645928 578.006248 578.552971 578.979352
577.666228 575.452886 575.849704 576.261434 576.439591
576.662417 576.932072 577.184103 577.408615 577.614551
577.803391 577.975691 578.134510 578.282324 578.422610
578.561332 578.704691 578.858847 579.029685 579.223257
579.445929 579.669614 579.851865 579.996927 580.107863
580.186496 580.233463 580.247942 580.226922 580.163941
580.047377 579.858789 579.572558 579.157482 578.575454
577.761931 576.537429 575.836830 577.256930 578.617619
579.723108 580.575735 581.255023 581.805500 582.253281
582.615007 582.901853 583.121520 583.279327 583.378837

Row 68

581.377770 581.375589 581.373757 581.372231 581.370968
581.369934 581.369107 581.368476 581.368056 581.367889
581.368053 581.368673 581.369930 581.372073 581.375427
581.380411 581.387537 581.397417 581.410749 581.417135
581.404605 581.373964 581.326163 581.262286 581.183516
581.091078 580.986163 580.869876 580.743217 580.607120
580.462541 580.310570 580.152520 579.989958 579.824681
579.658851 579.495566 579.339725 579.197648 579.072108
578.961152 578.894869 578.923543 579.939216 578.975758
578.912764 578.863489 578.789541 578.672480 578.551281
578.503120 578.555890 578.686170 578.845613 578.006919
579.162927 579.311295 579.451194 579.582258 579.704479
579.818165 579.923874 580.022379 580.114667 580.201961
580.285776 580.367982 580.450890 580.537368 580.631053
580.748641 580.871609 580.964664 581.028931 581.064796
581.071924 581.049265 580.994999 580.906456 580.780055
580.611310 580.394973 580.125389 579.797117 579.406048
578.951551 578.439699 577.909867 577.440035 577.580196
578.717026 579.666586 580.471318 581.115736 581.629922
582.039242 582.360431 582.604749 582.779798 582.890600

Row 65

581.334223 581.336715 581.339955 581.343916 581.348581
581.353946 581.360029 581.366877 581.374581 581.383290
581.393227 581.404711 581.418178 581.434212 581.453576
581.477242 581.506433 581.542645 581.572381 581.583225
581.575820 581.550824 581.508914 581.450778 581.377107
581.288579 581.185839 581.069490 580.940088 580.798151
580.644172 580.478639 580.302049 580.114912 579.917742
579.711028 579.495147 579.270161 579.035455 578.789287
578.528301 578.247655 577.965309 577.663149 577.267867
576.618680 576.550561 578.516418 578.696173 576.622184
575.863785 576.310170 576.720614 577.026113 577.255011
577.473468 577.695711 577.903835 578.093770 578.268234
578.429310 578.578269 578.716733 578.846416 578.968994
579.086533 579.203232 579.330918 579.477027 579.648200
579.851154 580.046227 580.202973 580.324843 580.414005
580.471492 580.497176 580.489530 580.445126 580.357900
580.218327 580.012840 579.723958 579.330822 578.807790
578.115124 577.160799 575.951182 576.682443 578.334473
579.514436 580.417313 581.128563 581.701287 582.165106

Row 69

581.391475 581.387810 581.384359 581.381067 581.377877
581.374736 581.371598 581.368422 581.365182 581.361865
581.358483 581.355072 581.351701 581.348475 581.345543
581.343104 581.341402 581.340733 581.341423 581.341765
581.326073 581.291696 581.239702 581.171371 581.088155
580.991573 580.883094 580.764025 580.635478 580.498424
580.353847 580.202938 580.047272 579.888816 579.726969
579.572060 579.419028 579.277316 579.160474 579.078412
579.015283 578.979647 578.983975 578.988956 578.986003
578.971633 578.955249 578.932206 578.902573 578.887054
578.916455 579.006071 579.138553 579.282800 579.428933
579.571279 579.707085 579.835116 579.954861 580.066231
580.169434 580.264912 580.353306 580.435450 580.512384
580.585384 580.656007 580.726147 580.798104 580.874659
580.960746 581.060397 581.135128 581.183087 581.204196
581.197821 581.162780 581.097324 580.999103 580.865154
580.691943 580.475490 580.211600 579.896204 579.525742
579.097317 578.607218 578.090410 577.583320 577.289776

578.425000	579.369763	580.159229	580.823732	581.356168	579.218024	578.866513	578.521945	578.185031	577.848179
581.777677	582.107351	582.357643	582.536754	582.650000	577.872385	578.664842	579.243848	579.726517	580.139681
					580.493108	580.790797	581.034857	581.227328	581.371084

Row 70

581.404943	581.399842	581.394821	581.389811	581.384740
581.379534	581.374119	581.368421	581.362368	581.355892
581.348929	581.341422	581.333320	581.324581	581.315167
581.305047	581.294194	581.282580	581.270169	581.256899
581.236752	581.197479	581.139829	581.065332	580.975808
580.873201	580.759363	580.635853	580.503852	580.364252
580.217899	580.065953	579.910258	579.753436	579.598253
579.446125	579.298073	579.159741	579.051611	579.056288
579.056338	579.039806	579.024848	579.004989	579.008130
579.028232	579.051772	579.079599	579.114945	579.168773
579.255177	579.379000	579.515172	579.654679	579.792901
579.926394	580.053113	580.172011	580.282642	580.384933
580.479064	580.565409	580.644509	580.717057	580.783909
580.846094	580.904839	580.961595	581.018050	581.076141
581.138011	581.209750	581.267354	581.300198	581.307751
581.289091	581.242916	581.167532	581.060840	580.920340
580.743165	580.526155	580.265952	579.959040	579.601533
579.188144	578.713105	578.217973	577.690754	577.039810
578.134113	579.093822	579.862803	580.498524	581.029369
581.462679	581.800860	582.057209	582.240456	582.356130

Row 71

581.418272	581.411791	581.405259	581.398592	581.391702
581.384494	581.376863	581.368701	581.359889	581.350299
581.339794	581.328220	581.315404	581.301152	581.285237
581.267396	581.247319	581.224649	581.198980	581.169867
581.136838	581.091329	581.026250	580.943447	580.845264
580.734293	580.612970	580.483191	580.346142	580.202429
580.052457	579.897050	579.738239	579.579799	579.426836
579.279635	579.132253	578.986558	579.038296	579.094694
579.109369	579.095169	579.068392	579.035579	579.032866
579.080435	579.143786	579.218761	579.306395	579.412240
579.543447	579.690076	579.833678	579.973683	580.108494
580.236551	580.356777	580.468579	580.571733	580.666263
580.752374	580.830410	580.900829	580.964198	581.021194
581.072600	581.119316	581.162349	581.202794	581.241779
581.280336	581.320569	581.362033	581.380933	581.376037
581.346138	581.289802	581.205360	581.090892	580.944225
580.762953	580.544456	580.285880	579.983993	579.634658
579.231415	578.784676	578.326133	577.826830	577.213528
577.895659	578.864193	579.605087	580.203861	580.699748
581.110129	581.442533	581.700738	581.888179	582.009775

Row 72

581.431557	581.423760	581.415786	581.407537	581.398908
581.389780	581.380023	581.369491	581.358019	581.345423
581.331490	581.315971	581.298578	581.278963	581.256713
581.231328	581.202213	581.168665	581.129880	581.084985
581.033112	580.973513	580.898830	580.804960	580.695025
580.572654	580.441251	580.303218	580.159621	580.010455
579.855160	579.693510	579.527357	579.361661	579.207831
579.072897	579.097509	579.130993	579.160594	579.182588
579.182430	579.158638	579.116894	579.063720	579.039540
579.119676	579.225397	579.344871	579.477388	579.625614
579.792149	579.954671	580.106718	580.249581	580.383504
580.508327	580.623864	580.730041	580.826921	580.914675
580.993566	581.063926	581.126152	581.180695	581.228060
581.268801	581.303503	581.332763	581.357135	581.377037
581.392577	581.403256	581.419194	581.425365	581.409092
581.368875	581.303138	581.210202	581.088257	580.935357
580.749415	580.528181	580.269174	579.969455	579.625075
579.234977	578.834763	578.428581	577.997266	577.484446
577.769046	578.712300	579.397955	579.947335	580.404558
580.786790	581.101431	581.352275	581.542514	581.676199

Row 73

581.444887	581.435847	581.426511	581.416769	581.406497
581.395556	581.383789	581.371016	581.357030	581.341591
581.324417	581.305172	581.283454	581.258773	581.230535
581.198010	581.160313	581.116376	581.064948	581.004636
580.934025	580.851945	580.757876	580.649141	580.523173
580.385235	580.240461	580.092093	579.940770	579.785384
579.623811	579.452845	579.273747	579.091530	579.043530
579.167875	579.230532	579.264631	579.284745	579.289511
579.273819	579.235329	579.174646	579.091429	578.992031
579.142270	579.294273	579.456871	579.629804	579.814246
580.006924	580.183284	580.343498	580.489988	580.624221
580.747061	580.859054	580.960606	581.052067	581.133770
581.206047	581.269233	581.323672	581.369711	581.407701
581.437978	581.460849	581.476544	581.485154	581.486515
581.480027	581.464363	581.443726	581.433100	581.406523
581.356827	581.282282	581.181167	581.051730	580.892170
580.700616	580.475095	580.213445	579.913113	579.572289

Row 74

581.458346	581.448144	581.437536	581.426401	581.414599
581.401972	581.388338	581.373487	581.357175	581.339112
581.318953	581.296286	581.270606	581.241298	581.207599
581.168565	581.123025	581.069534	581.006341	580.931397
580.842480	580.737565	580.615581	580.477530	580.327192
580.167528	580.004972	579.844366	579.684895	579.523282
579.357206	579.173069	579.041360	579.141732	579.235323
579.316015	579.372484	579.405103	579.418068	579.411271
579.382156	579.328261	579.248059	579.140648	579.007105
579.155266	579.350608	579.555869	579.766540	579.982555
580.195274	580.383525	580.550927	580.700865	580.835721
580.957123	581.066192	581.163732	581.250347	581.326516
581.392637	581.449053	581.496058	581.533908	581.562812
581.582917	581.594281	581.596828	581.590268	581.573989
581.656883	581.507092	581.454890	581.409480	581.367589
581.309194	581.226298	581.117112	580.979893	580.812914
580.614445	580.382710	580.115824	579.814281	579.498897
579.182799	578.876235	578.591284	578.347152	578.190696
578.287005	578.689419	579.125020	579.530648	579.897322
580.222448	580.504548	580.742871	580.937675	581.090431

Row 75

581.472011	581.460735	581.448956	581.436539	581.423334
581.409166	581.393832	581.377097	581.358683	581.338261
581.315435	581.289727	581.260551	581.227181	581.188716
581.144022	581.091669	581.029846	580.956267	580.868098
580.761962	580.634269	580.482306	580.306590	580.113558
579.915429	579.725896	579.552087	579.386081	579.217745
579.047981	579.145692	579.244455	579.333971	579.414196
579.481238	579.529682	579.557320	579.563914	579.548326
579.508107	579.440101	579.341059	579.209720	579.057149
579.152959	579.393477	579.644809	579.891802	580.134994
580.363370	580.561272	580.734344	580.886911	581.022091
581.142087	581.248451	581.342288	581.424402	581.495389
581.555700	581.605674	581.645564	581.675539	581.695683
581.705979	581.706275	581.696242	581.675295	581.642490
581.596372	581.534778	581.456177	581.379529	581.305753
581.226832	581.133976	581.016634	580.871078	580.695588
580.488489	580.248785	579.983627	579.701930	579.413027
579.127438	578.857557	578.619785	578.439557	578.361002
578.444579	578.688503	579.008171	579.343079	579.666857
579.966966	580.236379	580.471071	580.669224	580.830837

Row 76

581.485950	581.473696	581.460851	581.447276	581.432808
581.417259	581.400411	581.382008	581.361749	581.339274
581.314149	581.285846	581.253719	581.216964	581.174573
581.125268	581.067411	580.998880	580.916894	580.817780
580.696707	580.547573	580.363875	580.142797	579.893279
579.637893	579.404503	579.217669	579.050140	579.089272
579.218938	579.338082	579.438303	579.524079	579.597634
579.657149	579.699559	579.722397	579.723830	579.701744
579.653131	579.573732	579.457558	579.296758	579.087352
579.102373	579.423627	579.730491	580.011812	580.276563
580.516515	580.721224	580.897929	581.051825	581.186599
581.304854	581.408434	581.498650	581.576436	581.642468
581.697223	581.741031	581.774098	581.796516	581.808257
581.809162	581.798909	581.776967	581.742524	581.694401
581.630922	581.549760	581.448773	581.346568	581.246460
581.141649	581.025261	580.890903	580.733446	580.549817
580.339550	580.104926	579.850746	579.583928	579.313218
579.049243	578.805138	578.597987	578.450975	578.393777
578.451872	578.621185	578.865647	579.146513	579.436631
579.718334	579.980079	580.214680	580.418271	580.589501

Row 77

581.500223	581.487090	581.473295	581.458691	581.443108
581.426351	581.408189	581.388355	581.366531	581.342337
581.315316	581.284912	581.250442	581.211057	581.165690
581.112979	581.051164	580.977923	580.890125	580.783419
580.651558	580.485265	580.270962	579.994125	579.663189
579.322940	579.015384	579.025318	579.190561	579.320293
579.436585	579.542209	579.635784	579.717275	579.786499
579.841775	579.880559			

580.201401 579.967601 579.717840 579.458380 579.197547
578.945791 578.716007 578.524044 578.388872 578.330527
578.363177 578.485842 578.681549 578.926090 579.195319
579.468479 579.729979 579.969663 580.181892 580.364303

580.802925 580.617878 580.419418 580.204595 579.970979
579.717025 579.442644 579.150058 578.844774 578.536176
578.237014 577.961428 577.721884 577.525914 577.374253
577.261251 577.176135 577.114883 577.422331 577.900499
578.343998 578.735141 579.074179 579.365561 579.614549

Row 78

581.514881 581.500972 581.486344 581.470846 581.454305
581.436519 581.417255 581.396237 581.373141 581.347581
581.319090 581.287104 581.250933 581.209719 581.162387
581.107569 581.043489 580.967794 580.877268 580.767326
580.631033 580.456909 580.223198 579.882870 579.414991
579.077429 579.172302 579.309263 579.438311 579.550672
579.653572 579.748958 579.836131 579.913893 579.980686
580.034260 580.071834 580.090493 580.087432 580.059887
580.004676 579.917168 579.789069 579.603488 579.323985
579.009836 579.554989 579.952684 580.270465 580.548554
580.794734 581.001430 581.177506 581.328892 581.459628
581.572532 581.669595 581.752229 581.821432 581.877895
581.922074 581.954232 581.974470 581.982735 581.978818
581.962337 581.932717 581.889146 581.830524 581.755394
581.661859 581.547489 581.411023 581.272480 581.134413
580.991838 580.840007 580.674699 580.492602 580.291710
580.071685 579.834121 579.582715 579.323342 579.064072
578.815130 578.588816 578.399272 578.261765 578.190769
578.196619 578.282509 578.443940 578.667945 578.932000
579.210122 579.481507 579.733128 579.958182 580.153957

Row 82

581.578009 581.562042 581.545272 581.527562 581.508753
581.488667 581.467099 581.443814 581.418542 581.390972
581.360742 581.327436 581.290565 581.249564 581.203773
581.152430 581.094659 581.029480 580.955847 580.872778
580.779701 580.677289 580.569254 580.464913 580.379030
580.324445 580.304785 580.316021 580.351429 580.404665
580.470757 580.545940 580.627074 580.710966 580.792806
580.858692 580.904967 580.931373 580.937666 580.923685
580.889512 580.835851 580.764889 580.686758 580.627594
580.615864 580.676498 580.795223 580.941998 581.101634
581.269286 581.434238 581.579763 581.706984 581.817250
581.911683 581.991175 582.056399 582.107832 582.145774
582.170363 582.181585 582.179274 582.163115 582.132629
582.087161 582.025854 581.947623 581.851116 581.734665
581.596231 581.435464 581.269971 581.102252 580.929511
580.748721 580.556686 580.350111 580.125677 579.880186
579.610852 579.315970 578.996207 578.656549 578.307984
577.967087 577.652677 577.380405 577.156481 576.973915
576.814239 576.643605 576.363450 576.744652 577.474591
578.042205 578.503318 578.884779 579.203573 579.471552

Row 79

581.529963 581.515383 581.500042 581.483788 581.466447
581.447817 581.427665 581.405716 581.381648 581.355078
581.325548 581.292507 581.255281 581.213044 581.164766
581.109146 581.044516 580.968680 580.878672 580.770304
580.637310 580.469391 580.246709 579.915679 579.583644
579.508240 579.529925 579.600177 579.688044 579.778733
579.868320 579.955154 580.037435 580.113065 580.179563
580.233947 580.272837 580.292795 580.290708 580.263984
580.210329 580.126906 580.008643 579.845155 579.614670
579.267220 579.735795 580.122657 580.423891 580.687092
580.924748 581.125704 581.297153 581.444498 581.571437
581.680569 581.773744 581.852282 581.917113 581.968872
582.007964 582.034597 582.048812 582.050486 582.039332
582.014886 581.976478 581.923203 581.853869 581.768594
581.660473 581.532020 581.382277 581.231809 581.080697
580.924626 580.759499 580.581658 580.388177 580.177189
579.948231 579.702595 579.443640 579.177044 578.910872
578.655381 578.422483 578.224877 578.074854 577.982971
577.957300 578.005057 578.136225 578.354760 578.635335
578.937394 579.231934 579.503843 579.746562 579.958160

Row 83

581.594993 581.578761 581.561740 581.543798 581.524790
581.504550 581.482890 581.459597 581.434431 581.407116
581.377341 581.344752 581.308946 581.269472 581.225827
581.177462 581.123798 581.064270 580.998416 580.926060
580.847668 580.764983 580.681930 580.605273 580.543664
580.504480 580.490941 580.502098 580.534722 580.585063
580.649771 580.726092 580.811622 580.903127 580.983573
581.046353 581.091265 581.118213 581.127231 581.118582
581.092957 581.051854 580.998268 580.937812 580.888005
580.876334 580.912142 580.990501 581.098282 581.224700
581.363675 581.510606 581.646263 581.765770 581.869734
581.958773 582.033424 582.094113 582.141137 582.174662
582.194723 582.201224 582.193932 582.172472 582.136312
582.084750 582.016887 581.931600 581.827502 581.702899
581.555725 581.393229 581.228489 581.059667 580.884330
580.699690 580.502620 580.289645 580.056898 579.800081
579.514530 579.195721 578.840950 578.453075 578.05207
577.641231 577.269782 576.955557 576.706655 576.503212
576.309839 576.088220 575.779479 576.042232 577.064067
577.768744 578.301780 578.724128 579.067830 579.352178

Row 80

581.545500 581.530355 581.514421 581.497548 581.479565
581.460274 581.439447 581.416817 581.392071 581.364843
581.334696 581.301108 581.263451 581.220960 581.172700
581.117508 581.053921 580.980075 580.893538 580.791074
580.668272 580.519081 580.336193 580.121603 579.935994
579.846065 579.833037 579.867214 579.927122 579.996633
580.077957 580.158290 580.237732 580.313435 580.382185
580.440202 580.483227 580.506961 580.507774 580.483348
580.432818 580.356219 580.253529 580.123986 579.966667
579.779290 580.030530 580.337320 580.593398 580.828101
581.048805 581.240024 581.404326 581.545998 581.668080
581.772769 581.861656 581.935890 581.996281 582.043374
582.077498 582.098797 582.107245 582.102652 582.084661
582.052735 582.006129 581.943866 581.864683 581.766993
581.648808 581.507681 581.348312 581.189341 581.028385
580.861673 580.685558 580.496700 580.292285 580.070317
579.829973 579.572054 579.299514 579.017953 578.735821
578.464041 578.214891 578.000303 577.830022 577.710406
577.645037 577.640066 577.724714 577.957453 578.293528
578.647422 578.981533 579.282875 579.548073 579.777715

Row 84

581.612457 581.596051 581.578879 581.560820 581.541741
581.521491 581.499902 581.476786 581.451934 581.425110
581.396054 581.364478 581.330068 581.292486 581.251376
581.206388 581.157203 581.103595 581.045534 580.983364
580.918072 580.851673 580.787588 580.730681 580.686504
580.659797 580.653180 580.666952 580.699831 580.749899
580.815270 580.894380 580.985949 581.078500 581.155215
581.215634 581.259646 581.287290 581.298798 581.294693
581.275963 581.244347 581.202742 581.155655 581.109916
581.089813 581.106720 581.157889 581.236330 581.334787
581.444761 581.571490 581.697248 581.809343 581.907165
581.990913 582.060818 582.117080 582.159825 582.189094
582.204822 582.206835 582.194834 582.168390 582.126925
582.069696 581.995767 581.903985 581.792938 581.660905
581.508334 581.349900 581.187402 581.001193 580.843136
580.656626 580.456565 580.239259 580.002921 579.733849
579.432992 579.088670 578.691178 578.236212 577.738220
577.235187 576.773906 576.400908 576.142692 575.945405
575.733692 575.478117 575.197672 575.368731 576.729190
577.556467 578.148685 578.602533 578.964256 579.259842

Row 81

581.561512 581.545906 581.529497 581.512140 581.493670
581.473897 581.452601 581.429530 581.404390 581.376837
581.346469 581.312809 581.275294 581.233249 581.185865
581.132168 581.070976 581.000852 580.920059 580.825319
580.718026 580.592680 580.451532 580.305644 580.183214
580.110280 580.088307 580.105439 580.148943 580.209124
580.279562 580.355969 580.434993 580.513379 580.587382
580.652398 580.700690 580.726951 580.730588 580.710862
580.666917 580.598050 580.509918 580.412036 580.319755
580.278774 580.383578 580.572643 580.770920 580.967992
581.164629 581.343421 581.498781 581.633568 581.749986
581.849709 581.933994 582.003764 582.059673 582.102150
582.131435 582.147593 582.150531 582.139994 582.115562
582.076633 582.022402 581.951833 581.863612 581.756107
581.627304 581.474741 581.310404 581.148836 580.977793

Row 85

581.630386 581.613890 581.596660 581.578588 581.559554
581.539423 581.518048 581.495269 581.470906 581.444767
581.416643 581.386312 581.353541 581.318098 581.279763
581.238353 581.193759 581.146011 581.095369 581.042465
580.984844 580.935367 580.885934 580.843765 580.812697
580.796055 580.795998 580.813357 580.847955 580.899127
580.966196 581.048788 581.145402 581.234290 581.308142
581.366785 581.410197 581.438523 581.452113 581.451610
581.438076 581.413163 581.379307 581.339816 581.298620
581.268274 581.269447 581.300245 581.355921 581.431190
581.521358 581.622618 581.731801 581.837118 581.929203
582.007944 582.073326 582.125358 582.164020 582.189236
582.200853 582.198624 582.182192 582.151078 582.104664
582.042171 581.962636 581.864880 581.747468 581.609093

581.460565	581.307139	581.148036	580.981891	580.806808	581.816712	581.731667	581.636142	581.531180	581.417552
580.620350	580.419467	580.200305	579.957861	579.685331	581.295702	581.165722	581.027339	580.879912	580.722413
579.372939	579.005899	578.561713	578.013882	577.369874	580.553393	580.370920	580.172462	579.954711	579.713338
576.700759	576.078182	575.585703	575.387682	575.275571	579.442726	579.136092	578.787784	578.403720	578.021798
575.042972	575.109817	575.171500	575.093671	576.536967	577.700187	577.470738	577.334202	577.273439	577.263085
577.436844	578.060635	578.528967	578.897731	579.197182	577.281506	577.318006	577.374180	577.474822	577.708407
					578.071551	578.423763	578.733812	579.003109	579.237153

Row 86

581.648760	581.632250	581.615047	581.597055	581.578166
581.558267	581.537229	581.514919	581.491191	581.465891
581.438860	581.409938	581.378968	581.345811	581.310360
581.272568	581.232488	581.190322	581.146507	581.101809
581.057436	581.015132	580.977195	580.946341	580.925391
580.916840	580.922521	580.943497	580.980231	581.032893
581.101735	581.187418	581.285068	581.371062	581.442753
581.500067	581.543061	581.571952	581.587147	581.589312
581.579445	581.558971	581.529796	581.494259	581.454861
581.417446	581.405603	581.420484	581.458118	581.514237
581.584792	581.666178	581.755156	581.848563	581.935494
582.009651	582.070839	582.118917	582.153745	582.175151
582.182904	582.176693	582.156110	582.120635	582.069613
582.002237	581.917521	581.814265	581.691142	581.555876
581.414270	581.266353	581.111540	580.948688	580.776115
580.591571	580.392122	580.173921	579.931756	579.658170
579.341677	578.962714	578.483026	577.816395	576.896648
575.926131	574.933088	574.643995	575.189123	575.539545
575.686189	575.754555	575.748083	575.589361	576.529164
577.431593	578.048606	578.508781	578.870814	579.165363

Row 87

581.667551	581.651096	581.633995	581.616164	581.597510
581.577936	581.557338	581.535605	581.512623	581.488278
581.462454	581.435048	581.405968	581.375155	581.342593
581.308341	581.272561	581.235571	581.197898	581.160348
581.124065	581.090572	581.061752	581.039730	581.026677
581.024567	581.034990	581.059099	581.097707	581.151513
581.221394	581.308764	581.405487	581.489359	581.559445
581.615763	581.658438	581.687728	581.704056	581.708047
581.700577	581.682802	581.656157	581.622263	581.582715
581.540465	581.518528	581.521052	581.544364	581.584768
581.638705	581.702852	581.774094	581.849407	581.925713
581.995789	582.053191	582.097654	582.128945	582.146816
582.150971	582.141047	582.116595	582.077058	582.021752
581.949848	581.860340	581.752469	581.633029	581.505578
581.370765	581.228670	581.078843	580.920322	580.751638
580.570763	580.374992	580.160712	579.922951	579.654518
579.344229	578.972775	578.500790	577.815992	576.878070
576.326593	576.031488	575.960591	576.059418	576.189788
576.278112	576.324914	576.319697	576.210735	576.715951
577.549417	578.114573	578.541760	578.882777	579.163589

Row 88

581.686730	581.670389	581.653455	581.635855	581.617510
581.598341	581.578262	581.557189	581.535038	581.511726
581.487181	581.461345	581.434186	581.405704	581.375958
581.345079	581.313307	581.281021	581.248785	581.217389
581.187880	581.161574	581.140024	581.124939	581.118050
581.120972	581.135100	581.161584	581.201402	581.255525
581.325158	581.412075	581.507340	581.589695	581.658609
581.714177	581.756577	581.786089	581.803120	581.808229
581.802146	581.785777	581.760170	581.726431	581.685564
581.639576	581.610713	581.604050	581.616182	581.643845
581.683896	581.733330	581.789256	581.848838	581.909214
581.967440	582.020177	582.061407	582.089491	582.104124
582.104963	582.091603	582.063559	582.020248	581.960963
581.884856	581.793506	581.691250	581.579499	581.459241
581.331021	581.194934	581.050628	580.897305	580.733712
580.558092	580.368083	580.160532	579.931153	579.673932
579.380034	579.035850	578.620205	578.111096	577.568437
577.144151	576.877334	576.752401	576.733223	576.765716
576.809096	576.847447	576.873979	576.882353	577.143017
577.781210	578.247888	578.620999	578.929285	579.189014

Row 89

581.706261	581.690089	581.673377	581.656065	581.638090
581.619386	581.599890	581.579538	581.558272	581.536041
581.512808	581.488556	581.463297	581.437082	581.410020
581.382295	581.354191	581.326117	581.298637	581.272495
581.248630	581.228177	581.212429	581.202785	581.200658
581.207396	581.224220	581.252213	581.292379	581.345756
581.413607	581.497666	581.591238	581.672549	581.740622
581.795621	581.837759	581.867323	581.884692	581.890345
581.884873	581.868964	581.843365	581.808810	581.765907
581.717057	581.684416	581.671424	581.675101	581.692620
581.721240	581.758295	581.801175	581.847297	581.894072
581.938878	581.979077	582.012070	582.035407	582.046898
582.044709	582.028188	581.996825	581.950466	581.890061

Row 90

581.726110	581.710149	581.693705	581.676729	581.659170
581.640980	581.622110	581.602518	581.582170	581.561041
581.539123	581.516432	581.493016	581.468962	581.444416
581.419594	581.394801	581.370453	581.347091	581.325402
581.306218	581.290513	581.279375	581.273960	581.273540
581.284946	581.303530	581.332167	581.371783	581.423336
581.487929	581.566955	581.657721	581.738352	581.805842
581.860403	581.902277	581.931746	581.949153	581.954901
581.949454	581.933321	581.907019	581.871010	581.825627
581.775611	581.741956	581.725103	581.721058	581.732277
581.751633	581.778411	581.810312	581.845036	581.880283
581.913752	581.943162	581.966312	581.981158	581.985922
581.979197	581.960039	581.928000	581.883116	581.825826
581.756849	581.677052	581.587311	581.488402	581.380916
581.265209	581.141368	581.009195	580.868195	580.717571
580.556203	580.382625	580.194988	579.991036	579.768137
579.523546	579.255320	578.964902	578.662277	578.370204
578.117314	577.923201	577.792660	577.719161	577.690785
577.696556	577.731230	577.798447	577.914321	578.101614
578.349675	578.613865	578.865732	579.095852	579.302712

Row 91

581.746237	581.730524	581.714385	581.697782	581.680676
581.663031	581.644816	581.626007	581.606588	581.586557
581.565932	581.544753	581.523095	581.501071	581.478850
581.456665	581.434827	581.413741	581.393917	581.375974
581.360646	581.348769	581.341260	581.339082	581.343210
581.354586	581.374105	581.402596	581.440848	581.489640
581.549793	581.622204	581.707251	581.787487	581.854591
581.908815	581.950416	581.979669	581.996878	582.002376
581.996521	581.979675	581.952179	581.914296	581.866161
581.818338	581.785767	581.767029	581.760389	581.764007
581.775972	581.794327	581.817086	581.842244	581.867789
581.891719	581.912074	581.926978	581.934711	581.933780
581.922992	581.901512	581.868888	581.825033	581.770175
581.704772	581.629414	581.544723	581.451272	581.349512
581.239728	581.122006	580.996218	580.862014	580.718819
580.565837	580.402056	580.226281	580.037203	579.833585
579.614692	579.381203	579.136856	578.890489	578.656484
578.451148	578.286766	578.168322	578.094254	578.059410
578.058565	578.089343	578.153966	578.258906	578.408877
578.595893	578.800460	579.005078	579.199847	579.380496

Row 92

581.766605	581.751169	581.735364	581.719160	581.702531
581.685452	581.667907	581.649887	581.631392	581.612439
581.593064	581.573328	581.553323	581.533181	581.513083
581.493267	581.474040	581.455787	581.438975	581.424161
581.411987	581.403167	581.398476	581.398716	581.404695
581.417193	581.436944	581.464626	581.500854	581.546188
581.601126	581.666061	581.741160	581.820278	581.887152
581.941117	581.982439	582.011381	582.028212	582.033202
582.026621	582.008716	581.979688	581.939656	581.890304
581.848456	581.818306	581.799128	581.789804	581.788977
581.795136	581.806666	581.821888	581.839083	581.856515
581.872458	581.885230	581.893233	581.895008	581.889286
581.875043	581.851533	581.818312	581.775215	581.722331
581.659931	581.588409	581.508203	581.419733	581.323343
581.219267	581.107597	580.988273	580.861079	580.725647
580.581475	580.427962	580.264471	580.090446	579.905646
579.710538	579.506957	579.298976	579.093599	578.900431
578.729716	578.589606	578.484418	578.414708	578.378664
578.374000	578.399560	578.456033	578.545077	578.666271
578.813719	578.976777	579.144589	579.309243	579.466067

Row 93

581.787174	581.772038	581.756588	581.740803	581.724665
581.708163	581.691290	581.674051	581.656461	581.638549
581.620368	581.601992	581.583525	581.565109	581.546929
581.529222	581.512282	581.494666		

581.834272	581.809030	581.775270	581.732787	581.681572	581.809170	581.799557	581.787162	581.771323	581.751446
581.621772	581.553641	581.477484	581.393608	581.302282	581.727019	581.697628	581.662953	581.622775	581.576965
581.203704	581.097977	580.985108	580.864997	580.737461	581.525477	581.468332	581.405605	581.337407	581.263880
580.602253	580.459110	580.307835	580.148421	579.981260	581.185178	581.101474	581.012953	580.919828	580.822348
579.807445	579.629184	579.450210	579.275957	579.113153	580.720834	580.615702	580.507512	580.397021	580.285231
578.968712	578.848349	578.755637	578.691914	578.656935	580.173438	580.063259	579.956618	579.855671	579.762684
578.649836	578.669955	578.717098	578.790933	578.889624	579.679855	579.609138	579.552105	579.509868	579.483071
579.008675	579.141351	579.280483	579.420095	579.555987	579.471921	579.476227	579.495408	579.528485	579.574058
					579.630335	579.695231	579.766530	579.842062	579.919856

Row 94

581.807909	581.793089	581.778007	581.762651	581.747012
581.731087	581.714879	581.698404	581.681688	581.664772
581.647717	581.630608	581.613556	581.596708	581.580247
581.564401	581.549447	581.535713	581.523581	581.513487
581.505911	581.501374	581.500419	581.503596	581.511445
581.524470	581.543124	581.567783	581.598727	581.636102
581.679870	581.729715	581.784893	581.843990	581.904596
581.958233	581.998999	582.027134	582.042844	582.046305
582.037651	582.016967	581.984313	581.946932	581.912286
581.882514	581.858665	581.841024	581.829351	581.823045
581.821257	581.822968	581.827038	581.832257	581.837377
581.841145	581.842336	581.839791	581.832445	581.819367
581.799784	581.773100	581.738907	581.696975	581.647237
581.589754	581.524684	581.452236	581.372640	581.286108
581.192818	581.092890	580.986385	580.873312	580.753637
580.627321	580.494368	580.354901	580.209278	580.058256
579.903199	579.746312	579.590821	579.440957	579.301626
579.177755	579.073534	578.991877	578.934311	578.901259
578.892510	578.907624	578.946025	579.006684	579.087529
579.185051	579.294563	579.411036	579.529951	579.647773

Row 95

581.828772	581.814278	581.799574	581.784651	581.769510
581.754154	581.738597	581.722860	581.706979	581.691004
581.675002	581.659063	581.643303	581.627867	581.612932
581.598716	581.585473	581.573502	581.563143	581.554777
581.548816	581.545699	581.545879	581.549804	581.557907
581.570579	581.588154	581.610883	581.638910	581.672230
581.710636	581.753636	581.800337	581.849291	581.898325
581.944447	581.983841	582.011522	582.026559	582.029603
582.019208	581.998418	581.971930	581.943474	581.915904
581.891154	581.870348	581.853968	581.842014	581.834138
581.829733	581.828014	581.828063	581.828884	581.829432
581.828651	581.825502	581.818998	581.808230	581.792397
581.770823	581.742978	581.708481	581.667096	581.618720
581.563358	581.501101	581.432096	581.356515	581.274537
581.186324	581.092015	580.991723	580.885540	580.773556
580.655893	580.532748	580.404464	580.271623	580.135165
579.965519	579.857732	579.721530	579.591247	579.470582
579.363192	579.272256	579.200141	579.148309	579.117414
579.107529	579.118331	579.149141	579.198777	579.265318
579.345983	579.437311	579.535597	579.637368	579.739711

Row 96

581.849729	581.835568	581.821243	581.806752	581.792102
581.777302	581.762373	581.747343	581.732253	581.717159
581.702133	581.687267	581.672675	581.658501	581.644912
581.632111	581.620331	581.609842	581.600942	581.593961
581.589252	581.587184	581.588128	581.592447	581.600481
581.612525	581.628813	581.649493	581.674601	581.704022
581.737447	581.774300	581.813667	581.854204	581.894075
581.930965	581.962262	581.985462	581.998754	582.001562
581.994747	581.980333	581.960926	581.939121	581.917111
581.896521	581.878403	581.863307	581.851373	581.842426
581.836046	581.831636	581.828468	581.825726	581.822544
581.818036	581.811325	581.801572	581.788002	581.769924
581.746750	581.718009	581.683351	581.642543	581.595465
581.542087	581.482459	581.416681	581.344891	581.267242
581.183893	581.094999	581.000714	580.901199	580.796638
580.687267	580.573420	580.455578	580.334444	580.211025
580.086710	579.963332	579.843182	579.728923	579.623418
579.529471	579.449549	579.385582	579.338864	579.310089
579.299434	579.306654	579.331094	579.371636	579.426616
579.493809	579.570563	579.654048	579.741542	579.830653

Row 97

581.870749	581.856921	581.842973	581.828909	581.814738
581.800476	581.786149	581.771789	581.757442	581.743166
581.729037	581.715145	581.701605	581.688549	581.676138
581.664558	581.654021	581.644764	581.637051	581.631165
581.627406	581.626080	581.627491	581.631927	581.639650
581.650875	581.665754	581.684353	581.706630	581.732400
581.761298	581.792733	581.825840	581.859439	581.892027
581.921833	581.946981	581.965769	581.977013	581.980341
581.976291	581.966170	581.951731	581.934814	581.917074
581.899821	581.883970	581.870062	581.858305	581.848634
581.840768	581.834256	581.828526	581.822915	581.816710

Row 98

581.891799	581.878304	581.864728	581.851079	581.837372
581.823626	581.809870	581.796141	581.782486	581.768966
581.755656	581.742644	581.730041	581.717972	581.706586
581.696051	581.686558	581.678318	581.671559	581.666523
581.663463	581.662631	581.664272	581.668613	581.675850
581.686132	581.699547	581.716101	581.735696	581.758107
581.782953	581.809666	581.837464	581.865344	581.892094
581.916360	581.936774	581.952144	581.961660	581.965063
581.962698	581.955429	581.944456	581.931093	581.916574
581.901930	581.887926	581.875051	581.863533	581.853373
581.844387	581.836239	581.828478	581.820572	581.811933
581.801946	581.789992	581.775472	581.757822	581.736532
581.711161	581.681343	581.646792	581.607306	581.562757
581.513092	581.458316	581.398488	581.333705	581.264099
581.189827	581.111072	581.028045	580.940994	580.850214
580.756076	580.659045	580.559718	580.458856	580.357419
580.256592	580.157787	580.062625	579.972875	579.890359
579.816833	579.753867	579.702746	579.664408	579.639420
579.627984	579.629950	579.644826	579.671780	579.709653
579.756993	579.812134	579.873308	579.938757	580.006851

Row 99

581.912854	581.899686	581.886473	581.873227	581.859964
581.846709	581.833492	581.820352	581.807339	581.794512
581.781944	581.769723	581.757951	581.746746	581.736244
581.726598	581.717977	581.710565	581.704561	581.700170
581.697602	581.697064	581.698752	581.702840	581.709469
581.718739	581.730686	581.745273	581.762369	581.781732
581.802986	581.825607	581.848933	581.872061	581.894082
581.913933	581.930602	581.943227	581.951236	581.954433
581.953039	581.947638	581.939060	581.928248	581.916120
581.903475	581.890934	581.878916	581.867641	581.857148
581.847317	581.837897	581.828536	581.818804	581.808221
581.796278	581.782456	581.766250	581.747182	581.724816
581.698771	581.668727	581.634432	581.595702	581.552419
581.504526	581.452025	581.394962	581.333430	581.267553
581.197493	581.123439	581.045619	580.964304	580.879819
580.792561	580.703016	580.611787	580.519614	580.427394
580.336194	580.247245	580.161920	580.081684	580.008022
579.942359	579.885970	579.839910	579.804963	579.781617
579.770056	579.770162	579.781525	579.803453	579.834991
579.874956	579.922003	579.974697	580.031604	580.091363

Row 100

581.933887	581.921038	581.908177	581.895318	581.882480
581.869689	581.856978	581.844385	581.831961	581.819765
581.807868	581.796352	581.785313	581.774860	581.765116
581.756219	581.748319	581.741575	581.736158	581.732240
581.729997	581.729594	581.731187	581.734906	581.740852
581.749080	581.759592	581.772320	581.787116	581.803734
581.821823	581.840910	581.860407	581.879617	581.897761
581.914033	581.927667	581.938027	581.944689	581.947501
581.946601	581.942384	581.935433	581.926425	581.916043
581.904899	581.893485	581.882152	581.871095	581.860369
581.849887	581.839491	581.828875	581.817703	581.805583
581.792092	581.776800	581.759282	581.739131	581.715978
581.689495	581.659404	581.625485	581.587575	581.545566
581.499407	581.449097	581.394680	581.336244	581.273911
581.207844	581.138238	581.065332	580.989408	580.910804
580.829929	580.747271	580.663420	580.579077	580.495067
580.412346	580.331984	580.255150	580.183067	580.116962
580.058003	580.007236	579.965532	579.933544	579.911688
579.900124	579.898762	579.907265	579.925059	579.951360
579.985201	580.025484	580.071035	580.120669	580.173245

Row 101

581.954875	581.942337	581.929815	581.917325	581.904890
581.892535	581.880294	581.868208	581.856324	581.844700
58				

581.852404	581.841235	581.829641	581.817343	581.804021	580.944664	580.879396	580.813880	580.748670	580.684381
581.789325	581.772898	581.754381	581.733434	581.709742	580.621681	580.561282	580.503924	580.450353	580.401294
581.683024	581.653043	581.619607	581.582573	581.541849	580.357427	580.319359	580.287594	580.262518	580.244383
581.497390	581.449196	581.397313	581.341826	581.282857	580.233295	580.229214	580.231956	580.241200	580.256507
581.220569	581.155159	581.086871	581.015991	580.942862	580.277334	580.303059	580.333011	580.366494	580.402817
580.867887	580.791548	580.714404	580.637114	580.560428					
580.485195	580.412350	580.342891	580.277849	580.218246					
580.165049	580.119122	580.081189	580.051796	580.031293					
580.019822	580.017311	580.023486	580.037874	580.059828					
580.088556	580.123154	580.162653	580.206069	580.252439					

Row 102

581.975799	581.963560	581.951362	581.939224	581.927167
581.915221	581.903416	581.891795	581.880403	581.869295
581.858536	581.848197	581.838361	581.829118	581.820566
581.812816	581.805980	581.800178	581.795533	581.792165
581.790190	581.789715	581.790830	581.793603	581.798074
581.804244	581.812070	581.821458	581.832250	581.844224
581.857089	581.870481	581.883974	581.897091	581.909327
581.920180	581.929193	581.935990	581.940318	581.942068
581.941284	581.938145	581.932941	581.926023	581.917763
581.908511	581.898567	581.888154	581.877411	581.866390
581.855055	581.843300	581.830951	581.817783	581.803535
581.787918	581.770635	581.751386	581.729885	581.705865
581.679087	581.649350	581.616489	581.580382	581.540951
581.498159	581.452012	581.402557	581.349878	581.294098
581.235378	581.173917	581.109956	581.043782	580.975730
580.906197	580.835641	580.764591	580.693654	580.623510
580.554913	580.488678	580.425663	580.366740	580.312770
580.264559	580.222829	580.188182	580.161077	580.141810
580.130502	580.127102	580.131383	580.142957	580.161291
580.185729	580.215526	580.249876	580.287955	580.328949

Row 103

581.996640	581.984687	581.972799	581.960992	581.949292
581.937725	581.926323	581.915127	581.904181	581.893537
581.883255	581.873402	581.864051	581.855285	581.847192
581.839867	581.833410	581.827921	581.823505	581.820261
581.818282	581.817650	581.818434	581.820679	581.824404
581.829594	581.836194	581.844105	581.853176	581.863202
581.873922	581.885022	581.896140	581.906881	581.916834
581.925597	581.932806	581.938164	581.941466	581.942616
581.941631	581.938629	581.933810	581.927427	581.919753
581.911050	581.901545	581.891414	581.880765	581.869643
581.858023	581.845819	581.832895	581.819066	581.804120
581.787818	581.769912	581.750154	581.728302	581.704132
581.677444	581.648065	581.615858	581.580719	581.542585
581.501427	581.457259	581.410129	581.360123	581.307362
581.252007	581.194253	581.134338	581.072542	581.009191

Streamlines

Number of Streamlines = 255

End x: 10066.327543 y: 9504.197345

Streamline #6

Coordinates of Streamline:
Start x: 10000.037778 y: 9540.468788
End x: 10069.146477 y: 9506.737029

Streamline #7

Coordinates of Streamline:
Start x: 10003.803333 y: 9544.964545
End x: 10071.899481 y: 9509.335615

Streamline #8

Coordinates of Streamline:
Start x: 10007.568889 y: 9549.460303
End x: 10074.638961 y: 9512.073374

Streamline #9

Coordinates of Streamline:
Start x: 10011.334444 y: 9553.956061
End x: 10077.810260 y: 9515.485706

Streamline #10

Coordinates of Streamline:
Start x: 10015.100000 y: 9558.451818
End x: 10081.226513 y: 9519.291650

Streamline #5

Coordinates of Streamline:
Start x: 9996.272222 y: 9535.973030

Streamline #11

Coordinates of Streamline:

Start x: 10018.865556 y: 9562.947576
End x: 10084.580232 y: 9523.066393

Streamline #12

Coordinates of Streamline:

Start x: 10022.631111 y: 9567.443333
End x: 10087.962572 y: 9526.914458

Streamline #13

Coordinates of Streamline:

Start x: 10026.396667 y: 9571.939091
End x: 10091.371689 y: 9530.824874

Streamline #14

Coordinates of Streamline:

Start x: 10030.162222 y: 9576.434848
End x: 10094.805501 y: 9534.789091

Streamline #15

Coordinates of Streamline:

Start x: 10033.927778 y: 9580.930606
End x: 10098.262957 y: 9538.801519

Streamline #16

Coordinates of Streamline:

Start x: 10037.693333 y: 9585.426364
End x: 10101.743430 y: 9542.858129

Streamline #17

Coordinates of Streamline:

Start x: 10041.458889 y: 9589.922121
End x: 10105.246537 y: 9546.955879

Streamline #18

Coordinates of Streamline:

Start x: 10045.224444 y: 9594.417879
End x: 10101.094133 y: 9556.885339

Streamline #19

Coordinates of Streamline:

Start x: 10048.990000 y: 9598.913636
End x: 10104.658201 y: 9561.080229

Streamline #20

Coordinates of Streamline:

Start x: 10052.755556 y: 9603.409394
End x: 10108.239869 y: 9565.304262

Streamline #21

Coordinates of Streamline:

Start x: 10056.521111 y: 9607.905152
End x: 10111.837144 y: 9569.553659

Streamline #22

Coordinates of Streamline:

Start x: 10060.286667 y: 9612.400909
End x: 10115.447139 y: 9573.823658

Streamline #23

Coordinates of Streamline:

Start x: 10064.052222 y: 9616.896667
End x: 10119.065357 y: 9578.107549

Streamline #24

Coordinates of Streamline:

Start x: 10067.817778 y: 9621.392424
End x: 10122.685230 y: 9582.396092

Streamline #25

Coordinates of Streamline:

Start x: 10071.583333 y: 9625.888182
End x: 10126.304002 y: 9586.685340

Streamline #26

Coordinates of Streamline:

Start x: 10075.348889 y: 9630.383939

End x: 10129.914231 y: 9590.965401

Streamline #27

Coordinates of Streamline:

Start x: 10079.114444 y: 9634.879697
End x: 10133.494946 y: 9595.209374

Streamline #28

Coordinates of Streamline:

Start x: 10082.880000 y: 9639.375455
End x: 10137.069661 y: 9599.448893

Streamline #29

Coordinates of Streamline:

Start x: 10086.645556 y: 9643.871212
End x: 10140.656361 y: 9603.707074

Streamline #30

Coordinates of Streamline:

Start x: 10090.411111 y: 9648.366970
End x: 10144.263304 y: 9607.993835

Streamline #31

Coordinates of Streamline:

Start x: 10094.176667 y: 9652.862727
End x: 10147.895200 y: 9612.314423

Streamline #32

Coordinates of Streamline:

Start x: 10097.942222 y: 9657.358485
End x: 10151.555162 y: 9616.672069

Streamline #33

Coordinates of Streamline:

Start x: 10101.707778 y: 9661.854242
End x: 10155.245393 y: 9621.068954

Streamline #34

Coordinates of Streamline:

Start x: 10105.473333 y: 9666.350000
End x: 10158.967433 y: 9625.506552

Streamline #35

Coordinates of Streamline:

Start x: 10109.238889 y: 9670.845758
End x: 10162.722134 y: 9629.985656

Streamline #36

Coordinates of Streamline:

Start x: 10113.004444 y: 9675.341515
End x: 10166.509410 y: 9634.506100

Streamline #37

Coordinates of Streamline:

Start x: 10116.770000 y: 9679.837273
End x: 10170.327656 y: 9639.066071

Streamline #38

Coordinates of Streamline:

Start x: 10120.535556 y: 9684.333030
End x: 10174.172602 y: 9643.660662

Streamline #39

Coordinates of Streamline:

Start x: 10124.301111 y: 9688.828788
End x: 10178.036225 y: 9648.280345

Streamline #40

Coordinates of Streamline:

Start x: 10128.066667 y: 9693.324545
End x: 10181.917398 y: 9652.924331

Streamline #41

Coordinates of Streamline:

Start x: 10131.832222 y: 9697.820303
End x: 10185.777356 y: 9657.543074

Streamline #42

Coordinates of Streamline:

Start x: 10135.597778 y: 9702.316061
End x: 10189.544612 y: 9662.040767

Streamline #43

Coordinates of Streamline:

Start x: 10139.363333 y: 9706.811818
End x: 10193.264893 y: 9666.477056

Streamline #44

Coordinates of Streamline:

Start x: 10143.128889 y: 9711.307576
End x: 10196.970653 y: 9670.894882

Streamline #45

Coordinates of Streamline:

Start x: 10146.894444 y: 9715.803333
End x: 10200.676597 y: 9675.313349

Streamline #46

Coordinates of Streamline:

Start x: 10150.660000 y: 9720.299091
End x: 10204.390701 y: 9679.742622

Streamline #47

Coordinates of Streamline:

Start x: 10154.425556 y: 9724.794848
End x: 10208.117751 y: 9684.188732

Streamline #48

Coordinates of Streamline:

Start x: 10158.191111 y: 9729.290606
End x: 10211.859831 y: 9688.654323

Streamline #49

Coordinates of Streamline:

Start x: 10161.956667 y: 9733.786364
End x: 10215.612329 y: 9693.133778

Streamline #50

Coordinates of Streamline:

Start x: 10165.722222 y: 9738.282121
End x: 10219.384385 y: 9697.638698

Streamline #51

Coordinates of Streamline:

Start x: 10169.487778 y: 9742.777879
End x: 10223.178233 y: 9702.172194

Streamline #52

Coordinates of Streamline:

Start x: 10173.253333 y: 9747.273636
End x: 10226.978972 y: 9706.716124

Streamline #53

Coordinates of Streamline:

Start x: 10177.018889 y: 9751.769394
End x: 10230.822150 y: 9711.316150

Streamline #54

Coordinates of Streamline:

Start x: 10180.784444 y: 9756.265152
End x: 10234.803630 y: 9716.092004

Streamline #55

Coordinates of Streamline:

Start x: 10184.550000 y: 9760.760909
End x: 10239.237754 y: 9721.508932

Streamline #56

Coordinates of Streamline:

Start x: 10188.315556 y: 9765.256667
End x: 10243.021658 y: 9726.024326

Streamline #57

Coordinates of Streamline:

Start x: 10192.081111 y: 9769.752424
End x: 10246.619011 y: 9730.277498

Streamline #58

Coordinates of Streamline:

Start x: 10195.846667 y: 9774.248182
End x: 10250.180998 y: 9734.490714

Streamline #59

Coordinates of Streamline:

Start x: 10199.612222 y: 9778.743939
End x: 10253.713838 y: 9738.669994

Streamline #60

Coordinates of Streamline:

Start x: 10203.377778 y: 9783.239697
End x: 10257.222324 y: 9742.821252

Streamline #61

Coordinates of Streamline:

Start x: 10207.143333 y: 9787.735455
End x: 10260.712468 y: 9746.952856

Streamline #62

Coordinates of Streamline:

Start x: 10210.908889 y: 9792.231212
End x: 10264.173917 y: 9751.051974

Streamline #63

Coordinates of Streamline:

Start x: 10214.674444 y: 9796.726970
End x: 10267.612784 y: 9755.128302

Streamline #64

Coordinates of Streamline:

Start x: 10218.440000 y: 9801.222727
End x: 10271.019900 y: 9759.172298

Streamline #65

Coordinates of Streamline:

Start x: 10222.205556 y: 9805.718485
End x: 10274.403938 y: 9763.197887

Streamline #66

Coordinates of Streamline:

Start x: 10225.971111 y: 9810.214242
End x: 10277.770673 y: 9767.215225

Streamline #67

Coordinates of Streamline:

Start x: 10229.736667 y: 9814.710000
End x: 10281.128747 y: 9771.237643

Streamline #68

Coordinates of Streamline:

Start x: 10233.502222 y: 9819.205758
End x: 10284.480340 y: 9775.271545

Streamline #69

Coordinates of Streamline:

Start x: 10237.267778 y: 9823.701515
End x: 10287.838508 y: 9779.340288

Streamline #70

Coordinates of Streamline:

Start x: 10241.033333 y: 9828.197273
End x: 10291.201263 y: 9783.456278

Streamline #71

Coordinates of Streamline:

Start x: 10244.798889 y: 9832.693030
End x: 10293.944001 y: 9786.790942

Streamline #72

Coordinates of Streamline:

Start x: 10248.564444 y: 9837.188788
End x: 10296.966465 y: 9790.538455

Streamline #73

Coordinates of Streamline:

Start x: 10252.330000 y: 9841.684545
End x: 10300.006883 y: 9794.348987

Streamline #74

Coordinates of Streamline:
Start x: 10256.095556 y: 9846.180303
End x: 10303.039512 y: 9798.196884

Streamline #75

Coordinates of Streamline:
Start x: 10259.861111 y: 9850.676061
End x: 10306.054825 y: 9802.079868

Streamline #76

Coordinates of Streamline:
Start x: 10263.626667 y: 9855.171818
End x: 10309.041535 y: 9805.998118

Streamline #77

Coordinates of Streamline:
Start x: 10267.392222 y: 9859.667576
End x: 10311.983436 y: 9809.952156

Streamline #78

Coordinates of Streamline:
Start x: 10271.157778 y: 9864.163333
End x: 10314.855646 y: 9813.940442

Streamline #79

Coordinates of Streamline:
Start x: 10274.923333 y: 9868.659091
End x: 10317.619726 y: 9817.955271

Streamline #80

Coordinates of Streamline:
Start x: 10278.688889 y: 9873.154848
End x: 10320.217623 y: 9821.974949

Streamline #81

Coordinates of Streamline:
Start x: 10282.454444 y: 9877.650606
End x: 10322.566427 y: 9825.950065

Streamline #82

Coordinates of Streamline:
Start x: 10286.220000 y: 9882.146364
End x: 10324.558128 y: 9829.780645

Streamline #83

Coordinates of Streamline:
Start x: 10289.985556 y: 9886.642121
End x: 10326.054511 y: 9833.254199

Streamline #84

Coordinates of Streamline:
Start x: 10293.751111 y: 9891.137879
End x: 10326.887124 y: 9836.047419

Streamline #85

Coordinates of Streamline:
Start x: 10297.516667 y: 9895.633636
End x: 10327.088750 y: 9838.385503

Streamline #86

Coordinates of Streamline:
Start x: 10301.282222 y: 9900.129394
End x: 10326.908711 y: 9840.818796

Streamline #87

Coordinates of Streamline:
Start x: 10305.047778 y: 9904.625152
End x: 10326.495700 y: 9843.525465

Streamline #88

Coordinates of Streamline:
Start x: 10308.813333 y: 9909.120909
End x: 10333.395660 y: 9840.475953

Streamline #89

Coordinates of Streamline:
Start x: 10312.578889 y: 9913.616667
End x: 10332.191553 y: 9843.180230

Streamline #90

Coordinates of Streamline:
Start x: 10316.344444 y: 9918.112424
End x: 10335.618529 y: 9847.709055

Streamline #91

Coordinates of Streamline:
Start x: 10320.110000 y: 9922.608182
End x: 10338.011658 y: 9851.097032

Streamline #92

Coordinates of Streamline:
Start x: 10323.875556 y: 9927.103939
End x: 10336.662099 y: 9854.579301

Streamline #93

Coordinates of Streamline:
Start x: 10327.641111 y: 9931.599697
End x: 10341.421670 y: 9850.429638

Streamline #94

Coordinates of Streamline:
Start x: 10331.406667 y: 9936.095455
End x: 10342.386839 y: 9854.593058

Streamline #95

Coordinates of Streamline:
Start x: 10335.172222 y: 9940.591212
End x: 10444.725106 y: 9879.763870

Streamline #96

Coordinates of Streamline:
Start x: 10338.937778 y: 9945.086970
End x: 10445.984334 y: 9878.149938

Streamline #97

Coordinates of Streamline:
Start x: 10342.703333 y: 9949.582727
End x: 10446.990151 y: 9876.796566

Streamline #98

Coordinates of Streamline:
Start x: 10346.468889 y: 9954.078485
End x: 10447.680195 y: 9876.103971

Streamline #99

Coordinates of Streamline:
Start x: 10350.234444 y: 9958.574242
End x: 10448.169339 y: 9875.928413

Streamline #100

Coordinates of Streamline:
Start x: 10354.000000 y: 9963.070000
End x: 10448.510677 y: 9876.188632

Streamline #101

Coordinates of Streamline:
Start x: 10362.030000 y: 9971.100000
End x: 10449.253765 y: 9876.623906

Streamline #102

Coordinates of Streamline:
Start x: 10371.432838 y: 9968.713108
End x: 10450.095901 y: 9877.058368

Streamline #103

Coordinates of Streamline:
Start x: 10380.835676 y: 9966.326216
End x: 10450.875163 y: 9878.176175

Streamline #104

Coordinates of Streamline:
Start x: 10390.238514 y: 9963.939324
End x: 10453.615960 y: 9870.553550

Streamline #105

Coordinates of Streamline:
Start x: 10399.641351 y: 9961.552432
End x: 10454.604781 y: 9873.023164

Streamline #106

Coordinates of Streamline:

Start x: 10409.044189 y: 9959.165541
End x: 10455.673909 y: 9876.098644

Streamline #107

Coordinates of Streamline:

Start x: 10418.447027 y: 9956.778649
End x: 10458.097539 y: 9870.214512

Streamline #108

Coordinates of Streamline:

Start x: 10427.849865 y: 9954.391757
End x: 10460.002951 y: 9864.876741

Streamline #109

Coordinates of Streamline:

Start x: 10437.252703 y: 9952.004865
End x: 10462.475998 y: 9869.745433

Streamline #110

Coordinates of Streamline:

Start x: 10446.655541 y: 9949.617973
End x: 10464.986158 y: 9865.572821

Streamline #111

Coordinates of Streamline:

Start x: 10456.058378 y: 9947.231081
End x: 10467.622872 y: 9861.981102

Streamline #112

Coordinates of Streamline:

Start x: 10465.461216 y: 9944.844189
End x: 10470.561771 y: 9858.930529

Streamline #113

Coordinates of Streamline:

Start x: 10474.864054 y: 9942.457297
End x: 10476.134601 y: 9865.711784

Streamline #114

Coordinates of Streamline:

Start x: 10484.266892 y: 9940.070405
End x: 10480.486349 y: 9863.387595

Streamline #115

Coordinates of Streamline:

Start x: 10493.669730 y: 9937.683514
End x: 10485.340437 y: 9861.341362

Streamline #116

Coordinates of Streamline:

Start x: 10503.072568 y: 9935.296622
End x: 10487.342844 y: 9850.480515

Streamline #117

Coordinates of Streamline:

Start x: 10512.475405 y: 9932.909730
End x: 10492.975015 y: 9848.845867

Streamline #118

Coordinates of Streamline:

Start x: 10521.878243 y: 9930.522838
End x: 10499.170326 y: 9847.246022

Streamline #119

Coordinates of Streamline:

Start x: 10531.281081 y: 9928.135946
End x: 10505.917422 y: 9845.620108

Streamline #120

Coordinates of Streamline:

Start x: 10540.683919 y: 9925.749054
End x: 10513.223454 y: 9843.910380

Streamline #121

Coordinates of Streamline:

Start x: 10550.086757 y: 9923.362162

End x: 10521.139568 y: 9842.050391

Streamline #122

Coordinates of Streamline:

Start x: 10559.489595 y: 9920.975270
End x: 10524.297184 y: 9832.054452

Streamline #123

Coordinates of Streamline:

Start x: 10568.892432 y: 9918.588378
End x: 10533.600138 y: 9829.829400

Streamline #124

Coordinates of Streamline:

Start x: 10578.295270 y: 9916.201486
End x: 10545.806654 y: 9826.097859

Streamline #125

Coordinates of Streamline:

Start x: 10587.698108 y: 9913.814595
End x: 10563.453976 y: 9820.960313

Streamline #126

Coordinates of Streamline:

Start x: 10597.100946 y: 9911.427703
End x: 10575.501143 y: 9818.066461

Streamline #127

Coordinates of Streamline:

Start x: 10606.503784 y: 9909.040811
End x: 10585.526710 y: 9815.489570

Streamline #128

Coordinates of Streamline:

Start x: 10615.906622 y: 9906.653919
End x: 10594.565638 y: 9813.087031

Streamline #129

Coordinates of Streamline:

Start x: 10625.309459 y: 9904.267027
End x: 10603.074452 y: 9810.816343

Streamline #130

Coordinates of Streamline:

Start x: 10634.712297 y: 9901.880135
End x: 10611.282473 y: 9808.651886

Streamline #131

Coordinates of Streamline:

Start x: 10644.115135 y: 9899.493243
End x: 10619.320503 y: 9806.575119

Streamline #132

Coordinates of Streamline:

Start x: 10653.517973 y: 9897.106351
End x: 10627.277351 y: 9804.575346

Streamline #133

Coordinates of Streamline:

Start x: 10662.920811 y: 9894.719459
End x: 10635.236006 y: 9802.652216

Streamline #134

Coordinates of Streamline:

Start x: 10672.323649 y: 9892.332568
End x: 10643.374741 y: 9800.819823

Streamline #135

Coordinates of Streamline:

Start x: 10681.726486 y: 9889.945676
End x: 10655.542218 y: 9797.401860

Streamline #136

Coordinates of Streamline:

Start x: 10691.129324 y: 9887.558784
End x: 10666.812081 y: 9794.520517

Streamline #137

Coordinates of Streamline:

Start x: 10700.532162 y: 9885.171892
End x: 10676.920520 y: 9791.951939

Streamline #138

Coordinates of Streamline:
Start x: 10709.935000 y: 9882.785000
End x: 10686.681448 y: 9789.470579

Streamline #139

Coordinates of Streamline:
Start x: 10719.337838 y: 9880.398108
End x: 10696.234709 y: 9787.040742

Streamline #140

Coordinates of Streamline:
Start x: 10728.740676 y: 9878.011216
End x: 10705.651912 y: 9784.645536

Streamline #141

Coordinates of Streamline:
Start x: 10738.143514 y: 9875.624324
End x: 10714.977683 y: 9782.274899

Streamline #142

Coordinates of Streamline:
Start x: 10747.546351 y: 9873.237432
End x: 10724.239538 y: 9779.923153

Streamline #143

Coordinates of Streamline:
Start x: 10756.949189 y: 9870.850541
End x: 10733.461880 y: 9777.586194

Streamline #144

Coordinates of Streamline:
Start x: 10766.352027 y: 9868.463649
End x: 10742.690908 y: 9775.255972

Streamline #145

Coordinates of Streamline:
Start x: 10775.754865 y: 9866.076757
End x: 10752.073073 y: 9772.899539

Streamline #146

Coordinates of Streamline:
Start x: 10785.157703 y: 9863.689865
End x: 10763.418008 y: 9770.002154

Streamline #147

Coordinates of Streamline:
Start x: 10794.560541 y: 9861.302973
End x: 10773.728283 y: 9767.417650

Streamline #148

Coordinates of Streamline:
Start x: 10803.963378 y: 9858.916081
End x: 10783.110848 y: 9765.025513

Streamline #149

Coordinates of Streamline:
Start x: 10813.366216 y: 9856.529189
End x: 10792.322236 y: 9762.678600

Streamline #150

Coordinates of Streamline:
Start x: 10822.769054 y: 9854.142297
End x: 10801.460819 y: 9760.352884

Streamline #151

Coordinates of Streamline:
Start x: 10832.171892 y: 9851.755405
End x: 10810.585489 y: 9758.033616

Streamline #152

Coordinates of Streamline:
Start x: 10841.574730 y: 9849.368514
End x: 10819.686890 y: 9755.721381

Streamline #153

Coordinates of Streamline:
Start x: 10850.977568 y: 9846.981622
End x: 10828.777914 y: 9753.413521

Streamline #154

Coordinates of Streamline:
Start x: 10860.380405 y: 9844.594730
End x: 10837.804100 y: 9751.123603

Streamline #155

Coordinates of Streamline:
Start x: 10869.783243 y: 9842.207838
End x: 10846.764567 y: 9748.855647

Streamline #156

Coordinates of Streamline:
Start x: 10879.186081 y: 9839.820946
End x: 10855.677620 y: 9746.611681

Streamline #157

Coordinates of Streamline:
Start x: 10888.588919 y: 9837.434054
End x: 10864.859378 y: 9744.315071

Streamline #158

Coordinates of Streamline:
Start x: 10897.991757 y: 9835.047162
End x: 10876.998911 y: 9741.229173

Streamline #159

Coordinates of Streamline:
Start x: 10907.394595 y: 9832.660270
End x: 10886.094619 y: 9738.887789

Streamline #160

Coordinates of Streamline:
Start x: 10916.797432 y: 9830.273378
End x: 10894.808560 y: 9736.647664

Streamline #161

Coordinates of Streamline:
Start x: 10926.200270 y: 9827.886486
End x: 10903.370243 y: 9734.456609

Streamline #162

Coordinates of Streamline:
Start x: 10935.603108 y: 9825.499595
End x: 10911.864284 y: 9732.294241

Streamline #163

Coordinates of Streamline:
Start x: 10945.005946 y: 9823.112703
End x: 10920.349256 y: 9730.145484

Streamline #164

Coordinates of Streamline:
Start x: 10954.408784 y: 9820.725811
End x: 10928.868510 y: 9727.997607

Streamline #165

Coordinates of Streamline:
Start x: 10963.811622 y: 9818.338919
End x: 10937.442723 y: 9725.843130

Streamline #166

Coordinates of Streamline:
Start x: 10973.214459 y: 9815.952027
End x: 10946.071216 y: 9723.680703

Streamline #167

Coordinates of Streamline:
Start x: 10982.617297 y: 9813.565135
End x: 10954.745033 y: 9721.511950

Streamline #168

Coordinates of Streamline:
Start x: 10992.020135 y: 9811.178243
End x: 10963.463625 y: 9719.336700

Streamline #169

Coordinates of Streamline:

Start x: 11001.422973 y: 9808.791351
End x: 10972.259109 y: 9717.146050

Streamline #170

Coordinates of Streamline:

Start x: 11010.825811 y: 9806.404459
End x: 10981.280175 y: 9714.896985

Streamline #171

Coordinates of Streamline:

Start x: 11020.228649 y: 9804.017568
End x: 10992.412838 y: 9712.015979

Streamline #172

Coordinates of Streamline:

Start x: 11029.631486 y: 9801.630676
End x: 11002.532925 y: 9709.510681

Streamline #173

Coordinates of Streamline:

Start x: 11039.034324 y: 9799.243784
End x: 11011.356710 y: 9707.282119

Streamline #174

Coordinates of Streamline:

Start x: 11048.437162 y: 9796.856892
End x: 11019.950357 y: 9705.126691

Streamline #175

Coordinates of Streamline:

Start x: 11057.840000 y: 9794.470000
End x: 11028.470321 y: 9703.005012

Streamline #176

Coordinates of Streamline:

Start x: 11067.210000 y: 9787.780000
End x: 11037.460159 y: 9696.422008

Streamline #177

Coordinates of Streamline:

Start x: 11075.238636 y: 9785.894545
End x: 11044.773181 y: 9694.765408

Streamline #178

Coordinates of Streamline:

Start x: 11083.267273 y: 9784.009091
End x: 11052.204005 y: 9693.075457

Streamline #179

Coordinates of Streamline:

Start x: 11091.295909 y: 9782.123636
End x: 11059.799364 y: 9691.329036

Streamline #180

Coordinates of Streamline:

Start x: 11099.324545 y: 9780.238182
End x: 11067.613468 y: 9689.501472

Streamline #181

Coordinates of Streamline:

Start x: 11107.353182 y: 9778.352727
End x: 11075.599673 y: 9687.611845

Streamline #182

Coordinates of Streamline:

Start x: 11115.381818 y: 9776.467273
End x: 11083.697095 y: 9685.684315

Streamline #183

Coordinates of Streamline:

Start x: 11123.410455 y: 9774.581818
End x: 11091.799191 y: 9683.767520

Streamline #184

Coordinates of Streamline:

Start x: 11131.439091 y: 9772.696364
End x: 11102.348092 y: 9681.135406

Streamline #185

Coordinates of Streamline:

Start x: 11139.467727 y: 9770.810909
End x: 11111.093838 y: 9679.012487

Streamline #186

Coordinates of Streamline:

Start x: 11147.496364 y: 9768.925455
End x: 11119.429797 y: 9676.995118

Streamline #187

Coordinates of Streamline:

Start x: 11155.525000 y: 9767.040000
End x: 11127.605657 y: 9675.034958

Streamline #188

Coordinates of Streamline:

Start x: 11163.553636 y: 9765.154545
End x: 11135.748812 y: 9673.094595

Streamline #189

Coordinates of Streamline:

Start x: 11171.582273 y: 9763.269091
End x: 11143.862096 y: 9671.173592

Streamline #190

Coordinates of Streamline:

Start x: 11179.610909 y: 9761.383636
End x: 11152.011837 y: 9669.250186

Streamline #191

Coordinates of Streamline:

Start x: 11187.639545 y: 9759.498182
End x: 11160.184241 y: 9667.327732

Streamline #192

Coordinates of Streamline:

Start x: 11195.668182 y: 9757.612727
End x: 11168.361547 y: 9665.413632

Streamline #193

Coordinates of Streamline:

Start x: 11203.696818 y: 9755.727273
End x: 11176.548593 y: 9663.515060

Streamline #194

Coordinates of Streamline:

Start x: 11211.725455 y: 9753.841818
End x: 11184.796791 y: 9661.646023

Streamline #195

Coordinates of Streamline:

Start x: 11219.754091 y: 9751.956364
End x: 11194.447975 y: 9659.292350

Streamline #196

Coordinates of Streamline:

Start x: 11227.782727 y: 9750.070909
End x: 11206.777800 y: 9656.217776

Streamline #197

Coordinates of Streamline:

Start x: 11235.811364 y: 9748.185455
End x: 11218.373841 y: 9653.739739

Streamline #198

Coordinates of Streamline:

Start x: 11243.840000 y: 9746.300000
End x: 11228.564597 y: 9651.603973

Streamline #199

Coordinates of Streamline:

Start x: 11251.868636 y: 9744.414545
End x: 11237.460930 y: 9649.618715

Streamline #200

Coordinates of Streamline:

Start x: 11259.897273 y: 9742.529091
End x: 11245.297956 y: 9647.730092

Streamline #201

Coordinates of Streamline:

Start x: 11267.925909 y: 9740.643636
End x: 11252.296794 y: 9645.941401

Streamline #202

Coordinates of Streamline:

Start x: 11275.954545 y: 9738.758182
End x: 11258.645144 y: 9644.272615

Streamline #203

Coordinates of Streamline:

Start x: 11283.983182 y: 9736.872727
End x: 11264.499287 y: 9642.744710

Streamline #204

Coordinates of Streamline:

Start x: 11292.011818 y: 9734.987273
End x: 11269.992139 y: 9641.374640

Streamline #205

Coordinates of Streamline:

Start x: 11300.040455 y: 9733.101818
End x: 11275.245914 y: 9640.174355

Streamline #206

Coordinates of Streamline:

Start x: 11308.069091 y: 9731.216364
End x: 11280.385890 y: 9639.155099

Streamline #207

Coordinates of Streamline:

Start x: 11316.097727 y: 9729.330909
End x: 11286.160564 y: 9638.029868

Streamline #208

Coordinates of Streamline:

Start x: 11324.126364 y: 9727.445455
End x: 11293.291760 y: 9636.371356

Streamline #209

Coordinates of Streamline:

Start x: 11332.155000 y: 9725.560000
End x: 11300.407264 y: 9634.793525

Streamline #210

Coordinates of Streamline:

Start x: 11340.183636 y: 9723.674545
End x: 11307.254312 y: 9633.380799

Streamline #211

Coordinates of Streamline:

Start x: 11348.212273 y: 9721.789091
End x: 11313.808485 y: 9632.154691

Streamline #212

Coordinates of Streamline:

Start x: 11356.240909 y: 9719.903636
End x: 11320.074762 y: 9631.153639

Streamline #213

Coordinates of Streamline:

Start x: 11364.269545 y: 9718.018182
End x: 11326.834184 y: 9629.909765

Streamline #214

Coordinates of Streamline:

Start x: 11372.298182 y: 9716.132727
End x: 11337.139159 y: 9626.800283

Streamline #215

Coordinates of Streamline:

Start x: 11380.326818 y: 9714.247273
End x: 11351.730315 y: 9622.472924

Streamline #216

Coordinates of Streamline:

Start x: 11388.355455 y: 9712.361818

End x: 11371.119553 y: 9618.066050

Streamline #217

Coordinates of Streamline:

Start x: 11396.384091 y: 9710.476364
End x: 11397.001977 y: 9614.836436

Streamline #218

Coordinates of Streamline:

Start x: 11404.412727 y: 9708.590909
End x: 11428.739933 y: 9606.158099

Streamline #219

Coordinates of Streamline:

Start x: 11412.441364 y: 9706.705455
End x: 11481.505646 y: 9603.250461

Streamline #220

Coordinates of Streamline:

Start x: 11420.470000 y: 9704.820000
End x: 11490.452150 y: 9639.796612

Streamline #221

Coordinates of Streamline:

Start x: 11428.500000 y: 9712.840000
End x: 11496.466416 y: 9678.103430

Streamline #222

Coordinates of Streamline:

Start x: 11432.042059 y: 9722.600294
End x: 11504.587582 y: 9697.825096

Streamline #223

Coordinates of Streamline:

Start x: 11435.584118 y: 9732.360588
End x: 11510.559967 y: 9715.359025

Streamline #224

Coordinates of Streamline:

Start x: 11439.126176 y: 9742.120882
End x: 11515.165839 y: 9730.560740

Streamline #225

Coordinates of Streamline:

Start x: 11442.668235 y: 9751.881176
End x: 11509.464585 y: 9744.788308

Streamline #226

Coordinates of Streamline:

Start x: 11446.210294 y: 9761.641471
End x: 11512.838192 y: 9753.498994

Streamline #227

Coordinates of Streamline:

Start x: 11449.752353 y: 9771.401765
End x: 11516.136517 y: 9760.839754

Streamline #228

Coordinates of Streamline:

Start x: 11453.294412 y: 9781.162059
End x: 11519.343431 y: 9768.407022

Streamline #229

Coordinates of Streamline:

Start x: 11456.836471 y: 9790.922353
End x: 11522.624130 y: 9776.675510

Streamline #230

Coordinates of Streamline:

Start x: 11460.378529 y: 9800.682647
End x: 11525.872631 y: 9785.093621

Streamline #231

Coordinates of Streamline:

Start x: 11463.920588 y: 9810.442941
End x: 11528.966229 y: 9793.070855

Streamline #232

Coordinates of Streamline:

Start x: 11467.462647 y: 9820.203235
End x: 11532.001164 y: 9801.037579

Streamline #233

Coordinates of Streamline:
Start x: 11471.004706 y: 9829.963529
End x: 11534.976886 y: 9808.993864

Streamline #234

Coordinates of Streamline:
Start x: 11474.546765 y: 9839.723824
End x: 11528.729672 y: 9819.872756

Streamline #235

Coordinates of Streamline:
Start x: 11478.088824 y: 9849.484118
End x: 11531.589355 y: 9827.864511

Streamline #236

Coordinates of Streamline:
Start x: 11481.630882 y: 9859.244412
End x: 11534.306927 y: 9835.687765

Streamline #237

Coordinates of Streamline:
Start x: 11485.172941 y: 9869.004706
End x: 11536.830176 y: 9843.289133

Streamline #238

Coordinates of Streamline:
Start x: 11488.715000 y: 9878.765000
End x: 11539.101556 y: 9850.643948

Streamline #239

Coordinates of Streamline:
Start x: 11492.257059 y: 9888.525294
End x: 11541.073419 y: 9857.791553

Streamline #240

Coordinates of Streamline:
Start x: 11495.799118 y: 9898.285588
End x: 11542.739976 y: 9864.889146

Streamline #241

Coordinates of Streamline:
Start x: 11499.341176 y: 9908.045882
End x: 11544.200404 y: 9872.302148

Streamline #242

Coordinates of Streamline:
Start x: 11502.883235 y: 9917.806176
End x: 11546.456404 y: 9881.184878

Streamline #243

Coordinates of Streamline:
Start x: 11506.425294 y: 9927.566471
End x: 11554.990567 y: 9883.783902

Streamline #244

=====

Coordinates of Streamline:

Start x: 11509.967353 y: 9937.326765
End x: 11556.249909 y: 9865.410084

Streamline #245

Coordinates of Streamline:

Start x: 11513.509412 y: 9947.087059
End x: 11584.130999 y: 9899.179291

Streamline #246

Coordinates of Streamline:

Start x: 11517.051471 y: 9956.847353
End x: 11586.155081 y: 9923.566518

Streamline #247

Coordinates of Streamline:

Start x: 11520.593529 y: 9966.607647
End x: 11592.473990 y: 9939.345600

Streamline #248

Coordinates of Streamline:

Start x: 11524.135588 y: 9976.367941
End x: 11597.807537 y: 9954.208759

Streamline #249

Coordinates of Streamline:

Start x: 11527.677647 y: 9986.128235
End x: 11602.629812 y: 9970.624509

Streamline #250

Coordinates of Streamline:

Start x: 11531.219706 y: 9995.888529
End x: 11606.449783 y: 9980.336880

Streamline #251

Coordinates of Streamline:

Start x: 11534.761765 y: 10005.648824
End x: 11609.853079 y: 9989.034074

Streamline #252

Coordinates of Streamline:

Start x: 11538.303824 y: 10015.409118
End x: 11613.032604 y: 9997.136112

Streamline #253

Coordinates of Streamline:

Start x: 11541.845882 y: 10025.169412
End x: 11606.710186 y: 10007.187325

Streamline #254

Coordinates of Streamline:

Start x: 11545.387941 y: 10034.929706
End x: 11609.598342 y: 10014.785627

Streamline #255

Coordinates of Streamline:

Start x: 11548.930000 y: 10044.690000
End x: 11612.251985 y: 10021.964915

Particle Traces

Number of Particle-traces = 0

APPENDIX C-4

**GROUNDWATER MODELING OF
REMEDIAL ALTERNATIVES – AREA BCE**

**Area BCE Extraction Wells and Collection Trench
Modeling Summary**

=====

WinFlow
Analytical Model of 2D Ground-Water Flow

Developed by

James O. Rumbaugh, III

Douglas B. Rumbaugh

(c) 1995 Environmental Simulations, Inc.

=====

Date: 10/19/99
Time: 16:51:47.00

Input File: FND4-2C2.WFL
Map File : C:\WINFLOW\BCC\CURRENT\BCCCLEAN.MAP

=====

Model Entities

Number of Linesinks Defined by Infiltration Rate = 0

Number of Linesinks Defined by Head = 94

Line Sink #1
x1: 9455.809570 y1: 8852.379883
x2: 9532.019531 y2: 8919.309570
Discharge per length = 0.001120
Head in Center of Linesink = 573.999207
Total Linesink Discharge = 0.113607 [L3/T]

Line Sink #2
x1: 9758.330078 y1: 8921.110352
x2: 9856.000000 y2: 8920.000000
Discharge per length = 0.000277
Head in Center of Linesink = 573.999878
Total Linesink Discharge = 0.027062 [L3/T]

Line Sink #3
x1: 9933.679688 y1: 9097.740234
x2: 9962.000000 y2: 9176.000000
Discharge per length = 0.000682
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.056767 [L3/T]

Line Sink #4
x1: 10070.490234 y1: 9330.889648
x2: 10125.000000 y2: 9402.000000
Discharge per length = 0.000796
Head in Center of Linesink = 573.999939
Total Linesink Discharge = 0.071276 [L3/T]

Line Sink #5
x1: 10243.269531 y1: 9391.910156
x2: 10352.000000 y2: 9380.000000
Discharge per length = 0.001184
Head in Center of Linesink = 573.999512
Total Linesink Discharge = 0.129531 [L3/T]

Line Sink #6
x1: 10466.790039 y1: 9379.070313
x2: 10570.000000 y2: 9384.000000
Discharge per length = 0.001901
Head in Center of Linesink = 573.999939
Total Linesink Discharge = 0.196404 [L3/T]

Line Sink #7
x1: 10676.169922 y1: 9380.349609
x2: 10766.000000 y2: 9374.000000
Discharge per length = 0.001017
Head in Center of Linesink = 573.999451
Total Linesink Discharge = 0.091587 [L3/T]

Line Sink #8
x1: 10958.150391 y1: 9452.929688
x2: 11058.000000 y2: 9493.280273
Discharge per length = 0.000864
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.093040 [L3/T]

Line Sink #9
x1: 11164.320313 y1: 9533.219727
x2: 11264.900391 y2: 9559.000000
Discharge per length = 0.001640
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.170290 [L3/T]

Line Sink #10

x1: 11274.799805 y1: 9557.620117
 x2: 11375.000000 y2: 9548.629883
 Discharge per length = 0.000034
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.003430 [L3/T]

Line Sink #11
 x1: 11798.269531 y1: 9458.070313
 x2: 11910.019531 y2: 9429.009766
 Discharge per length = 0.002064
 Head in Center of Linesink = 573.999756
 Total Linesink Discharge = 0.238308 [L3/T]

Line Sink #12
 x1: 12250.440430 y1: 9339.889648
 x2: 12379.919922 y2: 9307.370117
 Discharge per length = 0.000632
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.084344 [L3/T]

Line Sink #13
 x1: 12609.480469 y1: 9251.900391
 x2: 12842.719727 y2: 9201.009766
 Discharge per length = 0.000859
 Head in Center of Linesink = 573.999817
 Total Linesink Discharge = 0.205098 [L3/T]

Line Sink #14
 x1: 9238.709961 y1: 8655.839844
 x2: 9162.280273 y2: 8589.679688
 Discharge per length = 0.000433
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.043794 [L3/T]

Line Sink #15
 x1: 8799.389648 y1: 8269.179688
 x2: 8743.000000 y2: 8212.000000
 Discharge per length = 0.001505
 Head in Center of Linesink = 573.999573
 Total Linesink Discharge = 0.120844 [L3/T]

Line Sink #16
 x1: 9305.000000 y1: 7620.000000
 x2: 9499.110352 y2: 7798.709961
 Discharge per length = 0.000628
 Head in Center of Linesink = 573.999756
 Total Linesink Discharge = 0.165708 [L3/T]

Line Sink #17
 x1: 10618.910156 y1: 8563.019531
 x2: 10893.000000 y2: 8655.000000
 Discharge per length = 0.000082
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.023646 [L3/T]

Line Sink #18
 x1: 11621.400391 y1: 8674.400391
 x2: 11886.000000 y2: 8669.000000
 Discharge per length = 0.000117
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.031064 [L3/T]

Line Sink #19
 x1: 12429.190430 y1: 8627.009766
 x2: 12836.000000 y2: 8598.000000
 Discharge per length = 0.000518
 Head in Center of Linesink = 573.999817
 Total Linesink Discharge = 0.211379 [L3/T]

Line Sink #20
 x1: 10298.349609 y1: 10053.889648
 x2: 10275.230469 y2: 9945.990234
 Discharge per length = 0.000128
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.014178 [L3/T]

Line Sink #21
 x1: 9915.799805 y1: 10113.259766
 x2: 10032.509766 y2: 10055.139648
 Discharge per length = 0.001201
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.156589 [L3/T]

Line Sink #22
 x1: 9803.790039 y1: 10170.790039
 x2: 9702.000000 y2: 10222.000000
 Discharge per length = 0.001903
 Head in Center of Linesink = 578.999878
 Total Linesink Discharge = 0.216785 [L3/T]

Line Sink #23
 x1: 10341.650391 y1: 9900.759766
 x2: 10457.000000 y2: 9838.719727
 Discharge per length = -0.001610
 Head in Center of Linesink = 579.000061
 Total Linesink Discharge = -0.210849 [L3/T]

Line Sink #24
 x1: 10574.030273 y1: 9781.690430
 x2: 10679.879883 y2: 9750.730469
 Discharge per length = -0.002594
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = -0.286058 [L3/T]

Line Sink #25
 x1: 10795.110352 y1: 9720.509766
 x2: 10904.009766 y2: 9693.559570
 Discharge per length = -0.003698
 Head in Center of Linesink = 579.000366
 Total Linesink Discharge = -0.414866 [L3/T]

Line Sink #26
x1: 11634.080078 y1: 10079.360352
x2: 11606.690430 y2: 9965.889648
Discharge per length = 0.002651
Head in Center of Linesink = 576.999817
Total Linesink Discharge = 0.309429 [L3/T]

Line Sink #27
x1: 11447.019531 y1: 10428.690430
x2: 11581.000000 y2: 10397.530273
Discharge per length = 0.002298
Head in Center of Linesink = 575.000000
Total Linesink Discharge = 0.316103 [L3/T]

Line Sink #28
x1: 11748.410156 y1: 10464.120117
x2: 11704.809570 y2: 10284.269531
Discharge per length = 0.001622
Head in Center of Linesink = 574.999939
Total Linesink Discharge = 0.300188 [L3/T]

Line Sink #29
x1: 11243.259766 y1: 9603.580078
x2: 11342.610352 y2: 9578.759766
Discharge per length = 0.000638
Head in Center of Linesink = 574.000061
Total Linesink Discharge = 0.065304 [L3/T]

Line Sink #30
x1: 9013.269531 y1: 8457.370117
x2: 9089.059570 y2: 8525.450195
Discharge per length = 0.000414
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.042168 [L3/T]

Line Sink #31
x1: 9089.059570 y1: 8526.740234
x2: 9159.709961 y2: 8588.400391
Discharge per length = 0.000415
Head in Center of Linesink = 573.999878
Total Linesink Discharge = 0.038954 [L3/T]

Line Sink #32
x1: 9009.419922 y1: 8452.230469
x2: 8938.759766 y2: 8398.280273
Discharge per length = 0.000460
Head in Center of Linesink = 573.999878
Total Linesink Discharge = 0.040935 [L3/T]

Line Sink #33
x1: 8870.679688 y1: 8337.900391
x2: 8936.190430 y2: 8394.419922
Discharge per length = 0.000532
Head in Center of Linesink = 573.999939
Total Linesink Discharge = 0.046044 [L3/T]

Line Sink #34
x1: 8801.959961 y1: 8269.179688
x2: 8868.759766 y2: 8335.969727
Discharge per length = 0.000650
Head in Center of Linesink = 573.999817
Total Linesink Discharge = 0.061383 [L3/T]

Line Sink #35
x1: 9242.559570 y1: 8657.120117
x2: 9319.639648 y2: 8726.490234
Discharge per length = 0.000472
Head in Center of Linesink = 573.999817
Total Linesink Discharge = 0.048940 [L3/T]

Line Sink #36
x1: 9322.209961 y1: 8727.780273
x2: 9385.150391 y2: 8788.150391
Discharge per length = 0.000558
Head in Center of Linesink = 573.999817
Total Linesink Discharge = 0.048674 [L3/T]

Line Sink #37
x1: 9386.440430 y1: 8789.440430
x2: 9453.240234 y2: 8851.099609
Discharge per length = 0.000704
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.064033 [L3/T]

Line Sink #38
x1: 9541.230469 y1: 8919.830078
x2: 9636.290039 y2: 8921.110352
Discharge per length = 0.001141
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.108446 [L3/T]

Line Sink #39
x1: 9641.429688 y1: 8919.830078
x2: 9753.190430 y2: 8919.830078
Discharge per length = 0.000633
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.070792 [L3/T]

Line Sink #40
x1: 9857.879883 y1: 8917.900391
x2: 9896.419922 y2: 9003.959961
Discharge per length = 0.000224
Head in Center of Linesink = 574.000000
Total Linesink Discharge = 0.021144 [L3/T]

Line Sink #41
x1: 9895.139648 y1: 9006.530273
x2: 9931.110352 y2: 9093.889648
Discharge per length = 0.000509
Head in Center of Linesink = 574.000000

Total Linesink Discharge = 0.048050 [L3/T]
 Line Sink #42
 x1: 9961.299805 y1: 9176.740234
 x2: 10012.679688 y2: 9252.530273
 Discharge per length = 0.000789
 Head in Center of Linesink = 573.999756
 Total Linesink Discharge = 0.072255 [L3/T]
 Line Sink #43
 x1: 10013.959961 y1: 9252.530273
 x2: 10070.490234 y2: 9328.320313
 Discharge per length = 0.000739
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.069872 [L3/T]
 Line Sink #44
 x1: 10128.290039 y1: 9404.110352
 x2: 10234.269531 y2: 9391.910156
 Discharge per length = 0.000752
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.080274 [L3/T]
 Line Sink #45
 x1: 10356.309570 y1: 9379.070313
 x2: 10459.080078 y2: 9379.070313
 Discharge per length = 0.001736
 Head in Center of Linesink = 574.000061
 Total Linesink Discharge = 0.178363 [L3/T]
 Line Sink #46
 x1: 10573.410156 y1: 9384.209961
 x2: 10671.040039 y2: 9381.639648
 Discharge per length = 0.001624
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.158574 [L3/T]
 Line Sink #47
 x1: 10768.030273 y1: 9375.860352
 x2: 10857.950195 y2: 9411.820313
 Discharge per length = 0.000855
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.082806 [L3/T]
 Line Sink #48
 x1: 10859.230469 y1: 9413.110352
 x2: 10954.290039 y2: 9450.360352
 Discharge per length = 0.000865
 Head in Center of Linesink = 573.999573
 Total Linesink Discharge = 0.088358 [L3/T]
 Line Sink #49
 x1: 11061.559570 y1: 9494.679688
 x2: 11160.469727 y2: 9530.650391
 Discharge per length = 0.001201
 Head in Center of Linesink = 573.999207
 Total Linesink Discharge = 0.126441 [L3/T]
 Line Sink #50
 x1: 11378.849609 y1: 9547.349609
 x2: 11468.769531 y2: 9534.500000
 Discharge per length = 0.000306
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.027776 [L3/T]
 Line Sink #51
 x1: 11471.339844 y1: 9533.219727
 x2: 11549.700195 y2: 9521.650391
 Discharge per length = 0.001359
 Head in Center of Linesink = 574.000061
 Total Linesink Discharge = 0.107608 [L3/T]
 Line Sink #52
 x1: 11554.200195 y1: 9519.730469
 x2: 11667.240234 y2: 9492.750000
 Discharge per length = 0.001309
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.152149 [L3/T]
 Line Sink #53
 x1: 11671.089844 y1: 9490.190430
 x2: 11793.129883 y2: 9459.360352
 Discharge per length = 0.001958
 Head in Center of Linesink = 573.999023
 Total Linesink Discharge = 0.246515 [L3/T]
 Line Sink #54
 x1: 11913.879883 y1: 9427.250000
 x2: 12014.080078 y2: 9400.269531
 Discharge per length = 0.001603
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.166324 [L3/T]
 Line Sink #55
 x1: 12019.200195 y1: 9398.980469
 x2: 12124.530273 y2: 9370.719727
 Discharge per length = 0.001153
 Head in Center of Linesink = 573.999878
 Total Linesink Discharge = 0.125753 [L3/T]
 Line Sink #56
 x1: 12129.690430 y1: 9369.440430
 x2: 12244.019531 y2: 9342.459961
 Discharge per length = 0.000842
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.098890 [L3/T]
 Line Sink #57
 x1: 12383.389648 y1: 9304.559570
 x2: 12605.629883 y2: 9253.179688
 Discharge per length = 0.000486

Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.110848 [L3/T]
 Line Sink #58
 x1: 9501.480469 y1: 7801.080078
 x2: 9698.190430 y2: 7983.569824
 Discharge per length = 0.000215
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.057673 [L3/T]
 Line Sink #59
 x1: 9702.929688 y1: 7988.310059
 x2: 9885.410156 y2: 8158.950195
 Discharge per length = 0.000149
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.037124 [L3/T]
 Line Sink #60
 x1: 9892.519531 y1: 8163.689941
 x2: 10103.450195 y2: 8334.320313
 Discharge per length = 0.000107
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.028921 [L3/T]
 Line Sink #61
 x1: 10111.750000 y1: 8335.509766
 x2: 10365.330078 y2: 8463.480469
 Discharge per length = 0.000091
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.025889 [L3/T]
 Line Sink #62
 x1: 10370.070313 y1: 8461.110352
 x2: 10611.799805 y2: 8560.650391
 Discharge per length = 0.000091
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.023684 [L3/T]
 Line Sink #63
 x1: 10896.200195 y1: 8655.440430
 x2: 11206.660156 y2: 8672.030273
 Discharge per length = 0.000085
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.026534 [L3/T]
 Line Sink #64
 x1: 11216.139648 y1: 8669.660156
 x2: 11607.179688 y2: 8676.769531
 Discharge per length = 0.000105
 Head in Center of Linesink = 574.000000
 Total Linesink Discharge = 0.041071 [L3/T]
 Line Sink #65
 x1: 11891.209961 y1: 8667.299805
 x2: 12412.599609 y2: 8627.009766
 Discharge per length = 0.000155
 Head in Center of Linesink = 573.999939
 Total Linesink Discharge = 0.081130 [L3/T]
 Line Sink #66
 x1: 9805.070313 y1: 10169.500000
 x2: 9914.259766 y2: 10116.830078
 Discharge per length = 0.001247
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.151180 [L3/T]
 Line Sink #67
 x1: 10035.009766 y1: 10050.040039
 x2: 10145.490234 y2: 9997.370117
 Discharge per length = 0.000877
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.107354 [L3/T]
 Line Sink #68
 x1: 10148.059570 y1: 9996.089844
 x2: 10254.679688 y2: 9944.700195
 Discharge per length = 0.000287
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.033998 [L3/T]
 Line Sink #69
 x1: 10298.349609 y1: 10057.750000
 x2: 10320.190430 y2: 10156.660156
 Discharge per length = 0.000577
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = 0.058489 [L3/T]
 Line Sink #70
 x1: 10342.030273 y1: 10256.860352
 x2: 10320.190430 y2: 10157.950195
 Discharge per length = 0.002023
 Head in Center of Linesink = 578.999939
 Total Linesink Discharge = 0.204866 [L3/T]
 Line Sink #71
 x1: 10257.250000 y1: 9940.849609
 x2: 10336.889648 y2: 9902.309570
 Discharge per length = -0.000201
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.017760 [L3/T]
 Line Sink #72
 x1: 10458.290039 y1: 9836.150391
 x2: 10571.330078 y2: 9783.490234
 Discharge per length = -0.004088
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.509819 [L3/T]
 Line Sink #73
 x1: 10681.169922 y1: 9749.440430
 x2: 10792.929688 y2: 9721.179688

Discharge per length = -0.002781
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.320633 [L3/T]
 Line Sink #74
 x1: 10906.580078 y1: 9692.280273
 x2: 11014.490234 y2: 9664.019531
 Discharge per length = -0.004309
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.480665 [L3/T]
 Line Sink #75
 x1: 11017.059570 y1: 9661.450195
 x2: 11126.250000 y2: 9635.759766
 Discharge per length = -0.004633
 Head in Center of Linesink = 579.000122
 Total Linesink Discharge = -0.519735 [L3/T]
 Line Sink #76
 x1: 11130.099609 y1: 9633.190430
 x2: 11240.580078 y2: 9604.929688
 Discharge per length = -0.005609
 Head in Center of Linesink = 579.000000
 Total Linesink Discharge = -0.639590 [L3/T]
 Line Sink #77
 x1: 11502.000000 y1: 9540.059570
 x2: 11527.690430 y2: 9636.400391
 Discharge per length = -0.002122
 Head in Center of Linesink = 577.000061
 Total Linesink Discharge = -0.211599 [L3/T]
 Line Sink #78
 x1: 11526.410156 y1: 9640.250000
 x2: 11549.530273 y2: 9735.309570
 Discharge per length = -0.000563
 Head in Center of Linesink = 577.000000
 Total Linesink Discharge = -0.055048 [L3/T]
 Line Sink #79
 x1: 11550.809570 y1: 9737.879883
 x2: 11576.500000 y2: 9841.929688
 Discharge per length = 0.000164
 Head in Center of Linesink = 577.000183
 Total Linesink Discharge = 0.017572 [L3/T]
 Line Sink #80
 x1: 11577.139648 y1: 9846.429688
 x2: 11606.690430 y2: 9962.040039
 Discharge per length = 0.002232
 Head in Center of Linesink = 576.999756
 Total Linesink Discharge = 0.266330 [L3/T]
 Line Sink #81
 x1: 11586.139648 y1: 10396.240234
 x2: 11710.740234 y2: 10365.410156
 Discharge per length = 0.001052
 Head in Center of Linesink = 574.999878
 Total Linesink Discharge = 0.134985 [L3/T]
 Line Sink #82
 x1: 10440.099609 y1: 9875.209961
 x2: 10548.650391 y2: 9822.330078
 Discharge per length = 0.006272
 Head in Center of Linesink = 574.999817
 Total Linesink Discharge = 0.757319 [L3/T]
 Line Sink #83
 x1: 10551.429688 y1: 9819.549805
 x2: 10648.849609 y2: 9794.500000
 Discharge per length = 0.005541
 Head in Center of Linesink = 574.998779
 Total Linesink Discharge = 0.557322 [L3/T]
 Line Sink #84
 x1: 10653.019531 y1: 9793.099609
 x2: 10761.570313 y2: 9765.269531
 Discharge per length = 0.004968
 Head in Center of Linesink = 574.999634
 Total Linesink Discharge = 0.556699 [L3/T]
 Line Sink #85
 x1: 10762.959961 y1: 9763.879883
 x2: 10877.070313 y2: 9734.660156
 Discharge per length = 0.004989
 Head in Center of Linesink = 574.999756
 Total Linesink Discharge = 0.587666 [L3/T]
 Line Sink #86
 x1: 10879.860352 y1: 9731.870117
 x2: 10989.799805 y2: 9706.820313
 Discharge per length = 0.005003
 Head in Center of Linesink = 574.999695
 Total Linesink Discharge = 0.564182 [L3/T]
 Line Sink #87
 x1: 10994.080078 y1: 9704.040039
 x2: 11101.240234 y2: 9677.599609
 Discharge per length = 0.004971
 Head in Center of Linesink = 575.000000
 Total Linesink Discharge = 0.548703 [L3/T]
 Line Sink #88
 x1: 11105.410156 y1: 9676.209961
 x2: 11202.830078 y2: 9653.940430
 Discharge per length = 0.005138
 Head in Center of Linesink = 574.999573
 Total Linesink Discharge = 0.513465 [L3/T]
 Line Sink #89
 x1: 11204.160156 y1: 9652.549805

x2: 11300.190430 y2: 9630.280273
 Discharge per length = 0.002883
 Head in Center of Linesink = 574.999451
 Total Linesink Discharge = 0.284172 [L3/T]
 Line Sink #90
 x1: 11301.580078 y1: 9628.889648
 x2: 11387.860352 y2: 9609.410156
 Discharge per length = 0.001172
 Head in Center of Linesink = 575.000000
 Total Linesink Discharge = 0.103646 [L3/T]
 Line Sink #91
 x1: 11390.639648 y1: 9608.019531
 x2: 11483.879883 y2: 9588.530273
 Discharge per length = 0.000818
 Head in Center of Linesink = 574.999695
 Total Linesink Discharge = 0.077962 [L3/T]
 Line Sink #92
 x1: 11485.269531 y1: 9595.490234
 x2: 11504.759766 y2: 9673.419922
 Discharge per length = 0.002792
 Head in Center of Linesink = 574.999878
 Total Linesink Discharge = 0.224289 [L3/T]
 Line Sink #93
 x1: 11504.759766 y1: 9677.599609
 x2: 11527.019531 y2: 9772.230469
 Discharge per length = 0.003468
 Head in Center of Linesink = 574.999878
 Total Linesink Discharge = 0.337100 [L3/T]
 Line Sink #94
 x1: 11527.019531 y1: 9776.410156
 x2: 11550.679688 y2: 9872.429688
 Discharge per length = 0.003556
 Head in Center of Linesink = 575.000000
 Total Linesink Discharge = 0.351677 [L3/T]

Number of Ponds = 10

Pond #1
 Center of Pond -- x: 9863.690430 y: 9771.309570
 Radius = 357.489990
 Infiltration Rate = 0.000002
 Head at Center of Pond = 581.051147
 Total Pond Flux = 0.987672 [L3/T]
 Pond #2
 Center of Pond -- x: 10779.519531 y: 10159.440430
 Radius = 330.489990
 Infiltration Rate = 0.000003
 Head at Center of Pond = 581.768677
 Total Pond Flux = 0.936762 [L3/T]
 Pond #3
 Center of Pond -- x: 11295.660156 y: 9892.900391
 Radius = 240.630005
 Infiltration Rate = 0.000005
 Head at Center of Pond = 580.648438
 Total Pond Flux = 0.993212 [L3/T]
 Pond #4
 Center of Pond -- x: 9461.429688 y: 9236.889648
 Radius = 292.000000
 Infiltration Rate = 0.000002
 Head at Center of Pond = 580.749939
 Total Pond Flux = 0.658947 [L3/T]
 Pond #5
 Center of Pond -- x: 10127.879883 y: 10456.309570
 Radius = 196.600006
 Infiltration Rate = 0.000003
 Head at Center of Pond = 581.790405
 Total Pond Flux = 0.331497 [L3/T]
 Pond #6
 Center of Pond -- x: 11860.480469 y: 9758.450195
 Radius = 254.770004
 Infiltration Rate = 0.000011
 Head at Center of Pond = 583.117126
 Total Pond Flux = 2.222660 [L3/T]
 Pond #7
 Center of Pond -- x: 10427.480469 y: 9572.870117
 Radius = 70.000000
 Infiltration Rate = 0.000055
 Head at Center of Pond = 582.394104
 Total Pond Flux = 0.840502 [L3/T]
 Pond #8
 Center of Pond -- x: 10600.910156 y: 9607.610352
 Radius = 70.000000
 Infiltration Rate = 0.000041
 Head at Center of Pond = 582.153931
 Total Pond Flux = 0.629607 [L3/T]
 Pond #9
 Center of Pond -- x: 10761.839844 y: 9620.469727
 Radius = 40.000000
 Infiltration Rate = 0.000041
 Head at Center of Pond = 580.395935
 Total Pond Flux = 0.206088 [L3/T]
 Pond #10
 Center of Pond -- x: 11421.280273 y: 9700.990234
 Radius = 64.430000

Infiltration Rate = 0.000027
Head at Center of Pond = 578.756653
Total Pond Flux = 0.356032 [L3/T]

Number of Wells = 13

Well #1
Center of Well -- x: 10070.389648 y: 9500.530273
Radius = 1.500000
Pumping Rate = 0.080000
Head at Well Radius = 575.363098

Well #2
Center of Well -- x: 10093.549805 y: 9529.839844
Radius = 1.500000
Pumping Rate = 0.080000
Head at Well Radius = 575.342407

Well #3
Center of Well -- x: 10213.759766 y: 9683.230469
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 577.483215

Well #4
Center of Well -- x: 10118.419922 y: 9563.080078
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 576.302856

Well #5
Center of Well -- x: 10143.230469 y: 9593.110352
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 576.675293

Well #6
Center of Well -- x: 10168.040039 y: 9623.139648
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 577.000000

Well #7
Center of Well -- x: 10190.250000 y: 9654.500000
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 577.276672

Well #8
Center of Well -- x: 10310.410156 y: 9806.740234
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 577.900146

Well #9
Center of Well -- x: 10336.530273 y: 9842.000000
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 578.083862

Well #10
Center of Well -- x: 10363.959961 y: 9873.349609
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 578.529358

Well #11
Center of Well -- x: 10238.559570 y: 9712.679688
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 577.650635

Well #12
Center of Well -- x: 10263.370117 y: 9744.019531
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 577.757202

Well #13
Center of Well -- x: 10285.570313 y: 9776.690430
Radius = 1.500000
Pumping Rate = 0.050000
Head at Well Radius = 577.808716

Reference Head = 582.000000 Defined at -- x: 10200.940430 y: 10653.509766

Calibration Targets

Target Head	Computed Head	Residual	Well Name
576.21	577.34	-1.1331	RFI-17
578.01	578.39	-0.3784	RFI-42
580.29	579.85	0.4357	RFI-43
581.32	581.57	-0.2494	RFI-33
581.18	582.17	-0.9929	PS-11
580.86	580.41	0.4480	PS-12
581.22	575.56	5.6595	RFI-32
582.32	576.42	5.8976	PS-13
581.05	580.66	0.3853	R-15
582.55	579.63	2.9177	RFI-36
580.27	578.86	1.4126	RFIP223
581.64	578.54	3.0988	RFI-51

579.29	578.80	0.4914	RFIPZ22
580.54	578.13	2.4138	R-11
580.23	578.87	1.3650	RFIPZ16
573.69	576.06	-2.3659	RFIPZ27
576.79	575.97	0.8236	RFIPZ18
575.54	575.00	0.5398	R-13
580.83	575.47	5.3647	R-08
576.77	575.40	1.3744	R-09
573.84	575.01	-1.1748	RFIPZ17
575.66	574.58	1.0838	RFIPZ21
573.61	574.03	-0.4206	RFIPZ19
573.50	574.02	-0.5190	RFIPZ20
582.05	582.01	0.0428	RFI-20
582.63	582.04	0.5853	PS-05
581.60	580.14	1.4560	PS-06
582.09	580.86	1.2251	PS-04
580.73	580.56	0.1713	RFI-31
580.19	579.38	0.8134	RFI-30
581.27	579.11	2.1584	RFIPZ26
580.81	578.95	1.8646	RFIPZ25
579.99	577.83	2.1565	RFI-29
579.92	578.35	1.5727	RFI-18
582.23	578.23	4.0006	PS-08
581.36	579.22	2.1366	RFIPZ24
580.20	578.07	2.1266	RFI-35
581.62	580.57	1.0455	PS-07
581.11	581.23	-0.1206	RFI-27
581.62	580.43	1.1929	PS-09
579.92	577.95	1.9675	RFI-28
573.68	574.02	-0.3441	RFI-34
573.55	574.03	-0.4795	RFI-45
582.42	581.28	1.1439	RFI-37

Number of Targets = 44
 Residual Mean = 1.163477
 Residual Standard Deviation = 1.729479
 Residual Sum of Squares = 191.170216
 Absolute Residual Mean = 1.535213
 Minimum Residual = -2.365881
 Maximum Residual = 5.897558
 Observed Range in Head = 9.130000
 Resid. Std./Range in Head = 0.189428

Aquifer Properties

.... Steady-State Flow Model

Permeability.....= 0.007820 [L/T]
 Porosity.....= 0.100000
 Elevation of Aquifer Top....= 585.000000
 Elevation of Aquifer Bottom.= 572.800000
 Uniform Regional Gradient...= 0.000000
 Angle of Uniform Gradient...= 0.000000
 Recharge.....= 0.000000

Contour Matrix

Number of nodes in the X-direction = 100
 Number of nodes in the Y-direction = 100

Minimum X Coordinate = 9025.477979
 Minimum Y Coordinate = 8203.024170

Maximum X Coordinate = 11901.302297
 Maximum Y Coordinate = 10901.187749

Minimum Head = 573.739900
 Maximum Head = 583.380287

CONTOUR GRID -----

Row 1					574.184625	574.146987	574.113433	574.085612	574.065685
					574.052152	574.038803	574.117460	574.279841	574.423135
					574.551396	574.667231	574.772474	574.868599	574.956930
					575.038661	575.114795	575.186132	575.253290	575.316753
					575.376906	575.434065	575.488497	575.540429	575.590058
					575.637555	575.683066	575.726719	575.768625	575.808879
					575.847567	575.884767	575.920549	575.954981	575.988123
	575.489427	575.460792	575.426871	575.388165	575.345122				
	575.298162	575.247689	575.194111	575.137843	575.079317				
	575.018981	574.957298	574.894740	574.831783	574.768898				
	574.706539	574.645133	574.585079	574.526730	574.470393				
	574.416318	574.364691	574.315632	574.269211	574.225494				

576.020037 576.050780 576.080407 576.108973 576.136532
576.163136 576.188836 576.213684 576.237730 576.261024
576.283615 576.305553 576.326884 576.347657 576.367916
576.387708 576.407075 576.426061 576.444705 576.463048
576.481126 576.498977 576.516632 576.534127 576.551493
576.568761 576.585962 576.603127 576.620290 576.637482
576.654739 576.672098 576.689597 576.707278 576.725184
576.743363 576.761863 576.780737 576.800039 576.819827

Row 2

575.337192 575.322126 575.300122 575.272106 575.238827
575.200919 575.158946 575.113428 575.064862 575.013732
574.960517 574.905694 574.849735 574.793105 574.736256
574.679623 574.623612 574.568601 574.514928 574.462889
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Row 3

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Row 4

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Row 5

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Row 6

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Row 7

574.566688 574.621597 574.660802 574.687234 574.703179
574.710359 574.710128 574.703601 574.691719 574.675298
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576.057164 576.070311 576.083617 576.097150 576.110986

Row 8

574.416439 574.486000 574.537085 574.573955 574.599333
574.615107 574.622757 574.623510 574.618403 574.608329
574.594060 574.576274 574.555569 574.532477 574.507478
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575.867345 575.879613 575.891705 575.903663 575.915538
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Row 9

574.270271 574.354080 574.416118 574.463166 574.497843
574.522033 574.537336 574.545112 574.546516 574.542528
574.533983 574.521602 574.506014 574.487773 574.467370
574.445243 574.421786 574.397352 574.372259 574.346796
574.321225 574.295785 574.270689 574.246133 574.222288
574.199302 574.177293 574.156348 574.136523 574.117837
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574.006122 574.003728 574.001009 573.997434 574.087045
574.193991 574.289344 574.374393 574.453473 574.528478

574.599731	574.667403	574.731633	574.792514	574.850094	574.007209	574.006717	574.006301	574.005442	574.004209
574.904421	574.955597	575.003793	575.049222	575.092088	574.002768	574.001213	573.999641	574.095503	574.189202
575.132563	575.170785	575.206868	575.240910	575.273006	574.271766	574.341163	574.403956	574.462384	574.516955
575.303258	575.331773	575.358665	575.384052	575.408046	574.567898	574.615338	574.659319	574.699843	574.736937
575.430755	575.452277	575.472703	575.492124	575.510626	574.770735	574.801530	574.829714	574.855665	574.879679
575.528300	575.545240	575.561540	575.577289	575.592565	574.901961	574.922635	574.941773	574.959417	574.975618
575.607434	575.621942	575.636119	575.649981	575.663531	574.990483	575.004220	575.017126	575.029506	575.041596
575.676761	575.689659	575.702216	575.714423	575.726287	575.053530	575.065353	575.077046	575.088551	575.099776
575.737822	575.749060	575.760039	575.770806	575.781412	575.110598	575.120869	575.130416	575.139062	575.146687
575.791910	575.802359	575.812829	575.823399	575.834160	575.153281	575.158959	575.163893	575.168220	575.172003
					575.175227	575.177849	575.179840	575.181265	575.182331

Row 10

574.142977	574.225527	574.297608	574.355170	574.399230
574.431684	574.454372	574.468867	574.476475	574.478277
574.475175	574.467936	574.457218	574.443596	574.427573
574.409594	574.390055	574.369310	574.347676	574.325443
574.302872	574.280202	574.257652	574.235420	574.213685
574.192602	574.172302	574.152890	574.134442	574.117013
574.100641	574.085361	574.071231	574.058341	574.046838
574.036900	574.028670	574.022133	574.017052	574.013060
574.009763	574.006775	574.003728	574.000277	573.996091
573.990652	574.092345	574.181342	574.268211	574.351332
574.430008	574.504386	574.574677	574.641007	574.703397
574.761838	574.816447	574.867511	574.915383	574.960372
575.002704	575.042540	575.080001	575.115187	575.148195
575.179137	575.208140	575.235344	575.260893	575.284921
575.307554	575.328901	575.349058	575.368119	575.386178
575.403335	575.419700	575.435387	575.450506	575.465155
575.479407	575.493314	575.506902	575.520176	575.533125
575.545725	575.557945	575.569753	575.581127	575.592057
575.602555	575.612653	575.622397	575.631837	575.641027
575.650017	575.658863	575.667635	575.676417	575.685315

Row 11

574.208205	574.093135	574.180550	574.250475	574.304182
574.344685	574.374405	574.395233	574.408680	574.415939
574.417974	574.415593	574.409484	574.400240	574.388374
574.374337	574.358525	574.341290	574.322950	574.303790
574.284071	574.264035	574.243904	574.223884	574.204160
574.184901	574.166251	574.148333	574.131245	574.115066
574.099860	574.085685	574.072606	574.060700	574.050064
574.040788	574.032921	574.026419	574.021119	574.016777
574.013117	574.009866	574.006790	574.003741	574.000773
573.998637	574.002084	574.005180	574.055195	574.151462
574.241138	574.325022	574.403700	574.477488	574.546378
574.610186	574.669024	574.723485	574.774236	574.821749
574.866312	574.908103	574.947235	574.983799	575.017891
575.049632	575.079178	575.106711	575.132415	575.156460
575.178993	575.200133	575.219979	575.238622	575.256157
575.272696	575.288369	575.303324	575.317703	575.331631
575.345197	575.358455	575.371425	575.384098	575.396443
575.408413	575.419949	575.430990	575.441484	575.451405
575.460758	575.469583	575.477940	575.485892	575.493493
575.500788	575.507821	575.514654	575.521376	575.528117

Row 12

574.735289	574.211730	574.065767	574.150842	574.213656
574.261782	574.297995	574.324641	574.343503	574.355851
574.362689	574.364864	574.363090	574.357975	574.350039
574.339735	574.327457	574.313554	574.298337	574.282090
574.265071	574.247523	574.229674	574.211739	574.193915
574.176383	574.159306	574.142823	574.127052	574.112093
574.098025	574.084920	574.072841	574.061851	574.052010
574.043360	574.035908	574.029598	574.024311	574.019875
574.016098	574.012798	574.009838	574.007182	574.005000
574.003860	574.004436	574.004924	574.003859	574.002187
574.024038	574.122399	574.213393	574.297998	574.376324
574.447518	574.511506	574.569911	574.624088	574.674687
574.722023	574.766261	574.807491	574.845776	574.881192
574.913872	574.944020	574.971889	574.997733	575.021775
575.044187	575.065096	575.084595	575.102762	575.119681
575.135471	575.150293	575.164347	575.177835	575.190922
575.203720	575.216282	575.228615	575.240691	575.252451
575.263815	575.274687	575.284960	575.294538	575.303362
575.311432	575.318809	575.325586	575.331851	575.337662
575.343045	575.348017	575.352614	575.356925	575.361110

Row 13

575.156462	574.755857	574.237188	574.057850	574.128453
574.183939	574.225667	574.257432	574.281272	574.298324
574.309604	574.316013	574.318289	574.317049	574.312813
574.306032	574.297097	574.286347	574.274084	574.260585
574.246106	574.230892	574.215176	574.199185	574.183131
574.167213	574.151611	574.136484	574.121970	574.108181
574.095213	574.083140	574.072024	574.061912	574.052841
574.044822	574.037840	574.031840	574.026727	574.022376
574.018651	574.015431	574.012632	574.010247	574.008378

Row 14

575.518543	575.184656	574.785595	574.267890	574.050032
574.113130	574.157454	574.193730	574.222300	574.243647
574.258961	574.269265	574.275305	574.277683	574.276917
574.273454	574.267674	574.259903	574.250428	574.239513
574.227408	574.214359	574.200612	574.186406	574.171974
574.157536	574.143293	574.129426	574.116088	574.103410
574.091495	574.080420	574.070241	574.060992	574.052688
574.045324	574.038871	574.033273	574.028451	574.024311
574.020753	574.017691	574.015066	574.012865	574.011113
574.009836	574.008942	574.008184	574.007344	574.006395
574.005442	574.004673	574.004457	574.005688	574.011503
574.084101	574.152249	574.220666	574.285045	574.345136
574.401054	574.452900	574.500674	574.544277	574.583597
574.618733	574.650163	574.678572	574.704560	574.728525
574.750694	574.771173	574.789987	574.807106	574.822490
574.836188	574.848468	574.859825	574.870775	574.881660
574.892625	574.903680	574.914760	574.925759	574.936542
574.946944	574.956751	574.965692	574.973448	574.979752
574.984568	574.988148	574.990849	574.992912	574.994390
574.995189	574.995136	574.994063	574.991936	574.989018

Row 15

575.842154	575.553514	575.223449	574.831591	574.334412
574.051382	574.090770	574.133665	574.167117	574.192083
574.210928	574.224803	574.234330	574.240071	574.242548
574.242204	574.239403	574.234448	574.227602	574.219107
574.209203	574.198139	574.186175	574.173574	574.160593
574.147478	574.134457	574.121732	574.109479	574.097841
574.089331	574.076824	574.067567	574.059181	574.051662
574.044988	574.039120	574.034000	574.029559	574.025722
574.022412	574.019563	574.017127	574.015079	574.013408
574.012089	574.011049	574.010169	574.009353	574.008590
574.007969	574.007696	574.008172	574.010236	574.015504
574.020865	574.018911	574.016354	574.085176	574.153655
574.216904	574.275172	574.328500	574.376653	574.419153
574.455853	574.487691	574.516080	574.541993	574.565914
574.588054	574.608464	574.627094	574.643794	574.658328
574.670521	574.680681	574.689778	574.698796	574.708214
574.718118	574.728416	574.738955	574.749567	574.760069
574.770254	574.779852	574.788471	574.795532	574.800392
574.802883	574.803640	574.803491	574.802853	574.801717
574.799823	574.796771	574.792096	574.785454	574.777093

Row 16

576.138419	575.883711	575.599596	575.275286	574.891782
574.397677	574.023102	574.079698	574.116905	574.143583
574.165513	574.182778	574.195537	574.204380	574.209873
574.212461	574.212483	574.210204	574.205843	574.199608
574.191724	574.182446	574.172056	574.160849	574.149119
574.137145	574.125184	574.113466	574.102189	574.091514
574.081559	574.072398	574.064063	574.056556	574.049853
574.043914	574.038686	574.034111	574.030124	574.026660
574.023659	574.021067	574.018843	574.016955	574.015380
574.014083	574.013014	574.012109	574.011325	574.010668
574.010210	574.010106	574.010605	574.012025	574.014320
574.015895	574.015128	574.012709	574.008963	574.003607
574.007365	574.075703	574.137752	574.193306	574.241027
574.279290	574.310595	574.338442	574.364169	574.388157
574.410485	574.431106	574.449877	574.466514	574.480447
574.490737	574.497360	574.502774	574.509106	574.516793
574.525614	574.535248	574.545403	574.555828	574.566295
574.576576	574.586394	574.595291	574.602317	574.605750
574.604699	574.601123	574.597115	574.593210	574.589130
574.584308	574.578001	574.569220	574.556710	574.540073

Row 17

574.024542	574.022244	574.020257	574.018551	574.017099	574.030539	574.029482	574.028477	574.027503	574.026557
574.015872	574.014832	574.013946	574.013192	574.012578	574.025644	574.024768	574.023934	574.023143	574.022393
574.012151	574.011994	574.012204	574.012804	574.013526	574.021678	574.020993	574.020328	574.019674	574.019018
574.013660	574.012566	574.010151	574.006437	574.001284	574.018347	574.017636	574.016845	574.015916	574.014771
573.994437	573.985561	573.974178	573.987646	574.047045	574.013324	574.011495	574.009226	574.006498	574.003333
574.084704	574.112308	574.138974	574.164667	574.189131	573.999810	573.996095	573.992475	573.989383	573.987366
574.212154	574.233543	574.253080	574.270451	574.284946	573.986919	573.988247	573.991145	573.995138	573.999694
574.293715	574.292649	574.291270	574.294079	574.299969	574.004339	574.008681	574.012394	574.015180	574.016691
574.307880	574.317113	574.327192	574.337770	574.348579	574.016470	574.014425	574.011580	574.009328	574.008377
574.359405	574.370064	574.380319	574.389326	574.392649	574.008820	574.010488	574.013142	574.016549	574.020503
574.384289	574.372863	574.363513	574.355701	574.348330	574.024824	574.029337	574.033756	574.037374	574.038704
574.340362	574.330670	574.317683	574.298236	574.266378	574.036586	574.032143	574.027273	574.022813	574.018763
					574.014820	574.010657	574.006075	574.001197	573.996839

Row 18

576.673845	576.468954	576.246074	576.000260	575.724262
575.406854	575.029754	574.559401	574.001726	574.048806
574.083628	574.107360	574.125079	574.139165	574.150053
574.158046	574.163406	574.166241	574.166564	574.164421
574.159976	574.153539	574.145505	574.136301	574.126331
574.115961	574.105523	574.095315	574.085602	574.076591
574.068418	574.061133	574.054716	574.049099	574.044189
574.039894	574.036129	574.032824	574.029918	574.027362
574.025116	574.023145	574.021421	574.019919	574.018617
574.017491	574.016515	574.015668	574.014938	574.014326
574.013854	574.013549	574.013420	574.013395	574.013251
574.012620	574.011161	574.008698	574.005148	574.000413
573.994372	573.986903	573.977949	573.967754	573.958465
573.954259	573.960258	573.970341	573.981417	573.992350
574.002532	574.011551	574.027038	574.046448	574.064033
574.083164	574.050941	574.039512	574.039179	574.043851
574.051439	574.060874	574.071495	574.082860	574.094662
574.106718	574.119010	574.131896	574.146998	574.165785
574.127648	574.102403	574.086532	574.074187	574.063000
574.051430	574.038068	574.021251	573.999204	573.923498

Row 19

576.920760	576.735651	576.535726	576.317256	576.075116
575.801984	575.486677	575.108675	574.618973	574.010566
574.053613	574.074692	574.093066	574.109642	574.122989
574.133507	574.141532	574.147005	574.149684	574.149415
574.146326	574.140818	574.133434	574.124724	574.115175
574.105197	574.095155	574.085388	574.076214	574.067889
574.060563	574.054262	574.048907	574.044361	574.040476
574.037118	574.034185	574.031599	574.029306	574.027264
574.025445	574.023825	574.022386	574.021109	574.019977
574.018975	574.018083	574.017288	574.016578	574.015950
574.015405	574.014939	574.014519	574.014063	574.013409
574.012340	574.010648	574.008190	574.004883	574.000673
573.995537	573.989526	573.982864	573.976195	573.970998
573.969312	573.972284	573.978580	573.986407	573.994633
574.002560	574.009716	574.015765	574.020522	574.024137
574.026279	574.016124	574.004062	573.997890	573.995918
573.996752	573.999512	574.003608	574.008626	574.014285
574.020435	574.027127	574.034862	574.045422	574.059001
574.044008	574.027198	574.017139	574.010469	574.005157
573.999818	573.993291	573.984485	573.972355	573.953685

Row 20

577.157194	576.989830	576.810051	576.614892	576.400413
576.161190	575.889287	575.571951	575.187063	574.692230
574.049615	574.038175	574.062224	574.082432	574.097751
574.110624	574.121521	574.129990	574.135258	574.136791
574.134694	574.129611	574.122373	574.113722	574.104231
574.094330	574.084387	574.074786	574.065934	574.058179
574.051704	574.046484	574.042336	574.039012	574.036280
574.033959	574.031929	574.030114	574.028469	574.026968
574.025597	574.024346	574.023206	574.022167	574.021222
574.020358	574.019565	574.018830	574.018145	574.017499
574.016883	574.016277	574.015639	574.014896	574.013934
574.012616	574.010813	574.008428	574.005407	574.001738
573.997469	573.992737	573.987850	573.983390	573.980260
573.979427	573.981322	573.985486	573.991033	573.997154
574.003240	574.008837	574.013599	574.017253	574.019448
574.019095	574.014715	574.008842	574.004746	574.003083
574.003505	574.005537	574.008768	574.012873	574.017609
574.022818	574.028443	574.034504	574.040660	574.043857
574.039071	574.030487	574.022979	574.017056	574.012017
574.007059	574.001456	573.994607	573.986130	573.976528

Row 21

577.384843	577.233771	577.072213	576.897717	576.707086
576.496032	576.258570	575.985947	575.664711	575.272005
574.755756	573.986652	574.037556	574.058699	574.073741
574.088909	574.103251	574.115611	574.124091	574.127352
574.125622	574.120179	574.112402	574.103296	574.093485
574.083341	574.077163	574.063363	574.054522	574.047189
574.041621	574.037685	574.034994	574.033118	574.031709

Row 22

577.604946	577.469109	577.324424	577.168814	576.999601
576.813264	576.605061	576.368393	576.093660	575.765655
575.356746	574.809894	574.039489	574.035064	574.048719
574.067455	574.086163	574.104544	574.117697	574.122418
574.119763	574.112652	574.103426	574.093314	574.082862
574.072234	574.061460	574.050920	574.041569	574.034445
574.029956	574.027705	574.026899	574.026800	574.026923
574.027018	574.026987	574.026812	574.026513	574.026117
574.025656	574.025152	574.024623	574.024081	574.023530
574.022971	574.022401	574.021814	574.021200	574.020549
574.019843	574.019060	574.018167	574.017123	574.015874
574.014369	574.012563	574.010430	574.007976	574.005242
574.002322	573.999372	573.996628	573.994395	573.993010
573.992748	573.993716	573.995803	573.998729	574.002145
574.005699	574.009073	574.011989	574.014200	574.015477
574.015666	574.014884	574.013654	574.012663	574.012394
574.013030	574.014551	574.016837	574.019729	574.023056
574.026635	574.030248	574.033564	574.036058	574.037056
574.036213	574.033948	574.031066	574.028138	574.025364
574.022730	574.020181	574.017764	574.015771	574.014862

Row 23

577.818393	577.697007	577.568234	577.430292	577.280898
577.117095	576.934984	576.729307	576.492722	576.214418
575.877353	575.451996	574.871753	573.974455	574.024264
574.045221	574.067871	574.098242	574.119372	574.124218
574.117656	574.106727	574.095023	574.083428	574.072202
574.061134	574.049457	574.037238	574.026341	574.019070
574.016126	574.016376	574.018162	574.020286	574.022165
574.023609	574.024618	574.025257	574.025605	574.025735
574.025704	574.025556	574.025323	574.025024	574.024672
574.024272	574.023823	574.023321	574.022758	574.022123
574.021402	574.020576	574.019620	574.018506	574.017202
574.015679	574.013918	574.011917	574.009698	574.007314
574.004858	574.002466	574.000319	573.998631	573.997618
573.997439	573.998153	573.999691	574.001875	574.004467
574.007211	574.009862	574.012203	574.014046	574.015256
574.015787	574.015760	574.015475	574.015311	574.015576
574.016436	574.017923	574.019983	574.022510	574.025368
574.028392	574.031378	574.034058	574.036095	574.037166
574.037147	574.036236	574.034823	574.033270	574.031799
574.030524	574.029543	574.029023	574.029281	574.030821

Row 24

578.025799	577.918265	577.804702	577.683574	577.552923
577.410229	577.252223	577.074588	576.871502	576.634842
576.352748	576.066507	575.562333	574.949586	574.029618
574.014534	574.038326	574.101795	574.137032	574.136169
574.118665	574.100976	574.086360	574.072983	574.061097
574.050514	574.038036	574.022197	574.007335	573.999322
573.999232	574.003662	574.009149	574.014005	574.017793
574.020582	574.022571	574.023954	574.024888	574.025492
574.025853	574.026035	574.026079	574.026013	574.025855
574.025613	574.025288	574.024878	574.024375	574.023771
574.023051	574.022203	574.021210	574.020054	574.018720
574.017197	574.015484	574.013595	574.011564	574.009449
574.007335	574.005336	574.003592	574.002253	574.001460
574.001310	574.001836	574.002988	574.004647	574.006646
574.008800	574.010925	574.012856	574.014460	574.015654
574.016429	574.016874	574.017174	574.017553	574.018210
574.019269	574.020774	574.022703	574.024985	574.027517
574.030164	574.032760	574.035111	574.037008	574.038285
574.038896	574.038950	574.038669	574.038293	

573.978148	573.990150	574.000775	574.008681	574.014293	575.426830	575.231105	574.988690	574.678861	574.254729
574.018248	574.021048	574.023039	574.024455	574.025458	574.020964	574.009583	574.008953	574.012314	574.016092
574.026158	574.026632	574.026928	574.027081	574.027110	574.019411	574.022182	574.024486	574.026417	574.028055
574.027025	574.026827	574.026514	574.026080	574.025516	574.029460	574.030670	574.031708	574.032583	574.033294
574.024811	574.023955	574.022940	574.021757	574.020403	574.033834	574.034187	574.034334	574.034254	574.033931
574.018881	574.017203	574.015397	574.013502	574.011579	574.033350	574.032506	574.031404	574.030062	574.028508
574.009706	574.007976	574.006498	574.005379	574.004714	574.026784	574.024944	574.023048	574.021166	574.019367
574.004565	574.004947	574.005824	574.007109	574.008684	574.017720	574.016286	574.015118	574.014251	574.013709
574.010412	574.012159	574.013801	574.015244	574.016435	574.013493	574.013593	574.013979	574.014612	574.015445
574.017373	574.018122	574.018796	574.019537	574.020472	574.016428	574.017511	574.018654	574.019825	574.021008
574.022169	574.023236	574.025098	574.027229	574.029553	574.022199	574.023412	574.024670	574.026002	574.027440
574.031967	574.034349	574.036563	574.038481	574.040014	574.029009	574.030729	574.032608	574.034642	574.036818
574.041147	574.041954	574.042579	574.043196	574.043980	574.039116	574.041513	574.043985	574.046516	574.049104
574.045103	574.046748	574.049135	574.052533	574.057261	574.051764	574.054531	574.057462	574.060638	574.064156
					574.068136	574.072715	574.078050	574.084313	574.091690

Row 26

578.423870	578.342687	578.258042	578.168829	578.073623
577.970590	577.857373	577.730941	577.587375	577.421575
577.226806	576.993921	576.709905	576.354396	575.889014
575.224256	574.093412	574.264374	574.312885	574.192865
574.090648	574.072976	574.072028	574.045567	574.025449
574.037790	574.037757	573.990889	573.935965	573.926133
573.953068	573.978336	573.994872	574.005338	574.012203
574.016899	574.020217	574.022616	574.024379	574.025686
574.026660	574.027381	574.027902	574.028256	574.028464
574.028533	574.028465	574.028255	574.027897	574.027381
574.026700	574.025845	574.024815	574.023607	574.022230
574.020698	574.019034	574.017273	574.015462	574.013662
574.011944	574.010388	574.009078	574.008094	574.007500
574.007337	574.007609	574.008288	574.009307	574.010581
574.012007	574.013484	574.014923	574.016256	574.017445
574.018491	574.019437	574.020356	574.021340	574.022472
574.023818	574.025409	574.027243	574.029292	574.031499
574.033791	574.036080	574.038276	574.040300	574.042104
574.043690	574.045115	574.046484	574.047932	574.049613
574.051690	574.054345	574.057786	574.062254	574.068017

Row 27

578.614792	578.546217	578.475438	578.401549	578.323366
578.239347	578.147498	578.045251	577.929316	577.795494
577.638422	577.451224	577.224902	576.947177	576.600308
576.158746	575.585347	574.781505	574.559571	574.177203
573.957008	574.057333	574.096665	574.023431	573.960073
574.047870	574.094524	573.982142	573.834249	573.842653
573.934027	573.974522	573.994031	574.004962	574.011917
574.016709	574.020167	574.022739	574.024693	574.026202
574.027380	574.028302	574.029019	574.029558	574.029937
574.030159	574.030224	574.030123	574.029849	574.029389
574.028737	574.027888	574.026841	574.025604	574.024192
574.022628	574.020946	574.019188	574.017409	574.015669
574.014034	574.012577	574.011364	574.010455	574.009897
574.009714	574.009905	574.010442	574.011276	574.012339
574.013553	574.014843	574.016142	574.017398	574.018584
574.019701	574.020775	574.021857	574.023004	574.024277
574.025719	574.027356	574.029192	574.031206	574.033363
574.035610	574.037888	574.040138	574.042313	574.044389
574.046375	574.048319	574.050306	574.052447	574.054874
574.057737	574.061207	574.065474	574.070754	574.077279

Row 28

578.800244	578.743914	578.686635	578.627704	578.566169
578.500768	578.429835	578.351197	578.262055	578.158852
578.037137	577.891445	577.715204	577.500740	577.239667
576.924488	576.552557	576.138979	575.735930	575.402761
575.182397	575.100461	575.037757	574.922406	574.805935
574.730749	574.631612	574.451798	574.205466	573.844810
573.954007	573.986280	573.999682	574.007717	574.013400
574.017635	574.020869	574.023389	574.025389	574.027002
574.028319	574.029402	574.030288	574.030999	574.031544
574.031922	574.032125	574.032142	574.031960	574.031564
574.030946	574.030100	574.029032	574.027752	574.026283
574.024658	574.022920	574.021120	574.019317	574.017577
574.015964	574.014544	574.013374	574.012501	574.011956
574.011754	574.011887	574.012330	574.013039	574.013960
574.015032	574.016195	574.017398	574.018602	574.019786
574.020949	574.022107	574.023296	574.024554	574.025925
574.027440	574.029121	574.030974	574.032988	574.035139
574.037395	574.039715	574.042063	574.044412	574.046750
574.049092	574.051480	574.053982	574.056693	574.059727
574.063220	574.067325	574.072217	574.078086	574.085140

Row 29

578.980039	578.935568	578.891404	578.847048	578.801789
578.754639	578.704246	578.648791	578.585870	578.512377
578.424408	578.317242	578.183821	578.016542	577.813923
577.576477	577.309006	577.024332	576.742957	576.484686
576.267370	576.092425	575.933894	575.769517	575.600186

Row 30

579.153903	579.120860	579.089374	579.059161	579.029760
579.000470	578.970257	578.937644	578.900577	578.856273
578.799250	578.717223	578.608177	578.471843	578.308712
578.120829	577.912824	577.692547	577.469722	577.252189
577.041555	576.832304	576.627121	576.420345	576.206945
575.981146	575.731374	575.440560	575.084733	574.619949
574.076617	574.021720	574.015508	574.016840	574.019250
574.021674	574.023902	574.025902	574.027695	574.029309
574.030769	574.032086	574.033267	574.034306	574.035192
574.035907	574.036426	574.036720	574.036761	574.036521
574.035981	574.035134	574.033984	574.032553	574.030877
574.029008	574.027011	574.024960	574.022935	574.021018
574.019281	574.017789	574.016590	574.015712	574.015168
574.014951	574.015041	574.015407	574.016007	574.016797
574.017734	574.018774	574.019884	574.021038	574.022221
574.023431	574.024677	574.025976	574.027354	574.028834
574.030440	574.032191	574.034098	574.036163	574.038383
574.040746	574.043238	574.045848	574.048564	574.051388
574.054333	574.057427	574.060716	574.064265	574.068157
574.072497	574.077405	574.083021	574.089503	574.097019

Row 31

579.321498	579.299383	579.280061	579.263474	579.249427
579.237526	579.227085	579.216998	579.205568	579.185302
579.142337	579.076002	578.986351	578.873759	578.739235
578.584796	578.413774	578.230680	578.042008	577.845387
577.645630	577.435589	577.206327	576.966587	576.718947
576.456962	576.170648	575.844975	575.455800	574.953268
574.148461	574.008897	574.018215	574.020825	574.022453
574.024119	574.025822	574.027498	574.029126	574.030695
574.032197	574.033619	574.034946	574.036160	574.037237
574.038148	574.038858	574.039325	574.039509	574.039370
574.038879	574.038024	574.036807	574.035255	574.033411
574.031339	574.029119	574.026842	574.024605	574.022503
574.020622	574.019030	574.017774	574.016875	574.016335
574.016136	574.016246	574.016626	574.017232	574.018020
574.018947	574.019976	574.021075	574.022224	574.023410
574.024630	574.025892	574.027212	574.028611	574.030113
574.031740	574.033512	574.035444	574.037544	574.039815
574.042255	574.044855	574.047609	574.050511	574.053559
574.056763	574.060141	574.063727	574.067573	574.071745
574.076332	574.081440	574.087193	574.093733	574.101218

Row 32

579.482439	579.470667	579.462894	579.459296	579.459964
579.464845	579.473648	579.485705	579.494921	579.484065
579.451933	579.398727	579.324772	579.230653	579.117377
578.986516	578.840226	578.680987	578.510947	578.330957
578.139617	577.932734	577.703373	577.444007	577.169434
576.880494	576.567989	576.218115	575.808633	575.297048
574.576103	574.014411	574.025072	574.025131	574.025528
574.026530	574.027766	574.029135	574.030604	574.032136
574.033692	574.035232	574.036722	574.038130	574.039423
574.040561	574.041497	574.042175	574.042535	574.042523
574.042094	574.041226	574.039921	574.038207	574.036139
574.033795	574.031271	574.028683	574.026149	574.023787
574.021701	574.019970	574.018637	574.017719	574.017200
574.017046	574.017211	574.017644	574.018296	574.019118
574.020069	574.021114	574.022223	574.023378	574.024567
574.025790	574.027055	574.028376	574.029776	574.031278
574.032907	574.034687	574.036636	574.038769	574.0

578.557523 578.354472 578.127161 577.868004 577.574435
577.265036 576.933737 576.567901 576.148125 575.641329
574.980165 574.060902 574.035843 574.028262 574.028120
574.028769 574.029595 574.030679 574.032021 574.033555
574.035198 574.036885 574.038564 574.040195 574.041738
574.043145 574.044356 574.045297 574.045884 574.046036
574.045689 574.044806 574.043387 574.041464 574.039103
574.036400 574.033474 574.030467 574.027532 574.024820
574.022462 574.020550 574.019132 574.018208 574.017741
574.017674 574.017939 574.018470 574.019209 574.020103
574.021109 574.022194 574.023330 574.024500 574.025694
574.026913 574.028166 574.029470 574.030848 574.032328
574.033939 574.035708 574.037661 574.039818 574.042195
574.044799 574.047632 574.050690 574.053965 574.057444
574.061119 574.064983 574.069040 574.073306 574.077814
574.082617 574.087792 574.093437 574.099671 574.106630

Row 34

579.782734 579.789500 579.802475 579.822321 579.849741
579.885461 579.930173 579.972175 579.994998 579.998942
579.984370 579.951652 579.901200 579.833510 579.749182
579.648896 579.533332 579.402966 579.257812 579.097086
578.918896 578.720005 578.495668 578.239418 577.942698
577.618016 577.273742 576.898229 576.474442 575.975159
575.349382 574.461466 574.018852 574.027813 574.030531
574.030874 574.031173 574.031983 574.033267 574.034874
574.036665 574.038543 574.040445 574.042331 574.044164
574.045893 574.047445 574.048722 574.049607 574.049981
574.049748 574.048852 574.047288 574.045097 574.042360
574.039192 574.035739 574.032179 574.028710 574.025531
574.022818 574.020688 574.019186 574.018291 574.017930
574.018010 574.018433 574.019115 574.019985 574.020988
574.022080 574.023229 574.024407 574.025600 574.026798
574.028005 574.029230 574.030496 574.031829 574.033261
574.034828 574.036564 574.038502 574.040669 574.043089
574.045774 574.048728 574.051948 574.055418 574.059120
574.063030 574.067124 574.071384 574.075806 574.080401
574.085202 574.090270 574.095693 574.101581 574.108065

Row 35

579.921311 579.936058 579.957956 579.987889 580.026866
580.076022 580.134768 580.181362 580.209556 580.219781
580.212418 580.187830 580.146383 580.088456 580.014444
579.924711 579.819510 579.698841 579.562267 579.408693
579.236166 579.041682 578.821018 578.568485 578.276493
577.943805 577.591506 577.211395 576.788192 576.298248
575.698051 574.874799 574.006636 574.033796 574.034553
574.032785 574.032238 574.032857 574.034230 574.036035
574.038058 574.040177 574.042335 574.044506 574.046671
574.048784 574.050763 574.052481 574.053770 574.054452
574.054382 574.053476 574.051729 574.049199 574.045985
574.042224 574.038090 574.033801 574.029618 574.025818
574.022646 574.020259 574.018698 574.017899 574.017731
574.018044 574.018701 574.019595 574.020645 574.021794
574.023002 574.024235 574.025471 574.026693 574.027895
574.029078 574.030259 574.031462 574.032720 574.034074
574.035565 574.037239 574.039136 574.041294 574.043743
574.046504 574.049582 574.052974 574.056657 574.060602
574.064765 574.069104 574.073573 574.078140 574.082789
574.087534 574.092417 574.097517 574.102941 574.108817

Row 36

580.051732 580.073471 580.103140 580.141819 580.190788
580.251562 580.318714 580.369560 580.402731 580.418662
580.417731 580.400271 580.366584 580.316939 580.251555
580.170561 580.073920 579.961324 579.832061 579.684869
579.517775 579.327952 579.111548 578.863452 578.576901
578.245111 577.889316 577.509085 577.090642 576.613452
576.041689 575.295907 574.077917 574.054711 574.038726
574.033326 574.032266 574.033084 574.034827 574.037011
574.039369 574.041776 574.044206 574.046678 574.049208
574.051775 574.054295 574.056601 574.058454 574.059578
574.059741 574.058828 574.056846 574.053885 574.050076
574.045571 574.040564 574.035316 574.030172 574.025532
574.021761 574.019085 574.017530 574.016949 574.017112
574.017780 574.018766 574.019939 574.021217 574.022550
574.023899 574.025240 574.026547 574.027805 574.029006
574.030154 574.031268 574.032378 574.033527 574.034763
574.036140 574.037713 574.039536 574.041657 574.044117
574.046945 574.050152 574.053731 574.057655 574.061876
574.066333 574.070953 574.075660 574.080385 574.085080
574.089728 574.094357 574.099038 574.103881 574.109020

Row 37

580.173765 580.201426 580.237602 580.283521 580.340672
580.410874 580.483125 580.538026 580.575851 580.597029
580.601920 580.590821 580.563970 580.521539 580.463612

580.390141 580.300891 580.195355 580.072656 579.931435
579.769730 579.584855 579.373244 579.130234 578.849724
578.523812 578.168853 577.792617 577.382826 576.922109
576.382193 575.706791 574.726032 574.055546 574.034271
574.030590 574.030804 574.032546 574.035058 574.037851
574.040646 574.043356 574.046033 574.048784 574.051695
574.054786 574.057986 574.061098 574.063766 574.065541
574.066040 574.065105 574.062799 574.059293 574.054756
574.049343 574.043239 574.036728 574.030261 574.024445
574.019873 574.016893 574.015487 574.015346 574.016053
574.017244 574.018671 574.020193 574.021744 574.023288
574.024804 574.026271 574.027665 574.028966 574.030163
574.031261 574.032280 574.033261 574.034256 574.035327
574.036540 574.037965 574.039669 574.041716 574.044160
574.047043 574.050383 574.054172 574.058375 574.062927
574.067741 574.072709 574.077715 574.082643 574.087399
574.091928 574.096239 574.100404 574.104546 574.108816

Row 38

580.287281 580.319745 580.361088 580.412625 580.475964
580.553108 580.628998 580.687797 580.730018 580.756081
580.766324 580.761010 580.740320 580.704347 580.653069
580.586316 580.503717 580.404635 580.288092 580.152677
579.996457 579.816863 579.610554 579.373229 579.099326
578.781514 578.431574 578.063079 577.665293 577.223931
576.717614 576.109097 575.317942 574.053350 574.019751
574.025380 574.028089 574.031352 574.035065 574.038711
574.042009 574.044966 574.047785 574.050730 574.054000
574.057670 574.061715 574.065943 574.069845 574.072627
574.073599 574.072561 574.069767 574.065565 574.060172
574.053701 574.046262 574.038092 574.029749 574.022203
574.016511 574.013264 574.012313 574.013001 574.014584
574.016514 574.018499 574.020426 574.022275 574.024049
574.025751 574.027364 574.028864 574.030219 574.031410
574.032436 574.033326 574.034130 574.034917 574.035764
574.036753 574.037970 574.039497 574.041419 574.043810
574.046728 574.050204 574.054234 574.058771 574.063730
574.068992 574.074412 574.079820 574.085039 574.089906
574.094312 574.098241 574.101780 574.105087 574.108348

Row 39

580.392275 580.428408 580.473553 580.529037 580.596488
580.677906 580.757146 580.819722 580.866142 580.896814
580.912058 580.912104 580.897091 580.867050 580.821884
580.761335 580.684941 580.591984 580.481425 580.351832
580.201302 580.027367 579.826871 579.595803 579.329042
579.019937 578.678997 578.321534 577.938374 577.517998
577.044635 576.494187 575.824004 574.930964 574.018511
574.021139 574.024525 574.029737 574.035162 574.039909
574.043691 574.046697 574.049406 574.052363 574.055928
574.060189 574.065209 574.070994 574.076881 574.081336
574.082942 574.081517 574.077894 574.072819 574.066487
574.058870 574.049923 574.039623 574.028505 574.018212
574.010851 574.007516 574.007676 574.009894 574.012841
574.015759 574.018387 574.020729 574.022867 574.024870
574.026769 574.028555 574.030188 574.031617 574.032801
574.033734 574.034449 574.035015 574.035524 574.036075
574.037666 574.037699 574.038975 574.040703 574.042986
574.045909 574.049523 574.053831 574.058775 574.064243
574.070082 574.076100 574.082071 574.087731 574.092811
574.097113 574.100585 574.103355 574.105660 574.107753

Row 40

580.488869 580.527564 580.575178 580.632977 580.702502
580.785662 580.868228 580.934496 580.984967 581.020045
581.040032 581.045138 581.035466 581.011006 580.971610
580.916961 580.846540 580.759579 580.655005 580.531383
580.386843 580.219001 580.024846 579.800602 579.541504
579.241452 578.912910 578.569241 578.202575 577.803666
577.360818 576.857917 576.269934 575.549104 574.862890
574.013293 574.019431 574.028011 574.035918 574.042011
574.046084 574.048696 574.050770 574.053405 574.057233
574.062036 574.067900 574.075750 574.085121 574.092678
574.095028 574.092292 574.087127 574.081088 574.073868
574.065120 574.054767 574.041973 574.026530 574.011388
574.001312 573.998519 574.001234 574.006218 574.011188
574.015287 574.018531 574.021205 574.023568 574.025772
574.027879 574.029875 574.031691 574.033231 574.034418
574.035227 574.035704 574.035951 574.036095 574.036262
574.036567 574.037124 574.038054 574.039494 574.041587
574.044465 574.048212 574.052845 574.058291 574.064403
574.070982 574.077796 574.084564 574.090914 574.096402
574.100652 574.103553 574.105334 574.106409 574.107145

Row 41

580.577314 580.617533 580.666370 580.724970 580.794698
580.877206 580.962767 581.032671 581.087093 581.126432

581.150983	581.160941	581.156390	581.137294	581.103472	581.115107	581.187572	581.266298	581.336140	581.391906
581.054574	580.990049	580.909103	580.810648	580.693257	581.433938	581.462479	581.477655	581.479473	581.467797
580.555092	580.393836	580.206593	579.989765	579.738863	581.442329	581.402579	581.347827	581.277079	581.189012
579.448535	579.135479	578.807810	578.458858	578.081121	581.081914	580.953609	580.801374	580.621833	580.416795
577.665698	577.201267	576.671844	576.050793	575.279179	580.199353	579.967229	579.716532	579.442930	579.141757
574.124371	574.012670	574.027014	574.038356	574.045985	578.808050	578.436523	578.021587	577.557687	577.040589
574.049781	574.051207	574.051574	574.053214	574.057714	576.469849	575.848374	575.163765	574.415694	574.166739
574.063147	574.068603	574.078562	574.094789	574.109066	574.328841	574.600409	574.818385	575.020124	575.358987
574.111859	574.104831	574.096700	574.090365	574.082590	575.689918	575.931299	576.098662	576.244049	576.337694
574.072496	574.061679	574.047057	574.024429	573.999444	576.307025	576.184949	576.067283	575.988160	575.909544
573.984516	573.984381	573.992920	574.002740	574.010402	575.825769	575.779548	575.776293	575.690953	575.532121
574.015589	574.019160	574.021936	574.024392	574.026746	575.289073	574.885069	574.268362	574.075627	574.046308
574.029075	574.031346	574.033434	574.035162	574.036374	574.022967	574.021697	574.025981	574.026665	574.028569
574.037017	574.037163	574.036976	574.036643	574.036326	574.032142	574.037307	574.044382	574.051005	574.053751
574.036148	574.036222	574.036684	574.037704	574.039487	574.051683	574.046751	574.041622	574.037757	574.035091
574.042234	574.046095	574.051112	574.057192	574.064120	574.032777	574.030035	574.026648	574.023050	574.020212
574.071635	574.079484	574.087377	574.094828	574.101091	574.019441	574.022120	574.029525	574.042172	574.058042
574.105410	574.107522	574.107917	574.107435	574.106611	574.072034	574.081209	574.092434	574.116613	574.151427
					574.174054	574.156636	574.111722	574.086659	574.123948

Row 42

580.657976	580.698780	580.747734	580.805813	580.874144
580.954036	581.041165	581.114677	581.172985	581.216490
581.245486	581.260164	581.260602	581.246751	581.218418
581.175239	581.116651	581.041851	580.949757	580.838952
580.707630	580.553526	580.373827	580.165062	579.922940
579.644403	579.349257	579.039271	578.708750	578.351468
577.960385	577.527098	577.040612	576.484191	575.825900
574.983196	574.013696	574.026768	574.044497	574.053513
574.055384	574.054903	574.051236	574.049744	574.057439
574.065421	574.064928	574.073829	574.105515	574.137211
574.138206	574.116919	574.103491	574.101432	574.093820
574.079388	574.071341	574.060735	574.025143	573.976543
573.952244	573.962352	573.984013	574.001535	574.011905
574.017276	574.020423	574.022911	574.025282	574.027723
574.030304	574.032965	574.035492	574.037555	574.038846
574.039254	574.038916	574.038123	574.037173	574.036265
574.035509	574.034986	574.034823	574.035237	574.036521
574.038994	574.042919	574.048400	574.055305	574.063288
574.071951	574.081059	574.090483	574.099731	574.107521
574.112199	574.113045	574.111202	574.108692	574.106272

Row 43

580.731316	580.771895	580.820031	580.876505	580.942176
581.017977	581.103715	581.180829	581.242988	581.290601
581.323971	581.343295	581.348655	581.340005	581.317157
581.279750	581.227228	581.158799	581.073394	580.969617
580.845693	580.699393	580.527959	580.327998	580.095341
579.832498	579.557103	579.266033	578.954317	578.616597
578.247019	577.838963	577.384423	576.872412	576.284471
575.579668	574.614060	574.016452	574.062379	574.067162
574.061561	574.062723	574.049922	574.034646	574.056290
574.080774	574.052143	574.041703	574.113156	574.198044
574.186357	574.116436	574.096419	574.120789	574.113680
574.076353	574.079172	574.102954	574.039648	573.924461
573.880955	573.931733	573.980139	574.007107	574.017795
574.020684	574.022113	574.023949	574.026096	574.028552
574.031432	574.034676	574.037954	574.040647	574.042127
574.042166	574.041064	574.039393	574.037649	574.036067
574.034672	574.033443	574.032465	574.032003	574.032488
574.034436	574.038312	574.044362	574.052417	574.061836
574.071848	574.082246	574.093544	574.105758	574.116751
574.122608	574.121062	574.114835	574.109563	574.106677

Row 44

580.797863	580.837548	580.884121	580.938165	581.000272
581.071015	581.150884	581.231334	581.297332	581.349025
581.386733	581.410669	581.420930	581.417492	581.400183
581.368666	581.322407	581.260642	581.182331	581.086108
580.970226	580.832486	580.670156	580.479876	580.257775
580.016344	579.762061	579.490812	579.198082	578.879022
578.528438	578.140708	577.709578	577.227706	576.685277
576.064655	575.318957	574.257463	574.128104	574.084918
574.054932	574.085018	574.061579	573.969302	574.047985
574.154376	573.993888	573.915294	574.099040	574.329808
574.247647	574.057550	574.035705	574.185705	574.161189
574.027726	574.025980	574.259748	574.097220	573.790468
573.740474	573.913553	573.995648	574.027162	574.030063
574.024605	574.023212	574.024783	574.026643	574.028976
574.032195	574.036298	574.040910	574.044857	574.046747
574.046114	574.043689	574.040682	574.037948	574.035696
574.033703	574.031702	574.029670	574.027936	574.027144
574.028120	574.031690	574.038428	574.048231	574.059877
574.071475	574.082511	574.095349	574.112388	574.130549
574.140224	574.133651	574.116932	574.106954	574.110149

Row 45

580.858189	580.896456	580.940913	580.991954	581.049932

Row 46

580.912880	580.949343	580.991304	581.038996	581.092571
581.152044	581.217217	581.287555	581.359431	581.419273
581.465632	581.498787	581.518907	581.526043	581.520114
581.500881	581.467915	581.420563	581.357899	581.278662
581.181190	581.063332	580.922359	580.756668	580.577261
580.384675	580.174945	579.943332	579.686987	579.402338
579.084806	578.728520	578.326027	577.869173	577.355894
576.796271	576.234238	575.744544	575.409618	575.324677
575.446134	575.675505	575.949498	576.258858	576.607030
576.958628	577.274703	577.531796	577.713741	577.802846
577.795084	577.718528	577.614747	577.505516	577.389271
577.262461	577.129644	576.986469	576.813296	576.599577
576.336140	576.008708	575.609914	575.125463	574.489789
573.999066	574.016143	574.032835	574.024194	574.026886
574.030850	574.036046	574.048007	574.060939	574.065389
574.059804	574.049745	574.041197	574.036397	574.034190
574.032310	574.029024	574.023867	574.017514	574.011414
574.007628	574.008197	574.015471	574.032470	574.057810
574.078467	574.079066	574.075633	574.107650	574.179365
574.248976	574.205921	574.087845	573.996884	574.091883

Row 47

580.962514	580.996909	581.036148	581.080332	581.129458
581.183368	581.241677	581.303669	581.368175	581.431050
581.481741	581.519522	581.546617	581.557139	581.557075
581.544265	581.518367	581.478823	581.424800	581.355128
581.268219	581.161967	581.034648	580.894249	580.738681
580.563609	580.368089	580.150453	579.908269	579.638207
579.335759	578.994765	578.606644	578.159373	577.637590
577.035989	576.447349	576.069382	575.923133	575.960134
576.135360	576.402548	576.730052	577.103050	577.510043
577.929317	578.328823	578.667590	578.900674	579.000836
578.982388	578.891806	578.772991	578.644652	578.503062
578.338978	578.150042	577.938899	577.706588	577.451207
577.167985	576.851603	576.500028	576.112711	575.687103
575.218085	574.692726	574.026559	574.008818	574.026330
574.029887	574.026062	574.050183	574.079545	574.086758
574.071680	574.050684	574.036931	574.032619	574.033089
574.033276	574.029810	574.022197	574.011814	574.000435
573.991832	573.988372	573.992020	574.012871	574.059923
574.107120	574.086495	574.018565	574.055851	574.192539
574.413964	574.694649	575.407588	575.978057	576.450501

Row 48

581.007641	581.039807	581.076220	581.116880	581.161678
581.210343	581.262390	581.317040	581.373132	581.429037
581.482077	581.524490	581.554582	581.572541	581.578444
581.572231	581.553674	581.522339	581.477525	581.418194
581.342872	581.251465	581.148477	581.026549	580.884702
580.722888	580.540378	580.335751	580.106817	579.850431
579.562124	579.235408	578.860383	578.420691	577.885779
577.188045	576.331422	576.166776	576.129236	576.379026
576.624875	576.942896	577.321294	577.751865	578.226591
578.731254	579.236993	579.687034	579.994372	580.096261
580.029188	579.889260	579.742839	579.602703	579.447569
579.253167	579.015565	578.749100	578.468662	578.178804
577.875296	577.553184	577.212882	576.859377	576.498189
57				

581.048768	581.078629	581.112205	581.149429	581.190122					
581.233958	581.280418	581.328735	581.377846	581.426337	581.181734	581.202565	581.225649	581.250856	581.277997
581.472433	581.514019	581.548457	581.571877	581.583814	581.306817	581.336987	581.368110	581.399721	581.431305
581.584333	581.573349	581.550590	581.515534	581.467942	581.462332	581.492296	581.520775	581.547505	581.572446
581.410676	581.342494	581.253671	581.144123	581.014448	581.595848	581.618286	581.640660	581.663049	581.669180
580.864659	580.694173	580.501769	580.285487	580.042417	581.653952	581.618236	581.562785	581.488191	581.394845
579.768298	579.456744	579.097623	578.673267	578.147651	581.282900	581.152237	581.002437	580.832734	580.641971
577.424066	576.297426	576.128330	576.405148	576.675411	580.428548	580.190399	579.925047	579.629919	579.303151
576.984299	577.349510	577.773367	578.255977	578.797758	578.945108	578.560013	578.155418	577.739569	577.315216
579.397062	580.040081	580.667665	581.085578	581.177183	577.530344	577.977880	578.468283	579.008434	579.603524
580.991738	580.757901	580.581380	580.450867	580.304161	580.261752	580.988386	581.709305	582.143548	582.298002
580.083653	579.788568	579.460793	579.134722	578.817094	582.203049	582.056918	582.136121	582.231842	582.177753
578.495851	578.160466	577.814512	577.469960	577.137043	581.963267	581.574641	581.033227	580.685087	580.569302
576.820122	576.516669	576.217431	575.909785	575.572630	580.322429	579.855547	579.310261	578.936091	578.674377
575.147097	574.524002	574.050771	574.225976	574.216067	578.500045	578.393363	578.335216	578.317735	578.343972
574.099282	574.008111	573.988318	574.013376	574.033021	578.393304	578.449432	578.531133	578.791304	579.003723
574.051684	574.047644	574.024071	574.010179	573.966895	578.393179	577.154400	575.420189	574.426667	574.718699
573.941926	573.933478	573.937351	573.803037	574.536626	575.204131	575.794412	576.114614	576.063955	575.678999
575.278731	575.890147	576.437176	576.993094	577.519063	575.186241	577.220116	577.379004	577.807119	578.354492
577.985159	578.373057	578.679444	578.916214	579.086179	578.963502	579.567774	580.084292	580.523558	580.895049
					581.205097	581.457872	581.656031	581.801063	581.893434

Row 50

581.086358	581.113897	581.144691	581.178628	581.215497
581.254956	581.296498	581.339422	581.382800	581.425464
581.466007	581.502835	581.534267	581.558689	581.574749
581.581553	581.578801	581.566804	581.546366	581.518538
581.482254	581.425482	581.347195	581.248349	581.129463
580.990580	580.831234	580.650394	580.446357	580.216551
579.957188	579.662601	579.323998	578.926916	578.446090
577.838557	577.050169	576.272014	576.579912	576.895843
577.245484	577.646543	578.105975	578.625983	579.226666
579.912871	580.711234	581.456411	581.864748	581.980178
581.820012	581.477549	581.292508	581.225620	581.137327
580.886441	580.496199	580.084645	579.714707	579.383961
579.053739	578.697513	578.330416	577.979768	577.660750
577.376963	577.125179	576.898269	576.686792	576.477969
576.254099	576.002938	575.717421	575.346038	574.584411
574.086897	573.887025	573.905518	574.019468	574.024700
574.088600	574.085451	574.005830	574.023303	574.221934
574.859249	575.148022	575.319714	575.679203	576.158093
576.685041	577.218521	577.745828	578.261828	578.732778
579.125346	579.445902	579.700687	579.894263	580.027760

Row 51

581.120819	581.146063	581.174168	581.205004	581.238349
581.273872	581.311115	581.349466	581.388155	581.426249
581.462677	581.496278	581.525887	581.550449	581.569157
581.581568	581.587686	581.587958	581.581380	581.573850
581.547500	581.499093	581.429704	581.340124	581.230803
581.101812	580.952796	580.782921	580.590778	580.374237
580.130189	579.854139	579.539552	579.176934	578.753202
578.254200	577.678136	577.059881	576.720640	577.052204
577.421482	577.845729	578.327942	578.875614	579.503004
580.237750	581.132466	581.867661	582.278057	582.413497
582.297325	581.971813	581.841542	581.876713	581.795844
581.555020	581.125812	580.598946	580.198487	579.894593
579.579269	579.180221	578.766943	578.398813	578.089098
577.834772	577.628126	577.460057	577.321522	577.203143
577.095217	576.991730	576.888067	576.756405	576.521982
576.099173	575.348518	574.448811	574.133229	573.953895
574.211070	574.439535	574.529270	574.622738	574.948792
575.921065	576.428052	576.420341	576.701604	577.137774
577.649532	578.191634	578.738293	579.227931	579.641508
579.987851	580.272001	580.497410	580.666196	580.778796

Row 52

581.152507	581.175511	581.201045	581.228972	581.259083
581.291079	581.324561	581.359025	581.393856	581.428344
581.461708	581.493145	581.521902	581.547364	581.569145
581.587177	581.601751	581.613518	581.623410	581.625076
581.604856	581.563379	581.501531	581.419982	581.319140
581.199109	581.059653	580.900141	580.719486	580.516047
580.287487	580.030597	579.741110	579.413713	579.042831
578.625374	578.166037	577.679604	577.174887	577.128935
577.515926	577.953845	578.445865	578.998085	579.623138
580.344591	581.207456	581.949092	582.368549	582.517680
582.424966	582.162283	582.149497	582.205397	582.131232
581.903798	581.501946	580.941065	580.548603	580.362853
580.097415	579.606718	579.108225	578.721815	578.427095
578.206888	578.046695	577.933651	577.858782	577.815050
577.792105	577.784247	577.802345	577.850443	577.845349
577.658415	576.958537	575.335025	574.107375	574.086454
574.573027	574.903138	575.026794	574.950916	574.871960
575.795594	577.006810	577.053373	577.369719	577.839318
578.385984	578.967403	579.503361	579.958086	580.343048
580.665250	580.929016	581.137070	581.290912	581.390860

Row 53

Row 54

581.208767	581.227498	581.248250	581.270905	581.295304
581.321238	581.348452	581.376649	581.405498	581.434658
581.463809	581.492687	581.521142	581.549193	581.577087
581.605352	581.634836	581.666717	581.696180	581.705555
581.694392	581.663455	581.613415	581.544820	581.458063
581.353355	581.230703	581.089888	580.930445	580.751654
580.552543	580.331939	580.088605	579.821550	579.530563
579.216909	578.883751	578.535594	578.176605	577.811333
577.483150	577.923943	578.405982	578.925112	579.478699
580.055919	580.644525	581.191283	581.590685	581.754348
581.752304	581.742503	581.833897	581.974885	581.946731
581.740712	581.347788	580.864727	580.551469	580.420284
580.203781	579.772638	579.345174	579.037738	578.831114
578.718980	578.679984	578.678701	578.699597	578.812201
578.932392	578.777904	578.161320	577.537381	576.871740
576.286445	575.665755	575.459250	575.734559	576.315588
576.792229	577.197702	577.395306	577.196407	576.528715
575.352028	576.749582	577.472736	578.076326	578.727166
579.407620	580.013185	580.526843	580.962636	581.330019
581.635465	581.883380	582.076659	582.217029	582.305228

Row 55

581.233836	581.250538	581.269063	581.289311	581.311154
581.334431	581.358955	581.384519	581.410912	581.437940
581.465454	581.493391	581.521817	581.550980	581.581365
581.613739	581.649202	581.689211	581.721711	581.733652
581.725772	581.698768	581.653264	581.589790	581.508761
581.410454	581.294996	581.162356	581.012334	580.844580
580.658617	580.453919	580.230045	579.986864	579.724857
579.445405	579.150838	578.843998	578.527235	578.200287
577.874234	577.753871	578.271908	578.768874	579.278348
579.786828	580.272653	580.698107	581.014404	581.195370
579.727749	581.314746	581.372972	581.442411	581.427860
581.221154	580.867094	580.509261	580.225904	580.016102
579.797558	579.520752	579.256252	579.044189	578.896686
578.864541	578.924221	578.991048	578.383089	577.660572
576.955569	576.174223	575.254518	575.563108	576.036412
576.551469	576.853480	577.001625	577.215335	577.525709
577.888869	578.249652	578.300081	578.002991	578.284647
575.970147	576.447251	577.465018	578.225498	578.983954
579.717790	580.336668	580.858409	581.298887	581.668568
581.974610	582.221940	582.413884	582.552529	582.638953

Row 56

581.257143	581.271880	581.288267	581.306226	581.325657
581.346445	581.368464	581.391585	581.415698	581.440728
581.466667	581.493610	581.521792	581.551644	581.583838
581.619340	581.659463	581.705234	581.739055	581.752976
581.747694	581.723866	581.682096	581.622917	581.546778
581.454028	581.344909	581.219556	581.077998	580.920179
580.745999	580.555381	580.348376	580.125309	579.886934
579.634538	579.369881	579.094917	578.811327	578.520340
578.223450	577.962945	578.050168	578.559326	579.035913
579.491617	579.907410	580.259825	580.526331	580.699101
580.794104	580.841040	580.860483	580.845325	580.760337
580.576859	58			

Row 57

581.278863	581.291690	581.306015	581.321775	581.338901
581.357314	581.376941	581.397721	581.419621	581.442663
581.466947	581.492686	581.520247	581.550193	581.583335
581.620788	581.660426	581.712971	581.747705	581.763081
581.759770	581.738415	581.699620	581.643936	581.571855
581.483801	581.380124	581.261105	581.126960	580.977871
580.814012	580.635615	580.443035	580.236842	580.017888
579.787335	579.546570	579.297028	579.039968	578.776454
578.507877	578.233977	578.052933	578.301019	578.770206
579.191725	579.561091	579.864362	580.091785	580.243179
580.328087	580.358878	580.340640	580.266845	580.132371
579.946187	579.726791	579.504315	579.299357	579.098812
578.801210	578.209600	577.573214	576.767432	575.642243
575.335994	575.634647	575.995965	576.353871	576.621130
576.915810	577.235882	577.555785	577.847457	578.097119
578.311389	578.487744	578.635151	578.774749	578.926491
579.109071	579.299249	579.234782	578.846870	578.042445
576.637861	575.553902	577.187925	578.232342	579.199404
580.024471	580.697759	581.256341	581.722059	582.108922
582.426392	582.681013	582.877310	583.018314	583.105884

Row 58

581.299155	581.310120	581.322439	581.336068	581.350959
581.367068	581.384360	581.402826	581.422497	581.443462
581.465903	581.490115	581.516553	581.545869	581.579865
581.617043	581.661675	581.711954	581.747222	581.763558
581.761627	581.742072	581.705511	581.652527	581.583662
581.899416	581.400239	581.286540	581.158695	581.017066
580.862036	580.694046	580.513649	580.321551	580.118645
579.905988	579.684727	579.455948	579.220490	578.978760
578.730414	578.473496	578.211931	578.134750	578.496829
578.901766	579.242198	579.508333	579.698028	579.818768
579.880623	579.887757	579.834679	579.699416	579.493011
579.281613	579.080495	578.527855	577.844434	577.063972
576.087376	575.054626	575.493277	575.883976	576.234487
576.465849	576.695898	576.949717	577.210466	577.467624
577.737950	578.028415	578.318669	578.560862	578.762457
578.929662	579.065600	579.175638	579.267896	579.348991
579.418798	579.456068	579.352477	578.938676	578.128675
576.901493	574.983618	576.829352	578.101392	579.171791
580.051769	580.761392	581.345225	581.828829	582.228453
582.555017	582.816065	583.016840	583.160907	583.250544

Row 59

581.318164	581.327304	581.337662	581.349206	581.361907
581.375743	581.390712	581.406841	581.424202	581.442933
581.463265	581.485546	581.510279	581.538161	581.570131
581.607420	581.651620	581.701790	581.737224	581.754041
581.752910	581.734488	581.699418	581.648324	581.581808
581.500444	581.404781	581.295340	581.172628	581.037156
580.889460	580.730136	580.559869	580.379458	580.189823
579.991966	579.786893	579.575472	579.358229	579.135045
578.904572	578.662892	578.417276	578.150301	578.258663
578.634019	578.963555	579.197930	579.342207	579.420005
579.453242	579.436873	579.365603	579.185995	578.333013
577.506812	576.722616	575.500729	575.314683	575.680330
576.043652	576.328891	576.598050	576.854076	577.087846
577.294207	577.493950	577.703036	577.924076	578.158538
578.412302	578.688060	578.935475	579.138570	579.303944
579.435994	579.537553	579.611081	579.658296	579.677473
579.658212	579.571320	579.355110	578.924456	578.215000
577.157570	575.463216	576.527479	577.910069	579.067630
580.008117	580.758685	581.371036	581.874889	582.289072
582.626159	582.894798	583.101000	583.248893	583.341178

Row 60

581.336028	581.343374	581.351804	581.361294	581.371827
581.383397	581.396022	581.409750	581.424679	581.440973
581.458886	581.478786	581.501190	581.526796	581.556531
581.591594	581.633519	581.682149	581.717380	581.734198
581.733283	581.715314	581.680970	581.630926	581.565850
581.486397	581.393208	581.286910	581.168124	581.037478
580.895631	580.743296	580.581259	580.410399	580.231674
580.046089	579.854609	579.658021	579.456730	579.250461
579.037757	578.815044	578.593587	578.390854	578.133124
578.430524	578.747007	578.953796	579.027326	579.029140
579.046451	579.001797	578.000427	576.482863	575.229762
575.530000	576.009267	576.284225	576.528883	576.778112
577.019166	577.239680	577.444051	577.636399	577.816934
577.988328	578.159120	578.338424	578.532334	578.745779
578.984186	579.236028	579.447150	579.618258	579.753773
579.856602	579.928337	579.969324	579.977969	579.948812
579.869190	579.714760	579.446778	579.017066	578.374225
577.435815	575.929853	576.186810	577.656835	578.887645
579.898586	580.695456	581.339150	581.864996	582.294984
582.643557	582.920558	583.132807	583.285009	583.380287

Row 61

581.352875	581.358455	581.364983	581.372439	581.380813
581.390107	581.400346	581.411589	581.423942	581.437574
581.452739	581.469797	581.489243	581.511740	581.538154
581.569597	581.607476	581.652756	581.687410	581.703737
581.702433	581.684207	581.649784	581.599900	581.535298
581.456723	581.364909	581.260583	581.144467	581.017289
580.879808	580.732828	580.577226	580.413957	580.244047
580.068564	579.888535	579.704810	579.517869	579.327598
579.133053	578.932151	578.744233	578.582801	578.444295
578.213698	578.625901	578.828383	578.782325	578.509817
577.730804	575.931397	575.743683	576.273135	576.459689
576.690269	576.958596	577.201787	577.419706	577.623851
577.815724	577.994015	578.159246	578.312536	578.456250
578.596108	578.738712	578.891333	579.060669	579.252953
579.474460	579.696623	579.877471	580.021264	580.131077
580.208697	580.256463	580.267970	580.245629	580.181243
580.063361	579.873759	579.587026	579.171979	578.589873
577.773619	576.533327	575.913463	577.285530	578.628992
579.727346	580.576458	581.253610	581.802579	582.249146
582.609794	582.895616	583.114267	583.271035	583.369461

Row 62

581.368834	581.372673	581.377321	581.382759	581.388976
581.395975	581.403779	581.412445	581.422072	581.432817
581.444912	581.458683	581.474575	581.493179	581.515261
581.541796	581.574007	581.613393	581.647085	581.662406
581.660075	581.640835	581.605466	581.554779	581.489608
581.410796	581.319182	581.215591	581.100836	580.975732
580.841116	580.697874	580.546962	580.389417	580.226363
580.058990	579.888499	579.715958	579.542070	579.367001
579.190491	579.013658	578.863689	578.749592	578.667072
578.618281	578.610423	578.931323	578.590456	576.817716
575.859601	576.297265	576.725614	577.059234	577.303458
577.527740	577.748555	577.952077	578.137947	578.310501
578.472061	578.623236	578.764565	578.896877	579.021290
579.139604	579.255469	579.381037	579.524844	579.693741
579.894460	580.086904	580.241307	580.361041	580.448218
580.503807	580.527598	580.517994	580.471557	580.382317
580.240963	580.034285	579.745271	579.353601	578.834363
578.150019	577.220064	576.151668	576.707793	578.327058
579.503051	580.405876	581.117142	581.689775	582.153348
582.526384	582.821250	583.046452	583.207867	583.309443

Row 63

581.384030	581.386154	581.388946	581.392381	581.396443
581.401128	581.406452	581.412455	581.419218	581.426870
581.435601	581.445683	581.457485	581.471497	581.488352
581.508849	581.533982	581.564957	581.596231	581.610005
581.605960	581.584882	581.547615	581.495063	581.428172
581.347906	581.255220	581.151043	581.036274	580.911798
580.778513	580.637370	580.489399	580.335726	580.177587
580.016347	579.853502	579.690541	579.528557	579.367831
579.208327	579.057486	578.947006	578.824888	578.684355
578.925906	579.072161	578.876293	578.401640	577.618544
577.281470	577.348691	577.554671	577.786700	577.008753
578.210660	578.397302	578.570930	578.732230	578.882609
579.023313	579.155129	579.278744	579.395023	579.505168
579.610902	579.714619	579.819416	579.935306	580.077367
580.252187	580.417783	580.548401	580.646501	580.713463
580.749667	580.754458	580.725996	580.660983	580.554312
580.398755	580.184877	579.901350	579.535603	579.074635
578.507361	577.841735	577.240532	576.975039	578.050379
579.234043	580.185292	580.930580	581.527301	582.008195
582.393781	582.697752	582.929508	583.095519	583.200134

Row 64

581.398588	581.399027	581.399989	581.401440	581.403356
581.405719	581.408527	581.411799	581.415585	581.419971
581.425093	581.431150	581.438415	581.447253	581.458135
581.471659	581.488560	581.509721	581.534742	581.546393
581.539980	581.516059	581.475827	581.420212	581.350305
581.267224	581.172070	581.065885	580.949646	580.824285
580.690737	580.549997	580.403167	580.251461	580.096220
579.938982	579.781645	579.626495	579.475496	579.328661
579.184300	579.059945	578.986846	578.975554	578.966818
579.004935	578.983298	578.841035	578.576829	578.265229

580.974274 581.298587 581.552680 581.740004 581.865173

Row 65

581.412633 581.411422 581.410587 581.410084 581.409872
581.409917 581.410195 581.410695 581.411426 581.412424
581.413757 581.415537 581.417924 581.421142 581.425483
581.431321 581.439115 581.449413 581.462833 581.471513
581.461734 581.434123 581.389700 581.329635 581.255215
581.167769 581.068587 580.958847 580.839592 580.711758
580.576268 580.434135 580.286532 580.134786 579.980298
579.824630 579.670014 579.520103 579.379560 579.248534
579.121151 579.017658 578.957772 578.983837 579.001637
579.009881 578.990515 578.918951 578.801351 578.683922
578.633279 578.678600 578.801534 578.953425 579.109967
579.262561 579.407952 579.545037 579.673523 579.793537
579.905437 580.009720 580.107011 580.198112 580.284075
580.366274 580.446482 580.526932 580.610407 580.700350
580.809862 580.927578 581.016149 581.076380 581.108550
581.112254 581.086408 581.029209 580.938070 580.809575
580.639498 580.422953 580.154729 579.829876 579.444691
578.998276 578.493774 577.965018 577.478114 577.507768
578.647081 579.594294 580.398723 581.048719 581.566056
581.977118 582.299162 582.543717 582.718517 582.828646

Row 69

581.466091 581.458815 581.451342 581.443570 581.435385
581.426659 581.417250 581.406996 581.395713 581.383189
581.369178 581.353389 581.335477 581.315027 581.291535
581.264392 581.232864 581.196076 581.153019 581.102588
581.043682 580.975390 580.895359 580.796245 580.680477
580.552279 580.415589 580.272974 580.125151 579.971370
579.809971 579.639341 579.460790 579.278842 579.104201
579.099384 579.155496 579.188921 579.214120 579.226887
579.219277 579.189443 579.140015 579.074313 579.027025
579.143049 579.275075 579.416266 579.566558 579.728869
579.904418 580.069857 580.222640 580.364776 580.497086
580.619795 580.732939 580.836562 580.930781 581.015789
581.091839 581.159232 581.218306 581.269434 581.313022
581.349502 581.379315 581.402881 581.420539 581.432436
581.438349 581.437383 581.437388 581.438310 581.417372
581.372861 581.303139 581.206512 581.081203 580.925338
580.736933 580.513864 580.253785 579.953898 579.610442
579.232643 578.853084 578.472305 578.079106 577.623594
577.771129 578.674791 579.320052 579.841350 580.278838
580.647435 580.953385 581.199922 581.389828 581.526665

Row 66

581.426286 581.423470 581.420881 581.418463 581.416158
581.413911 581.411671 581.409391 581.407035 581.404580
581.402020 581.399367 581.396661 581.393970 581.391394
581.389070 581.387171 581.385906 581.385502 581.385421
581.371467 581.338903 581.288853 581.222688 581.141971
581.048340 580.943356 580.828366 580.704454 580.572487
580.433276 580.287787 580.137297 579.983355 579.827424
579.670632 579.514789 579.364831 579.232787 579.129003
579.031692 579.000935 578.994458 578.984547 579.009810
579.037015 579.048530 579.040060 579.019524 579.011070
579.043777 579.133177 579.259279 579.397751 579.539357
579.678078 579.810750 579.935921 580.053037 580.162026
580.263094 580.356632 580.443178 580.523436 580.598311
580.668950 580.736789 580.803594 580.871510 580.943100
581.021825 581.114084 581.183781 581.227251 581.244292
581.234192 581.195736 581.127196 581.026303 580.890246
580.715712 580.499000 580.236221 579.923536 579.557339
579.133887 578.647044 578.133353 577.612417 577.143794
578.337430 579.285488 580.068570 580.727066 581.263807
581.687719 582.018684 582.269512 582.448562 582.561208

Row 70

581.479348 581.470740 581.461808 581.452435 581.442491
581.431825 581.420267 581.407619 581.393653 581.378100
581.360642 581.340899 581.318408 581.292608 581.262808
581.228155 581.187606 581.139885 581.083477 581.016655
580.937613 580.844793 580.737454 580.616327 580.479775
580.331172 580.176906 580.020693 579.862440 579.699798
579.529284 579.343383 579.143931 579.032521 579.142470
579.237970 579.297546 579.331693 579.348212 579.346691
579.323983 579.277912 579.207811 579.112374 578.983033
579.156810 579.335236 579.521026 579.712998 579.912260
580.113405 580.293660 580.455507 580.602032 580.735231
580.856349 580.966180 581.065278 581.154073 581.232935
581.302195 581.362164 581.413134 581.455382 581.489164
581.514702 581.532162 581.541609 581.542933 581.535734
581.519143 581.491546 581.454901 581.427954 581.396608
581.342533 581.263806 581.158675 581.025400 580.862222
580.667345 580.438898 580.174848 579.872834 579.540896
579.205520 578.875967 578.560558 578.270166 578.030766
578.090591 578.670098 579.178488 579.622809 580.012147
580.350380 580.638968 580.878719 581.070858 581.217591

Row 67

581.439669 581.435300 581.431012 581.426733 581.422388
581.417898 581.413182 581.408154 581.402731 581.396825
581.390350 581.383217 581.375336 581.366615 581.356951
581.346238 581.334354 581.321160 581.306500 581.290183
581.269221 581.230352 581.172954 581.098661 581.009444
580.907417 580.794560 580.672459 580.542188 580.404398
580.259586 580.108513 579.952608 579.794016 579.634735
579.474509 579.312496 579.151852 579.005590 579.054491
579.067746 579.056675 579.037854 579.013700 579.028591
579.077066 579.125452 579.171763 579.220866 579.285071
579.378520 579.503492 579.636442 579.772232 579.906896
580.037142 580.160869 580.276954 580.384920 580.484681
580.576397 580.660396 580.737138 580.807214 580.871363
580.930487 580.985679 581.038229 581.089628 581.141545
581.195746 581.257496 581.309622 581.337620 581.340813
581.318187 581.268401 581.189773 581.080277 580.937536
580.758862 580.541303 580.281697 579.976632 579.622070
579.212069 578.743665 578.257469 577.732481 577.085869
578.043752 579.007319 579.767709 580.391031 580.909409
581.337542 581.677497 581.934764 582.118215 582.233409

Row 71

581.492771 581.482924 581.472637 581.461782 581.450212
581.437757 581.424222 581.409379 581.392960 581.374649
581.354066 581.330752 581.304147 581.273560 581.238134
581.196798 581.148211 581.090696 581.022176 580.940143
580.841739 580.724138 580.585508 580.426722 580.252958
580.073224 579.895525 579.724042 579.555790 579.384600
579.209806 579.057340 579.153575 579.246626 579.331665
579.403803 579.455531 579.485467 579.494803 579.482864
579.447359 579.385593 579.295219 579.175666 579.034801
579.161264 579.383339 579.614708 579.845770 580.076603
580.297183 580.489594 580.658893 580.809135 580.943193
581.063047 581.170053 581.265164 581.349070 581.422289
581.485226 581.538201 581.581463 581.615202 581.639538
581.654512 581.660053 581.655934 581.641692 581.616520
581.579106 581.527407 581.460537 581.397661 581.338098
581.272426 581.185130 581.071509 580.929804 580.758302
580.555307 580.319111 580.048822 579.757248 579.456711
579.157533 578.871270 578.612824 578.406272 578.301084
578.393531 578.692202 579.058716 579.423420 579.764941
580.074705 580.348147 580.582762 580.777701 580.933641

Row 68

581.452900 581.447041 581.441120 581.435051 581.428739
581.422081 581.414963 581.407264 581.398846 581.389560
581.379238 581.367689 581.354693 581.339993 581.323285
581.304212 581.282347 581.257197 581.228197 581.194738
581.156198 581.108635 581.041782 580.956782 580.856221
580.742993 580.619775 580.488519 580.350209 580.205010
580.052697 579.893416 579.728681 579.561900 579.398301
579.234992 579.062573 579.046797 579.087521 579.124478
579.133222 579.116985 579.085498 579.046733 579.044723
579.116521 579.204067 579.299271 579.403114 579.521622
579.662217 579.810166 579.952930 580.090951 580.223270
580.348664 580.466188 580.575298 580.675782 580.767664
580.851131 580.926485 580.994118 581.054511 581.108231
581.155939 581.198390 581.236417 581.270898 581.302677
581.332412 581.360681 581.394199 581.408019 581.398560
581.364505 581.304372 581.216491 581.098994 580.949810
580.766667 580.547103 580.288411 579.987449 579.640060
579.239658 578.808927 578.367844 577.889386 577.306025
577.828112 578.791485 579.514535 580.095186 580.575749

Row 72

581.506449 581.495464 581.483939 581.471733 581.458687
581.444614 581.429300 581.412493 581.393894 581.373148
581.349827 581.323413 581.293266 581.258597 581.218416
581.171474 581.116177 581.050481 580.971745 580.876568
580.760654 580.618941 580.446711 580.242984 580.015716
579.782497 579.564451 579.376505 579.200357 579.018957
579.128965 579.256272 579.358092 579.445790 579.521962
579.584083 579.628564 579.653100 579.656349 579.636538
579.590915 579.515708 579.406152 579.257855 579.078128
579.134958 579.417348 579.701927 579.970392 580.227118
580.462320 580.663817 580.838399 580.991048 581.125316
581.243698 581.347943 581.439282 581.518590 581.586496
581.643455 581.689785 581.725693 581.751289 581.766574
581.771433 581.765600 581.748614 581.719745 581.677896
581.621471 581.548195 581.456080 581.363808 581.273906
581.179104 581.071894 580.945183 580.793218 580.612543
580.402641 580.166042 579.907943 579.635631 579.358051
579.085807 578.831861 578.613335 578.454846 578.391664

578.459185	578.653006	578.923185	579.222811	579.524061	578.507399	578.262186	578.051464	577.885485	577.771582
579.810930	580.073619	580.306222	580.505696	580.671218	577.714636	577.721927	577.818669	578.044176	578.361317
					578.699124	579.021245	579.313580	579.571722	579.795524

Row 73

581.520459	581.508447	581.495807	581.482392	581.468032
581.452531	581.435658	581.417143	581.396669	581.373852
581.348233	581.319252	581.286223	581.248289	581.204376
581.153116	581.092746	581.020949	580.934632	580.829567
580.699855	580.537208	580.330767	580.071606	579.769147
579.457719	579.175862	578.988216	579.102763	579.237067
579.358460	579.468412	579.564508	579.647635	579.718256
579.774719	579.814437	579.834906	579.833856	579.808787
579.756403	579.671865	579.547409	579.369275	579.106165
579.028857	579.448016	579.794537	580.095283	580.369782
580.614386	580.821136	580.998288	581.151571	581.284985
581.401333	581.502586	581.590134	581.664961	581.727754
581.778987	581.818963	581.847844	581.865662	581.872316
581.867560	581.850968	581.821899	581.779425	581.722251
581.648605	581.556104	581.442596	581.326829	581.212682
581.094018	580.964786	580.819479	580.653734	580.464941
580.252698	580.018995	579.768151	579.506614	579.242828
578.987310	578.753091	578.556565	578.418211	578.360955
578.401733	578.538275	578.748113	579.002472	579.276133
579.549490	579.808472	580.043999	580.251028	580.427503

Row 77

581.580984	581.566025	581.550257	581.533532	581.515677
581.496496	581.475764	581.453216	581.428549	581.401405
581.371363	581.337926	581.300502	581.258382	581.210712
581.156455	581.094349	581.022842	580.940029	580.843599
580.730881	580.599377	580.449192	580.291328	580.157996
580.079505	580.056204	580.073984	580.118670	580.179848
580.250844	580.327314	580.405905	580.483382	580.556059
580.619458	580.667506	580.693615	580.696689	580.675887
580.630174	580.559200	580.468965	580.366588	580.265837
580.213208	580.330699	580.536406	580.744426	580.947933
581.148963	581.329871	581.486675	581.622494	581.739698
581.840068	581.924932	581.995264	582.051749	582.094840
582.124792	582.141684	582.145429	582.135781	582.112325
582.074467	582.021409	581.952116	581.865284	581.759283
581.632102	581.481281	581.317347	581.153466	580.986352
580.812595	580.628804	580.431743	580.218501	579.986744
579.735071	579.463577	579.174636	578.873770	578.570155
578.276115	578.005323	577.770014	577.578044	577.431186
577.325625	577.254569	577.232003	577.514893	577.958485
578.382155	578.760623	579.090947	579.375906	579.619812

Row 74

581.534870	581.521944	581.508320	581.493846	581.478345
581.461614	581.443416	581.423469	581.401445	581.376948
581.349504	581.318536	581.283335	581.243025	581.196502
581.142359	581.078774	581.003330	580.912731	580.802305
580.665056	580.489698	580.256227	579.930000	579.507322
579.077036	579.047799	579.216676	579.360868	579.479929
579.587213	579.685603	579.774596	579.853341	579.920623
579.974376	580.011947	580.030551	580.027489	580.000000
579.944769	579.856886	579.727650	579.539414	579.252483
578.990706	579.520136	579.912731	580.230773	580.510647
580.757744	580.965073	581.141647	581.293500	581.424758
581.538299	581.636150	581.719744	581.790088	581.847878
581.893574	581.927447	581.949607	581.960014	581.958475
581.944632	581.917935	581.877603	581.822565	581.751392
581.662208	581.552588	581.420929	581.286906	581.153643
581.015920	580.868738	580.707641	580.529134	580.331114
580.113242	579.877191	579.626763	579.367920	579.108772
578.859584	578.632824	578.443144	578.306862	578.239896
578.253406	578.349215	578.519023	578.746315	579.008402
579.281538	579.546835	579.792165	580.010989	580.200604

Row 78

581.597415	581.582011	581.565793	581.548619	581.530326
581.510728	581.489613	581.466737	581.441820	581.414536
581.384509	581.351301	581.314401	581.273214	581.227041
581.175071	581.116368	581.049867	580.974412	580.888873
580.792482	580.685694	580.572123	580.461519	580.369922
580.311360	580.289535	580.299819	580.334872	580.387924
580.453757	580.528473	580.608849	580.691642	580.772552
580.838572	580.884803	580.910961	580.916767	580.920200
580.866653	580.811302	580.737964	580.658027	580.596632
580.583904	580.648227	580.773101	580.925207	581.089007
581.260034	581.426668	581.573240	581.701212	581.812039
581.906920	581.986798	582.052382	582.104175	582.142495
582.167493	582.179163	582.177347	582.161733	582.131847
582.087036	582.026447	581.948997	581.853336	581.737798
581.600345	581.440157	581.274638	581.107105	580.934719
580.754421	580.563006	580.357193	580.133720	579.889493
579.621898	579.329461	579.013085	578.677854	578.334525
577.999087	577.689613	577.421181	577.200071	577.020341
576.865123	576.702533	576.434467	576.818708	577.513924
578.063438	578.513772	578.888130	579.201807	579.465780

Row 75

581.549735	581.536013	581.521539	581.506160	581.489696
581.471943	581.452660	581.431565	581.408328	581.382554
581.353772	581.321409	581.284770	581.242996	581.195015
581.139471	581.074613	580.998135	580.906903	580.796463
580.660088	580.486540	580.253435	579.891435	579.467275
579.408062	579.444198	579.528010	579.625325	579.721492
579.814356	579.903132	579.986375	580.062234	580.128446
580.182221	580.220363	580.239603	580.236922	580.209667
580.155254	580.070249	579.948488	579.777402	579.530779
579.155386	579.679855	580.076049	580.385159	580.654121
580.894933	581.097717	581.270424	581.418714	581.546450
581.656341	581.750305	581.829707	581.895504	581.948350
581.988661	582.016658	582.032392	582.035752	582.026463
582.004077	581.967940	581.917167	581.850582	581.766667
581.663484	581.538591	581.392011	581.244308	581.096264
580.943405	580.781483	580.606721	580.416116	580.207789
579.981328	579.738107	579.481567	579.217409	578.953654
578.700485	578.469850	578.274756	578.128208	578.041738
578.024066	578.081489	578.219586	578.436357	578.708019
578.999617	579.284709	579.548562	579.784344	579.989762

Row 79

581.614394	581.598655	581.582112	581.564630	581.546058
581.526225	581.504935	581.481968	581.457074	581.429966
581.400319	581.367763	581.331877	581.292188	581.248164
581.199225	581.144750	581.084128	581.016839	580.942644
580.861949	580.776465	580.690181	580.610105	580.545299
580.503507	580.488063	580.497908	580.529614	580.579249
580.643323	580.718979	580.803728	580.894490	580.974855
581.037506	581.082229	581.108913	581.117573	581.108450
581.082207	581.040314	580.985752	580.924188	580.874155
580.862881	580.900100	580.980588	581.090567	581.218952
581.359647	581.507819	581.644009	581.763890	581.868122
581.957360	582.032171	582.093001	582.140163	582.173835
582.194060	582.200745	582.193663	582.172439	582.136544
582.085276	582.017737	581.932802	581.829088	581.704897
581.558165	581.395490	581.230588	581.061707	580.886398
580.701859	580.504965	580.292256	580.059906	579.803698
579.519106	579.201831	578.849458	578.465060	578.061596
577.662330	577.295055	576.983631	576.735851	576.533011
576.341170	576.121982	575.813373	576.082412	577.079460
577.772167	578.298140	578.715740	579.055900	579.337365

Row 76

581.565096	581.550697	581.535509	581.519380	581.502133
581.483564	581.463438	581.441480	581.417366	581.390715
581.361075	581.327901	581.290537	581.248185	581.199859
581.144331	581.080051	581.005023	580.916622	580.811292
580.684052	580.527682	580.331989	580.092479	579.882227
579.787849	579.777858	579.816875	579.881084	579.956589
580.036737	580.117979	580.197592	580.272856	580.340694
580.397495	580.439209	580.461758	580.461656	580.436533
580.385186	580.306979	580.200746	580.063639	579.890007
579.658859	579.959349	580.290910	580.559452	580.801019
581.026084	581.219609	581.385470	581.528264	581.651227
581.756675	581.846282	581.921247	581.982417	582.033060
582.065422	582.087759	582.097355	582.094030	582.077438
582.047050	582.002133	581.941718	581.864555	581.769064
581.653263	581.514705	581.357010	581.199556	581.040409
580.875693	580.701681	580.514985	580.312789	580.093149
579.855341	579.600293	579.331052	579.053218	578.775106

Row 80

581.631918	581.615947	581.599193	581.581534	581.562830
581.542927	581.521650	581.498804	581.474172	581.447511
581.418551	581.386991	581.352505	581.314739	581.273324
581.227888	581.178094	581.123696	581.064645	581.001268
580.934550	580.866523	580.800656	580.741902	580.695932
580.667589	580.659557	580.672142	580.704039	580.753287
580.817959	580.896456	580.987460	581.079611	581.155992
581.216114	581.259857			

579.432213 579.088180 578.691251 578.237256 577.740623
577.239078 576.779115 576.406903 576.148541 575.950910
575.739463 575.484781 575.205231 575.374351 576.723848
577.545924 578.134598 578.585682 578.945063 579.238549

580.552943 580.364065 580.157902 579.930345 579.675681
579.385678 579.048102 578.645443 578.164795 577.662188
577.260349 576.999774 576.869556 576.837891 576.858333
576.894687 576.931506 576.963828 576.995643 577.247902
577.817932 578.259823 578.618972 578.918155 579.171416

Row 81

581.649970 581.633863 581.617006 581.599288 581.580585
581.560759 581.539658 581.517116 581.492950 581.466660
581.438930 581.408632 581.375827 581.340274 581.301746
581.260054 581.215084 581.166862 581.115649 581.062082
581.007356 580.953425 580.903121 580.860036 580.828018
580.810406 580.809385 580.825820 580.859567 580.909990
580.976440 581.058570 581.154768 581.243074 581.316439
581.374685 581.417785 581.445879 581.459318 581.458745
581.445220 581.420387 581.386661 581.347309 581.306190
581.275477 581.276080 581.306180 581.361068 581.435500
581.524804 581.625175 581.733438 581.838415 581.930184
582.008622 582.073714 582.125462 582.163847 582.188790
582.200135 582.197634 582.180926 582.149532 582.102830
582.040039 581.960193 581.862111 581.744357 581.605758
581.457407 581.304089 581.145033 580.978888 580.803765
580.617238 580.416261 580.196983 579.954390 579.681646
579.368897 579.001140 578.555277 578.003356 577.352011
576.674466 576.043067 575.542434 575.350875 575.245477
575.035566 575.137264 575.193804 575.107697 576.524125
577.421222 578.042458 578.508418 578.874999 579.172430

Row 85

581.726919 581.711043 581.694620 581.677590 581.659889
581.641452 581.622215 581.602117 581.581100 581.559115
581.536129 581.512127 581.487127 581.461184 581.434414
581.407007 581.379251 581.351558 581.324491 581.298786
581.275365 581.255332 581.239942 581.230546 581.228514
581.235152 581.251656 581.279097 581.318474 581.370825
581.437386 581.519834 581.612365 581.693019 581.760519
581.815033 581.856779 581.886038 581.903175 581.908650
581.903017 581.886915 581.861029 581.826018 581.782408
581.732944 581.699712 581.685469 581.687362 581.702674
581.728761 581.763038 581.802968 581.846035 581.889717
581.931473 581.968756 581.999071 582.020076 582.029720
582.026390 582.009035 581.977225 581.931128 581.871405
581.799050 581.715206 581.620996 581.517393 581.405120
581.284597 581.155915 581.018820 580.872706 580.716601
580.549135 580.368488 580.172292 579.957496 579.720197
579.455541 579.158140 578.824714 578.463203 578.106946
577.804026 577.582881 577.445974 577.379489 577.362248
577.375806 577.410993 577.470458 577.578315 577.798674
578.123008 578.448836 578.742068 578.999901 579.226571

Row 82

581.668529 581.652372 581.635508 581.617838 581.599251
581.579630 581.558846 581.536760 581.513224 581.488080
581.461167 581.432320 581.401380 581.368208 581.332695
581.294797 581.254567 581.212216 581.168187 581.123254
581.078631 581.036060 580.997827 580.966624 580.945242
580.936161 580.941219 580.961511 580.997545 581.049551
581.117837 581.203138 581.300224 581.385535 581.456660
581.513521 581.556177 581.584842 581.599922 581.602078
581.592298 581.571981 581.542986 581.507578 581.468158
581.430183 581.417266 581.430864 581.467036 581.521568
581.590457 581.670116 581.757310 581.848954 581.935352
582.009011 582.069724 582.117342 582.151719 582.172675
582.179974 582.179974 582.152243 582.116277 582.064744
581.996833 581.911555 581.807709 581.684195 581.549546
581.408441 581.260915 581.106399 580.943768 580.771360
580.586944 580.387607 580.169517 579.927467 579.653995
579.337562 578.958398 578.477245 577.800430 576.842899
575.834885 574.780781 574.812102 575.274529 575.597583
575.738425 575.803481 575.794445 575.636648 576.527825
577.422977 578.034273 578.490050 578.848621 579.140326

Row 86

581.747157 581.731485 581.715327 581.698632 581.681351
581.663436 581.644840 581.625522 581.605451 581.584603
581.562977 581.540590 581.517496 581.493787 581.469613
581.445195 581.420841 581.396964 581.374100 581.352922
581.334240 581.318995 581.308234 581.303066 581.304616
581.313970 581.332147 581.360089 581.398696 581.448884
581.511683 581.588351 581.677333 581.757366 581.824315
581.878401 581.919863 581.948980 581.966079 581.971538
581.965787 581.949285 581.922491 581.885800 581.839479
581.789524 581.755869 581.738157 581.734182 581.741744
581.758637 581.782649 581.811571 581.843190 581.875290
581.905658 581.932115 581.952558 581.965048 581.967897
581.959768 581.939749 581.907390 581.862686 581.806004
581.737977 581.659379 581.571005 581.473563 581.367600
581.253449 581.131195 581.000660 580.861193 580.712662
580.553442 580.382404 580.197897 579.997955 579.780395
579.543149 579.285237 579.009093 578.724557 578.451380
578.213524 578.027992 577.899844 577.824456 577.792404
577.794788 577.827434 577.893680 578.006239 578.180016
578.405136 578.647667 578.882795 579.100387 579.297756

Row 83

581.687565 581.671436 581.654650 581.637118 581.618749
581.599441 581.579089 581.557581 581.534802 581.510635
581.484966 581.457690 581.428718 581.397991 581.365499
581.331305 581.295578 581.258645 581.221038 581.183568
581.147377 581.113974 581.085212 581.063178 581.050003
581.047631 581.057647 581.081222 581.119211 581.172366
581.241625 581.328469 581.424465 581.507624 581.577113
581.632954 581.675271 581.704323 581.720527 581.724498
581.717087 581.699414 581.678851 581.638935 581.591911
581.556254 581.533078 581.534064 581.555565 581.593943
581.645698 581.707546 581.776397 581.849248 581.923050
581.992198 582.048988 582.092851 582.123548 582.140820
582.144368 582.133820 582.108722 582.068513 582.012504
581.939862 581.849579 581.741631 581.623203 581.496667
581.362656 581.221254 581.072026 580.914037 580.745846
580.565463 580.370227 580.156580 579.919627 579.652301
579.343656 578.974953 578.508745 577.847584 576.998763
576.462982 576.170342 576.086806 576.159279 576.269577
576.349407 576.393530 576.391030 576.294764 576.747412
577.560310 578.111492 578.529853 578.864823 579.141167

Row 87

581.767710 581.752284 581.736430 581.720111 581.703289
581.685930 581.668005 581.649491 581.630376 581.610660
581.590365 581.569536 581.548250 581.526627 581.504836
581.483114 581.461771 581.441206 581.421918 581.404510
581.389690 581.378259 581.371091 581.369103 581.373220
581.384339 581.403307 581.430912 581.467889 581.514951
581.572809 581.642183 581.723700 581.803406 581.870010
581.923769 581.964941 581.993793 582.010612 582.015707
582.009400 581.992010 581.963822 581.925044 581.875776
581.829674 581.797669 581.778501 581.770651 581.772448
581.782122 581.797833 581.817700 581.839817 581.862270
581.883153 581.900605 581.912851 581.918267 581.915441
581.903244 581.880872 581.848783 581.804130 581.749816
581.685317 581.611145 581.527855 581.435959 581.335869
581.227848 581.111984 580.988172 580.856108 580.715289
580.565024 580.404447 580.232566 580.048352 579.850951
579.640116 579.417039 579.185695 578.954274 578.735206
578.542252 578.386010 578.271282 578.197460 578.160829
578.157406 578.185355 578.246289 578.344555 578.482357
578.652550 578.839671 579.028994 579.211243 579.381845

Row 84

581.707041 581.691009 581.674374 581.657060 581.638991
581.620084 581.600256 581.579419 581.557490 581.534388
581.510043 581.484399 581.457425 581.429128 581.399572
581.368894 581.337342 581.305301 581.273339 581.242241
581.213046 581.187045 581.165757 581.150845 581.143995
581.146790 581.160606 581.186598 581.225767 581.279114
581.347874 581.433838 581.528279 581.609936 581.678254
581.733336 581.775362 581.804608 581.821472 581.826497
581.820382 581.803985 581.778290 581.744320 581.702989
581.656270 581.626354 581.618183 581.628416 581.653865
581.691461 581.738259 581.791417 581.848144 581.905629
581.960989 582.011265 582.051791 582.079175 582.093095
582.093201 582.079083 582.050250 582.006112 581.945960
581.869153 581.778945 581.677917 581.567381 581.448278
581.321136 581.186047 581.042677 580.890258 580.727580

Row 88

581.788535 581.773385 581.773867 581.741953 581.725616
581.708835 581.691596 581.673890 581.655722 581.637113
581.618100 581.598749 581.579154 581.559451 581.539820
581.520501 581.501795 581.484078 581.467805 581.453512
581.441812 581.433385 581.428961 581.429297 581.435150
581.447250 581.466281 581.492863 581.527549 581.570814
581.623036 581.684431 581.754910 581.831495 581.897915
581.951430 581.992307 582.020800 582.037160 582.041635
582.034460 582.015842 581.985935 581.944808 581.896608
581.857082 581.827932 581.808705 581.798497 581.796124
581.800221 581.809301 581.821798 581.836099 581.850572
581.863594 581.873579 581.879030 581.878574 581.871019
581.855398 581.830997 581.797375 581.754349 581.701960
581.640429 581.570085 581.491308 581.404469 581.309879

581.207754	581.098190	580.981153	580.856473	580.723858	581.526222	581.467829	581.403618	581.333710	581.258247
580.582909	580.433166	580.274177	580.105624	579.927549	581.177385	581.091289	581.000132	580.904104	580.803431
579.740715	579.547162	579.350860	579.158142	578.977301	580.698400	580.589397	580.476956	580.361812	580.244974
578.817040	578.684404	578.583416	578.515049	578.478262	580.127775	580.011916	579.899455	579.792736	579.694241
578.471457	578.493721	578.545310	578.626864	578.737171	579.606385	579.531313	579.470732	579.425828	579.397272
578.870968	579.019517	579.173695	579.326419	579.473156	579.385266	579.389601	579.409666	579.444424	579.492375
					579.551570	579.619724	579.694399	579.773228	579.854084

Row 89

581.809586	581.794737	581.779577	581.764087	581.748251
581.732058	581.715504	581.698597	581.681354	581.663808
581.646013	581.628045	581.610012	581.592057	581.574363
581.557163	581.540745	581.525456	581.511704	581.499961
581.490754	581.484658	581.482282	581.484246	581.491163
581.503616	581.522138	581.547188	581.579138	581.618242
581.664588	581.718008	581.777918	581.843034	581.908282
581.961623	582.002207	582.030275	582.040604	582.049718
582.041454	582.021374	581.989533	581.947667	581.908184
581.875084	581.849270	581.830836	581.819352	581.814041
581.813891	581.817731	581.824284	581.832207	581.840126
581.846666	581.850489	581.850324	581.845012	581.833537
581.815064	581.788961	581.754803	581.712373	581.661629
581.602678	581.535724	581.461025	581.378850	581.289440
581.192980	581.089581	580.979273	580.862005	580.737663
580.606097	580.467169	580.320836	580.167269	580.007046
579.841410	579.672590	579.504091	579.340763	579.188420
579.052972	578.939372	578.850888	578.788993	578.753814
578.744844	578.761538	578.803481	578.869930	578.958870
579.066297	579.186544	579.313544	579.442040	579.568128

Row 90

581.830821	581.816290	581.801503	581.786447	581.771117
581.755511	581.739634	581.723504	581.707150	581.690614
581.673960	581.657275	581.640669	581.624288	581.608314
581.592968	581.578517	581.565279	581.553615	581.543937
581.536696	581.532376	581.531478	581.534509	581.541958
581.554279	581.571868	581.595043	581.624017	581.658860
581.699444	581.745354	581.795754	581.849190	581.903346
581.954522	581.994824	582.022426	582.037520	582.040261
582.030755	582.009055	581.977850	581.944987	581.913836
581.886457	581.863958	581.846742	581.834700	581.827366
581.824018	581.823756	581.825554	581.828310	581.830881
581.832111	581.830872	581.826092	581.816787	581.802090
581.781278	581.753789	581.719225	581.677353	581.628084
581.571447	581.507563	581.436607	581.358776	581.274264
581.183237	581.085826	580.982116	580.872158	580.755933
580.633633	580.505215	580.370970	580.231377	580.087299
579.940144	579.792048	579.645973	579.505672	579.375388
579.259352	579.161204	579.083575	579.027980	578.994992
578.984574	578.996350	579.029672	579.083394	579.155500
579.242877	579.341524	579.447150	579.555806	579.664281

Row 91

581.852198	581.837996	581.823589	581.808972	581.794146
581.779117	581.763898	581.748516	581.733006	581.717419
581.701825	581.686314	581.671000	581.656025	581.641564
581.627825	581.615053	581.603531	581.593580	581.585555
581.579839	581.576836	581.576958	581.580611	581.588179
581.600005	581.616371	581.637475	581.663401	581.694082
581.729251	581.768362	581.810501	581.854265	581.897662
581.938083	581.972481	581.997837	582.011916	582.014000
582.005160	581.987893	581.965337	581.940530	581.915950
581.893366	581.873873	581.858002	581.845841	581.837141
581.831404	581.827952	581.825974	581.824574	581.822809
581.819716	581.814348	581.805801	581.793240	581.775925
581.753230	581.724657	581.689839	581.648542	581.606050
581.546147	581.485097	581.417620	581.343865	581.263996
581.178170	581.086535	580.989227	580.886374	580.778120
580.664653	580.546248	580.423330	580.296553	580.166902
580.035788	579.905141	579.777434	579.655609	579.542871
579.442368	579.356863	579.288473	579.238574	579.207860
579.196474	579.204141	579.230188	579.273454	579.332160
579.403852	579.485555	579.574089	579.666427	579.759956

Row 92

581.873678	581.859811	581.845786	581.831605	581.817274
581.802805	581.788220	581.773549	581.758833	581.744129
581.729510	581.715066	581.700911	581.687182	581.674043
581.661685	581.650332	581.640235	581.631673	581.624952
581.620394	581.618334	581.619107	581.623034	581.630411
581.641487	581.656452	581.675405	581.698335	581.725086
581.755311	581.788421	581.823527	581.859381	581.894348
581.926453	581.953556	581.973673	581.985404	581.988308
581.983033	581.971130	581.954650	581.935707	581.916156
581.897429	581.880502	581.865923	581.853880	581.844268
581.836756	581.830837	581.825877	581.821157	581.815901
581.809314	581.800603	581.789008	581.773822	581.754412
581.730239	581.700862	581.665950	581.625277	581.578715

Row 93

581.895225	581.881692	581.868047	581.854293	581.840444
581.826515	581.812532	581.798531	581.784556	581.770667
581.756937	581.743456	581.730333	581.717698	581.705704
581.694526	581.684362	581.675435	581.667986	581.662276
581.658574	581.657155	581.658287	581.662223	581.669183
581.679341	581.692812	581.709623	581.729696	581.752821
581.778621	581.806516	581.835698	581.865099	581.893412
581.919147	581.940779	581.956957	581.966760	581.969894
581.966760	581.958356	581.946050	581.931319	581.915533
581.899816	581.884985	581.871548	581.859730	581.849514
581.840682	581.832861	581.825561	581.818204	581.810159
581.800771	581.789378	581.775343	581.758070	581.737019
581.711724	581.681801	581.646953	581.606969	581.561721
581.511154	581.455280	581.394158	581.327892	581.256612
581.180476	581.099661	581.014368	580.924833	580.831336
580.734230	580.633965	580.531127	580.426475	580.320985
580.215879	580.112637	580.012977	579.918792	579.832044
579.754629	579.688241	579.634260	579.593683	579.567107
579.554740	579.556421	579.571627	579.599480	579.638741
579.687853	579.745019	579.808331	579.875902	579.945994

Row 94

581.916804	581.903604	581.890330	581.876992	581.863606
581.850192	581.836778	581.823403	581.810114	581.796971
581.784046	581.771427	581.759217	581.747537	581.736528
581.726347	581.717171	581.709194	581.702624	581.697680
581.694587	581.693567	581.694834	581.698580	581.704966
581.714107	581.726058	581.740796	581.758201	581.778037
581.799925	581.823330	581.847538	581.871662	581.894664
581.915418	581.932814	581.945905	581.954056	581.957055
581.955154	581.949007	581.939542	581.927799	581.914783
581.901356	581.888180	581.875697	581.864130	581.853508
581.843693	581.834411	581.825282	581.815845	581.805591
581.793977	581.780457	581.764498	581.745596	581.723293
581.697190	581.666953	581.632318	581.593094	581.549161
581.500461	581.446994	581.388810	581.326000	581.258690
581.187039	581.111234	581.031496	580.948090	580.861331
580.771607	580.679401	580.585312	580.490087	580.394641
580.300074	580.207667	580.118860	580.035201	579.958267
579.889573	579.830474	579.782091	579.745253	579.720471
579.707938	579.707530	579.718814	579.741060	579.773258
579.814155	579.862320	579.916230	579.974363	580.035287

Row 95

581.938386	581.925511	581.912599	581.899662	581.886717
581.873790	581.860909	581.848116	581.835457	581.822992
581.810791	581.798938	581.787530	581.776679	581.766511
581.757167	581.748804	581.741589	581.735700	581.731320
581.728635	581.727823	581.729052	581.732465	581.738176
581.746252	581.756706	581.769480	581.784430	581.801314
581.819773	581.839324	581.859357	581.879139	581.897850
581.914628	581.928655	581.939244	581.945938	581.948575
581.947311	581.942580	581.935019	581.925363	581.914347
581.902625	581.890719	581.878997	581.867661	581.856761
581.846211	581.835808	581.825257	581.814194	581.802224
581.788844	581.773661	581.756210	581.736068	581.712848
581.686209	581.655862	581.621577	581.583186	581.545077
581.493697	581.442544	581.387161	581.327635	581.264089
581.196683	581.125611	581.051107	580.973451	580.892977
580.810089	580.725275	580.639128	580.552358	580.465806
580.380451	580.297404	580.217876	580.143147	580.074501
580.013164	579.960235	579.916627	579.883027	579.859867
579.847316	579.845279	579.853403	579.871091	579.897518
579.931673	579.972402	580.018476	580.068654	580.121746

Row 96

581.959941	581.947383	581.934819	581.922265	581.909740
581.897270	581.884886	581.872628	581.860549	581.848669
581.837140	581.825965	581.815257	581.805118	581.795662
581.787015	581.779313	581.772701	581.767327	581.763346

581.678409	581.648132	581.614320	581.576826	581.535554	580.600409	580.538812	580.480243	580.425458	580.375195
581.490456	581.441532	581.388826	581.332420	581.272439	580.330146	580.290926	580.258051	580.231914	580.212771
581.209041	581.142425	581.072830	581.000543	580.925903	580.200731	580.195754	580.197654	580.206107	580.220666
580.849315	580.771259	580.692302	580.613108	580.534441	580.240778	580.265814	580.295092	580.327906	580.363554
580.457169	580.382251	580.310715	580.243626	580.182044					
580.126971	580.079306	580.039798	580.009017	579.987324					
579.974866	579.971572	579.971155	579.991127	580.012818					
580.041405	580.075952	580.115455	580.158894	580.205276					

Row 97

581.981445	581.969193	581.956964	581.944773	581.932643
581.920599	581.908675	581.896909	581.885348	581.874048
581.863070	581.852490	581.842389	581.832860	581.824003
581.815931	581.808760	581.802614	581.797619	581.793903
581.791585	581.790780	581.791582	581.794067	581.798279
581.804226	581.811869	581.821116	581.831813	581.843735
581.856587	581.870001	581.883540	581.896712	581.908999
581.919880	581.928880	581.935611	581.939808	581.941361
581.940318	581.936869	581.931318	581.924035	581.915408
581.905803	581.895531	581.884822	581.873820	581.862575
581.851053	581.839138	581.826652	581.813362	581.798997
581.783261	581.765845	581.746441	581.724755	581.700512
581.673468	581.643413	581.610180	581.573641	581.533715
581.490365	581.443593	581.393445	581.340005	581.283394
581.223773	581.161339	581.096333	581.029039	580.959795
580.888995	580.817101	580.744646	580.672241	580.600577
580.530419	580.462598	580.397989	580.337487	580.281973
580.232276	580.189137	580.153175	580.124862	580.104502
580.092222	580.087968	580.091508	580.102445	580.120232
580.144198	580.173576	580.207541	580.245249	580.285865

Row 98

582.002876	581.990918	581.979006	581.967159	581.955399
581.943752	581.932250	581.920933	581.909844	581.899036
581.888568	581.878508	581.868931	581.859919	581.851562
581.843957	581.837207	581.831414	581.826686	581.823126
581.820830	581.819885	581.820363	581.822313	581.825758
581.830687	581.837048	581.844743	581.853623	581.863481
581.874056	581.885030	581.896035	581.906669	581.916514
581.925159	581.932231	581.937427	581.940537	581.941464
581.940225	581.936944	581.931829	581.925141	581.917160
581.908155	581.898361	581.887956	581.877052	581.865693
581.853852	581.841444	581.828324	581.814307	581.799173
581.782679	581.764572	581.744597	581.722509	581.698079
581.671100	581.641399	581.608833	581.573296	581.534723
581.493084	581.448390	581.400689	581.350064	581.296637
581.240567	581.182048	581.121319	581.058657	580.994390
580.928897	580.862613	580.796034	580.729718	580.664285

Streamlines

Number of Streamlines = 250

Streamline #1

Coordinates of Streamline:

Start	x:	9980.630000	y:	9512.860000
End	x:	10068.693892	y:	9492.662778

Streamline #2

Coordinates of Streamline:

Start	x:	9986.890847	y:	9520.738983
End	x:	10066.305945	y:	9499.542207

Streamline #3

Coordinates of Streamline:

Start	x:	9993.151695	y:	9528.617966
End	x:	10063.938897	y:	9500.786102

Streamline #4

Coordinates of Streamline:

Start	x:	9999.412542	y:	9536.496949
End	x:	10067.467386	y:	9500.853313

Streamline #5

Coordinates of Streamline:

Start	x:	10005.673390	y:	9544.375932

Row 99

582.024216	582.012537	582.000927	581.989402	581.977986
581.966706	581.955592	581.944681	581.934017	581.923648
581.913628	581.904020	581.894891	581.886315	581.878371
581.871144	581.864719	581.859187	581.854633	581.851142
581.848791	581.847645	581.847756	581.849154	581.851845
581.855804	581.860974	581.867254	581.874504	581.882537
581.891123	581.899988	581.908825	581.917301	581.925076
581.931822	581.937242	581.941093	581.943204	581.943487
581.941941	581.938640	581.933725	581.927378	581.919799
581.911185	581.901710	581.891507	581.880663	581.869210
581.857130	581.844352	581.830763	581.816211	581.800519
581.783488	581.764909	581.744573	581.722275	581.697826
581.671055	581.641815	581.609990	581.575493	581.538272
581.498308	581.455619	581.410254	581.362300	581.311877
581.259140	581.204281	581.147530	581.089155	581.029471
580.968835	580.907654	580.846385	580.785536	580.725658
580.667349	580.611234	580.557958	580.508164	580.462475
580.421471	580.385670	580.355500	580.331294	580.313266
580.301513	580.296004	580.296590	580.303007	580.314886
580.331773	580.353147	580.378441	580.407063	580.438419

Row 100

582.045446	582.034034	582.022707	582.011484	582.000388
581.989445	581.978684	581.968142	581.957858	581.947877
581.938250	581.929033	581.920286	581.912074	581.904468
581.897540	581.891363	581.886012	581.881558	581.878070
581.875606	581.874216	581.873934	581.874776	581.876737
581.879783	581.883851	581.888846	581.894637	581.901056
581.907900	581.914936	581.921905	581.928530	581.934535
581.939650	581.943637	581.946298	581.947490	581.947132
581.945208	581.941760	581.936880	581.930692	581.923338
581.914959	581.905681	581.895603	581.884787	581.873259
581.860999	581.847952	581.834024	581.819094	581.803016
581.785627	581.766757	581.746232	581.723884	581.699557
581.673108	581.644419	581.613393	581.579962	581.544087
581.505759	581.465001	581.421868	581.376446	581.328853
581.279241	581.227796	581.174739	581.120327	581.064857
581.008663	580.952124	580.895657	580.839720	580.784808
580.731445	580.680179	580.631563	580.586150	580.544468
580.507008	580.474206	580.446424	580.423941	580.406941
580.395507	580.389619	580.389155	580.393900	580.403549
580.417729	580.436004	580.457900	580.482920	580.510559

End x: 10063.413284 y: 9509.810351

Streamline #6

Coordinates of Streamline:

Start	x:	10011.934237	y:	9552.254915
End	x:	10071.765029	y:	9506.046876

Streamline #7

Coordinates of Streamline:

Start	x:	10018.195085	y:	9560.133898
End	x:	10089.502892	y:	9520.576329

Streamline #8

Coordinates of Streamline:

Start	x:	10024.455932	y:	9568.012881
End	x:	10088.516807	y:	9527.761026

Streamline #9

Coordinates of Streamline:

Start	x:	10030.716780	y:	9575.891864
End	x:	10083.306856	y:	9533.886208

Streamline #10

Coordinates of Streamline:

Start	x:	10036.977627	y:	9583.770847
End	x:	10086.409754	y:	9538.211530

Streamline #11

Coordinates of Streamline:

Start	x:	10043.238475	y:	9591.649831
End	x:	10091.594683	y:	9534.277832

Streamline #12

Coordinates of Streamline:

Start x: 10049.499322 y: 9599.528814
End x: 10093.558722 y: 9534.024758

Streamline #13

Coordinates of Streamline:
Start x: 10055.760169 y: 9607.407797
End x: 10098.712736 y: 9531.787231

Streamline #14

Coordinates of Streamline:
Start x: 10062.021017 y: 9615.286780
End x: 10108.783444 y: 9566.901439

Streamline #15

Coordinates of Streamline:
Start x: 10068.281864 y: 9623.165763
End x: 10112.669505 y: 9572.769097

Streamline #16

Coordinates of Streamline:
Start x: 10074.542712 y: 9631.044746
End x: 10120.197208 y: 9570.816971

Streamline #17

Coordinates of Streamline:
Start x: 10080.803559 y: 9638.923729
End x: 10120.990758 y: 9565.140545

Streamline #18

Coordinates of Streamline:
Start x: 10087.064407 y: 9646.802712
End x: 10132.389480 y: 9597.069731

Streamline #19

Coordinates of Streamline:
Start x: 10093.325254 y: 9654.681695
End x: 10142.251723 y: 9595.524907

Streamline #20

Coordinates of Streamline:
Start x: 10099.586102 y: 9662.560678
End x: 10144.309326 y: 9601.628698

Streamline #21

Coordinates of Streamline:
Start x: 10105.846949 y: 9670.439661
End x: 10153.332285 y: 9589.476611

Streamline #22

Coordinates of Streamline:
Start x: 10112.107797 y: 9678.318644
End x: 10157.192810 y: 9628.365540

Streamline #23

Coordinates of Streamline:
Start x: 10118.368644 y: 9686.197627
End x: 10165.956652 y: 9626.333228

Streamline #24

Coordinates of Streamline:
Start x: 10124.629492 y: 9694.076610
End x: 10171.136981 y: 9634.292414

Streamline #25

Coordinates of Streamline:
Start x: 10130.890339 y: 9701.955593
End x: 10187.348817 y: 9654.551872

Streamline #26

Coordinates of Streamline:
Start x: 10137.151186 y: 9709.834576
End x: 10182.683543 y: 9660.302950

Streamline #27

Coordinates of Streamline:
Start x: 10143.412034 y: 9717.713559
End x: 10187.796126 y: 9657.106705

Streamline #28

Coordinates of Streamline:
Start x: 10149.672881 y: 9725.592542
End x: 10191.786469 y: 9660.998030

Streamline #29

Coordinates of Streamline:
Start x: 10155.933729 y: 9733.471525
End x: 10203.461962 y: 9685.916039

Streamline #30

Coordinates of Streamline:
Start x: 10162.194576 y: 9741.350508
End x: 10207.380378 y: 9691.776529

Streamline #31

Coordinates of Streamline:
Start x: 10168.455424 y: 9749.229492
End x: 10212.736889 y: 9690.508431

Streamline #32

Coordinates of Streamline:
Start x: 10174.716271 y: 9757.108475
End x: 10233.768625 y: 9714.440498

Streamline #33

Coordinates of Streamline:
Start x: 10180.977119 y: 9764.987458
End x: 10230.141712 y: 9719.114162

Streamline #34

Coordinates of Streamline:
Start x: 10187.237966 y: 9772.866441
End x: 10236.598240 y: 9716.584251

Streamline #35

Coordinates of Streamline:
Start x: 10193.498814 y: 9780.745424
End x: 10255.219175 y: 9739.272153

Streamline #36

Coordinates of Streamline:
Start x: 10199.759661 y: 9788.624407
End x: 10253.320371 y: 9747.980023

Streamline #37

Coordinates of Streamline:
Start x: 10206.020508 y: 9796.503390
End x: 10256.735441 y: 9752.829678

Streamline #38

Coordinates of Streamline:
Start x: 10212.281356 y: 9804.382373
End x: 10260.456222 y: 9751.774089

Streamline #39

Coordinates of Streamline:
Start x: 10218.542203 y: 9812.261356
End x: 10273.724513 y: 9774.626439

Streamline #40

Coordinates of Streamline:
Start x: 10224.803051 y: 9820.140339
End x: 10278.574170 y: 9780.098585

Streamline #41

Coordinates of Streamline:
Start x: 10231.063898 y: 9828.019322
End x: 10280.252294 y: 9782.332847

Streamline #42

Coordinates of Streamline:
Start x: 10237.324746 y: 9835.898305
End x: 10281.928969 y: 9786.690048

Streamline #43

Coordinates of Streamline:
Start x: 10243.585593 y: 9843.777288
End x: 10284.138093 y: 9785.568967

Streamline #44

Coordinates of Streamline:
Start x: 10249.846441 y: 9851.656271
End x: 10304.126458 y: 9810.958927

Streamline #45

Coordinates of Streamline:
Start x: 10256.107288 y: 9859.535254
End x: 10300.880471 y: 9809.790820

Streamline #46

Coordinates of Streamline:
Start x: 10262.368136 y: 9867.414237
End x: 10302.122031 y: 9813.158656

Streamline #47

Coordinates of Streamline:
Start x: 10268.628983 y: 9875.293220
End x: 10309.777926 y: 9810.636147

Streamline #48

Coordinates of Streamline:
Start x: 10274.889831 y: 9883.172203
End x: 10307.488125 y: 9813.641192

Streamline #49

Coordinates of Streamline:
Start x: 10281.150678 y: 9891.051186
End x: 10312.198321 y: 9810.747492

Streamline #50

Coordinates of Streamline:
Start x: 10287.411525 y: 9898.930169
End x: 10310.182140 y: 9817.117111

Streamline #51

Coordinates of Streamline:
Start x: 10293.672373 y: 9906.809153
End x: 10312.881707 y: 9815.355822

Streamline #52

Coordinates of Streamline:
Start x: 10299.933220 y: 9914.688136
End x: 10317.390182 y: 9814.129083

Streamline #53

Coordinates of Streamline:
Start x: 10306.194068 y: 9922.567119
End x: 10325.215503 y: 9843.371242

Streamline #54

Coordinates of Streamline:
Start x: 10312.454915 y: 9930.446102
End x: 10331.486019 y: 9842.929145

Streamline #55

Coordinates of Streamline:
Start x: 10318.715763 y: 9938.325085
End x: 10331.459759 y: 9846.011688

Streamline #56

Coordinates of Streamline:
Start x: 10324.976610 y: 9946.204068
End x: 10326.234162 y: 9840.293456

Streamline #57

Coordinates of Streamline:
Start x: 10331.237458 y: 9954.083051
End x: 10328.743802 y: 9841.553012

Streamline #58

Coordinates of Streamline:
Start x: 10337.498305 y: 9961.962034
End x: 10452.329901 y: 9880.072214

Streamline #59

Coordinates of Streamline:
Start x: 10343.759153 y: 9969.841017
End x: 10453.068053 y: 9878.735399

Streamline #60

Coordinates of Streamline:
Start x: 10350.020000 y: 9977.720000
End x: 10452.958309 y: 9879.775380

Streamline #61

Coordinates of Streamline:
Start x: 10352.300000 y: 9973.150000
End x: 10452.814877 y: 9880.692850

Streamline #62

Coordinates of Streamline:
Start x: 10362.693265 y: 9969.654490
End x: 10454.628257 y: 9877.078878

Streamline #63

Coordinates of Streamline:
Start x: 10373.086531 y: 9966.158980
End x: 10455.619527 y: 9875.829831

Streamline #64

Coordinates of Streamline:
Start x: 10383.479796 y: 9962.663469
End x: 10456.441297 y: 9875.659697

Streamline #65

Coordinates of Streamline:
Start x: 10393.873061 y: 9959.167959
End x: 10457.281937 y: 9876.152178

Streamline #66

Coordinates of Streamline:
Start x: 10404.266327 y: 9955.672449
End x: 10458.237347 y: 9877.191034

Streamline #67

Coordinates of Streamline:
Start x: 10414.659592 y: 9952.176939
End x: 10460.388341 y: 9869.213566

Streamline #68

Coordinates of Streamline:
Start x: 10425.052857 y: 9948.681429
End x: 10461.981112 y: 9871.421982

Streamline #69

Coordinates of Streamline:
Start x: 10435.446122 y: 9945.185918
End x: 10464.004146 y: 9874.304727

Streamline #70

Coordinates of Streamline:
Start x: 10445.839388 y: 9941.690408
End x: 10466.641716 y: 9868.294512

Streamline #71

Coordinates of Streamline:
Start x: 10456.232653 y: 9938.194898
End x: 10469.208631 y: 9863.074185

Streamline #72

Coordinates of Streamline:
Start x: 10466.625918 y: 9934.699388
End x: 10473.948235 y: 9868.078668

Streamline #73

Coordinates of Streamline:
Start x: 10477.019184 y: 9931.203878
End x: 10478.112073 y: 9864.170005

Streamline #74

Coordinates of Streamline:
Start x: 10487.412449 y: 9927.708367
End x: 10482.895204 y: 9860.783075

Streamline #75

Coordinates of Streamline:
Start x: 10497.805714 y: 9924.212857
End x: 10488.383933 y: 9857.763320

Streamline #76

Coordinates of Streamline:

Start x: 10508.198980 y: 9920.717347
End x: 10494.583198 y: 9854.967742

Streamline #77

Coordinates of Streamline:

Start x: 10518.592245 y: 9917.221837
End x: 10501.449373 y: 9852.282114

Streamline #78

Coordinates of Streamline:

Start x: 10528.985510 y: 9913.726327
End x: 10508.925340 y: 9849.621336

Streamline #79

Coordinates of Streamline:

Start x: 10539.378776 y: 9910.230816
End x: 10516.972409 y: 9846.919015

Streamline #80

Coordinates of Streamline:

Start x: 10549.772041 y: 9906.735306
End x: 10525.606426 y: 9844.108424

Streamline #81

Coordinates of Streamline:

Start x: 10560.165306 y: 9903.219796
End x: 10529.332575 y: 9833.290550

Streamline #82

Coordinates of Streamline:

Start x: 10570.558571 y: 9899.744286
End x: 10539.127840 y: 9830.453527

Streamline #83

Coordinates of Streamline:

Start x: 10580.951837 y: 9896.248776
End x: 10560.952491 y: 9822.470292

Streamline #84

Coordinates of Streamline:

Start x: 10591.345102 y: 9892.753265
End x: 10575.089966 y: 9817.985746

Streamline #85

Coordinates of Streamline:

Start x: 10601.738367 y: 9889.257755
End x: 10586.061827 y: 9814.215845

Streamline #86

Coordinates of Streamline:

Start x: 10612.131633 y: 9885.762245
End x: 10595.821175 y: 9810.725346

Streamline #87

Coordinates of Streamline:

Start x: 10622.524898 y: 9882.266735
End x: 10604.986889 y: 9807.417033

Streamline #88

Coordinates of Streamline:

Start x: 10632.918163 y: 9878.771224
End x: 10615.859549 y: 9813.650864

Streamline #89

Coordinates of Streamline:

Start x: 10643.311429 y: 9875.275714
End x: 10625.057328 y: 9810.471072

Streamline #90

Coordinates of Streamline:

Start x: 10653.704694 y: 9871.780204
End x: 10634.237159 y: 9807.354561

Streamline #91

Coordinates of Streamline:

Start x: 10664.097959 y: 9868.284694

End x: 10643.755048 y: 9804.222539

Streamline #92

Coordinates of Streamline:

Start x: 10674.491224 y: 9864.789184
End x: 10657.303421 y: 9799.704222

Streamline #93

Coordinates of Streamline:

Start x: 10684.884490 y: 9861.293673
End x: 10669.408526 y: 9795.808598

Streamline #94

Coordinates of Streamline:

Start x: 10695.277755 y: 9857.798163
End x: 10680.136698 y: 9792.218535

Streamline #95

Coordinates of Streamline:

Start x: 10705.671020 y: 9854.302653
End x: 10690.548036 y: 9788.708032

Streamline #96

Coordinates of Streamline:

Start x: 10716.064286 y: 9850.807143
End x: 10700.800764 y: 9785.238648

Streamline #97

Coordinates of Streamline:

Start x: 10726.457551 y: 9847.311633
End x: 10710.956960 y: 9781.795227

Streamline #98

Coordinates of Streamline:

Start x: 10736.850816 y: 9843.816122
End x: 10721.033093 y: 9778.373877

Streamline #99

Coordinates of Streamline:

Start x: 10747.244082 y: 9840.320612
End x: 10731.012523 y: 9774.979876

Streamline #100

Coordinates of Streamline:

Start x: 10757.637347 y: 9836.825102
End x: 10740.845429 y: 9771.630032

Streamline #101

Coordinates of Streamline:

Start x: 10768.030612 y: 9833.329592
End x: 10753.396444 y: 9777.517952

Streamline #102

Coordinates of Streamline:

Start x: 10778.423878 y: 9829.834082
End x: 10763.881950 y: 9773.998400

Streamline #103

Coordinates of Streamline:

Start x: 10788.817143 y: 9826.338571
End x: 10775.212036 y: 9770.258203

Streamline #104

Coordinates of Streamline:

Start x: 10799.210408 y: 9822.843061
End x: 10785.655257 y: 9766.749569

Streamline #105

Coordinates of Streamline:

Start x: 10809.603673 y: 9819.347551
End x: 10795.772954 y: 9763.320993

Streamline #106

Coordinates of Streamline:

Start x: 10819.996939 y: 9815.852041
End x: 10805.792922 y: 9759.920294

Streamline #107

Coordinates of Streamline:

Start x: 10830.390204 y: 9812.356531
End x: 10815.814229 y: 9756.522174

Streamline #108

Coordinates of Streamline:
Start x: 10840.783469 y: 9808.861020
End x: 10825.862350 y: 9753.118944

Streamline #109

Coordinates of Streamline:
Start x: 10851.176735 y: 9805.365510
End x: 10835.896106 y: 9749.721999

Streamline #110

Coordinates of Streamline:
Start x: 10861.570000 y: 9801.870000
End x: 10845.836055 y: 9746.356122

Streamline #111

Coordinates of Streamline:
Start x: 10871.850000 y: 9796.160000
End x: 10858.365884 y: 9750.011882

Streamline #112

Coordinates of Streamline:
Start x: 10879.318378 y: 9794.370135
End x: 10865.573817 y: 9748.311464

Streamline #113

Coordinates of Streamline:
Start x: 10886.786757 y: 9792.580270
End x: 10873.000885 y: 9746.551668

Streamline #114

Coordinates of Streamline:
Start x: 10894.255135 y: 9790.790405
End x: 10872.770233 y: 9740.352165

Streamline #115

Coordinates of Streamline:
Start x: 10901.723514 y: 9789.000541
End x: 10890.312867 y: 9732.598486

Streamline #116

Coordinates of Streamline:
Start x: 10909.191892 y: 9787.210676
End x: 10897.911444 y: 9730.699476

Streamline #117

Coordinates of Streamline:
Start x: 10916.660270 y: 9785.420811
End x: 10905.128164 y: 9728.923481

Streamline #118

Coordinates of Streamline:
Start x: 10924.128649 y: 9783.630946
End x: 10912.147549 y: 9727.206625

Streamline #119

Coordinates of Streamline:
Start x: 10931.597027 y: 9781.841081
End x: 10919.074587 y: 9725.523032

Streamline #120

Coordinates of Streamline:
Start x: 10939.065405 y: 9780.051216
End x: 10925.965667 y: 9723.858468

Streamline #121

Coordinates of Streamline:
Start x: 10946.533784 y: 9778.261351
End x: 10932.843818 y: 9722.206123

Streamline #122

Coordinates of Streamline:
Start x: 10954.002162 y: 9776.471486
End x: 10939.707777 y: 9720.565334

Streamline #123

Coordinates of Streamline:

Start x: 10961.470541 y: 9774.681622
End x: 10946.542852 y: 9718.939714

Streamline #124

Coordinates of Streamline:

Start x: 10968.938919 y: 9772.891757
End x: 10953.329890 y: 9717.335344

Streamline #125

Coordinates of Streamline:

Start x: 10976.407297 y: 9771.101892
End x: 10960.050585 y: 9715.759895

Streamline #126

Coordinates of Streamline:

Start x: 10983.875676 y: 9769.312027
End x: 10966.690601 y: 9714.223002

Streamline #127

Coordinates of Streamline:

Start x: 10991.344054 y: 9767.522162
End x: 10973.244042 y: 9712.738740

Streamline #128

Coordinates of Streamline:

Start x: 10998.812432 y: 9765.732297
End x: 10979.732066 y: 9711.333720

Streamline #129

Coordinates of Streamline:

Start x: 11006.280811 y: 9763.942432
End x: 10985.723521 y: 9710.522769

Streamline #130

Coordinates of Streamline:

Start x: 11013.749189 y: 9762.152568
End x: 11000.961965 y: 9706.297260

Streamline #131

Coordinates of Streamline:

Start x: 11021.217568 y: 9760.362703
End x: 11008.072466 y: 9704.344310

Streamline #132

Coordinates of Streamline:

Start x: 11028.685946 y: 9758.572838
End x: 11015.080436 y: 9702.596965

Streamline #133

Coordinates of Streamline:

Start x: 11036.154324 y: 9756.782973
End x: 11021.920434 y: 9700.926184

Streamline #134

Coordinates of Streamline:

Start x: 11043.622703 y: 9754.993108
End x: 11028.695541 y: 9699.294645

Streamline #135

Coordinates of Streamline:

Start x: 11051.091081 y: 9753.203243
End x: 11035.464735 y: 9697.682257

Streamline #136

Coordinates of Streamline:

Start x: 11058.559459 y: 9751.413378
End x: 11042.264868 y: 9696.075293

Streamline #137

Coordinates of Streamline:

Start x: 11066.027838 y: 9749.623514
End x: 11049.115811 y: 9694.464523

Streamline #138

Coordinates of Streamline:

Start x: 11073.496216 y: 9747.833649
End x: 11056.024618 y: 9692.844570

Streamline #139

Coordinates of Streamline:
Start x: 11080.964595 y: 9746.043784
End x: 11062.991227 y: 9691.212716

Streamline #140

Coordinates of Streamline:
Start x: 11088.432973 y: 9744.253919
End x: 11070.014452 y: 9689.567333

Streamline #141

Coordinates of Streamline:
Start x: 11095.901351 y: 9742.464054
End x: 11077.098326 y: 9687.906186

Streamline #142

Coordinates of Streamline:
Start x: 11103.369730 y: 9740.674189
End x: 11084.262424 y: 9686.224138

Streamline #143

Coordinates of Streamline:
Start x: 11110.838108 y: 9738.884324
End x: 11091.566711 y: 9684.509933

Streamline #144

Coordinates of Streamline:
Start x: 11118.306486 y: 9737.094459
End x: 11099.263409 y: 9682.721710

Streamline #145

Coordinates of Streamline:
Start x: 11125.774865 y: 9735.304595
End x: 11111.946280 y: 9679.576542

Streamline #146

Coordinates of Streamline:
Start x: 11133.243243 y: 9733.514730
End x: 11119.338334 y: 9677.664289

Streamline #147

Coordinates of Streamline:
Start x: 11140.711622 y: 9731.724865
End x: 11126.470289 y: 9675.890693

Streamline #148

Coordinates of Streamline:
Start x: 11148.180000 y: 9729.935000
End x: 11133.543620 y: 9674.161876

Streamline #149

Coordinates of Streamline:
Start x: 11155.648378 y: 9728.145135
End x: 11140.583839 y: 9672.462491

Streamline #150

Coordinates of Streamline:
Start x: 11163.116757 y: 9726.355270
End x: 11147.631247 y: 9670.775035

Streamline #151

Coordinates of Streamline:
Start x: 11170.585135 y: 9724.565405
End x: 11154.707761 y: 9669.088697

Streamline #152

Coordinates of Streamline:
Start x: 11178.053514 y: 9722.775541
End x: 11161.772939 y: 9667.412486

Streamline #153

Coordinates of Streamline:
Start x: 11185.521892 y: 9720.985676
End x: 11168.801849 y: 9665.753407

Streamline #154

Coordinates of Streamline:
Start x: 11192.990270 y: 9719.195811
End x: 11175.773757 y: 9664.120375

Streamline #155

Coordinates of Streamline:
Start x: 11200.458649 y: 9717.405946
End x: 11182.660239 y: 9662.530895

Streamline #156

Coordinates of Streamline:
Start x: 11207.927027 y: 9715.616081
End x: 11189.466814 y: 9661.005563

Streamline #157

Coordinates of Streamline:
Start x: 11215.395405 y: 9713.826216
End x: 11196.274846 y: 9659.579778

Streamline #158

Coordinates of Streamline:
Start x: 11222.863784 y: 9712.036351
End x: 11203.851985 y: 9658.063856

Streamline #159

Coordinates of Streamline:
Start x: 11230.332162 y: 9710.246486
End x: 11217.193660 y: 9654.054638

Streamline #160

Coordinates of Streamline:
Start x: 11237.800541 y: 9708.456622
End x: 11228.970908 y: 9651.569101

Streamline #161

Coordinates of Streamline:
Start x: 11245.268919 y: 9706.666757
End x: 11238.806796 y: 9649.557653

Streamline #162

Coordinates of Streamline:
Start x: 11252.737297 y: 9704.876892
End x: 11247.244548 y: 9647.669124

Streamline #163

Coordinates of Streamline:
Start x: 11260.205676 y: 9703.087027
End x: 11254.710578 y: 9645.838780

Streamline #164

Coordinates of Streamline:
Start x: 11267.674054 y: 9701.297162
End x: 11261.487521 y: 9644.068014

Streamline #165

Coordinates of Streamline:
Start x: 11275.142432 y: 9699.507297
End x: 11267.767939 y: 9642.371195

Streamline #166

Coordinates of Streamline:
Start x: 11282.610811 y: 9697.717432
End x: 11273.687865 y: 9640.762960

Streamline #167

Coordinates of Streamline:
Start x: 11290.079189 y: 9695.927568
End x: 11279.347492 y: 9639.255404

Streamline #168

Coordinates of Streamline:
Start x: 11297.547568 y: 9694.137703
End x: 11284.826257 y: 9637.857686

Streamline #169

Coordinates of Streamline:
Start x: 11305.015946 y: 9692.347838
End x: 11290.196985 y: 9636.575939

Streamline #170

Coordinates of Streamline:
Start x: 11312.484324 y: 9690.557973
End x: 11295.536559 y: 9635.416622

Streamline #171

Coordinates of Streamline:

Start x: 11319.952703 y: 9688.768108
End x: 11301.244113 y: 9634.253902

Streamline #172

Coordinates of Streamline:

Start x: 11327.421081 y: 9686.978243
End x: 11308.542751 y: 9632.465963

Streamline #173

Coordinates of Streamline:

Start x: 11334.889459 y: 9685.188378
End x: 11315.958429 y: 9630.679448

Streamline #174

Coordinates of Streamline:

Start x: 11342.357838 y: 9683.398514
End x: 11323.363671 y: 9628.915831

Streamline #175

Coordinates of Streamline:

Start x: 11349.826216 y: 9681.608649
End x: 11330.764089 y: 9627.159989

Streamline #176

Coordinates of Streamline:

Start x: 11357.294595 y: 9679.818784
End x: 11338.228822 y: 9625.382458

Streamline #177

Coordinates of Streamline:

Start x: 11364.762973 y: 9678.028919
End x: 11346.086319 y: 9623.451826

Streamline #178

Coordinates of Streamline:

Start x: 11372.231351 y: 9676.239054
End x: 11354.613172 y: 9621.291450

Streamline #179

Coordinates of Streamline:

Start x: 11379.699730 y: 9674.449189
End x: 11363.922886 y: 9618.945004

Streamline #180

Coordinates of Streamline:

Start x: 11387.168108 y: 9672.659324
End x: 11374.054003 y: 9616.500274

Streamline #181

Coordinates of Streamline:

Start x: 11394.636486 y: 9670.869459
End x: 11384.759125 y: 9614.128710

Streamline #182

Coordinates of Streamline:

Start x: 11402.104865 y: 9669.079595
End x: 11397.367663 y: 9611.671151

Streamline #183

Coordinates of Streamline:

Start x: 11409.573243 y: 9667.289730
End x: 11410.410291 y: 9609.700055

Streamline #184

Coordinates of Streamline:

Start x: 11417.041622 y: 9665.499865
End x: 11423.761344 y: 9608.312662

Streamline #185

Coordinates of Streamline:

Start x: 11424.510000 y: 9663.710000
End x: 11437.472409 y: 9607.619242

Streamline #186

Coordinates of Streamline:

Start x: 11426.790000 y: 9663.710000

End x: 11442.506641 y: 9598.601908

Streamline #187

Coordinates of Streamline:

Start x: 11428.395781 y: 9669.740469
End x: 11452.626802 y: 9597.262058

Streamline #188

Coordinates of Streamline:

Start x: 11430.001563 y: 9675.770937
End x: 11470.051854 y: 9599.190886

Streamline #189

Coordinates of Streamline:

Start x: 11431.607344 y: 9681.801406
End x: 11487.744727 y: 9616.889874

Streamline #190

Coordinates of Streamline:

Start x: 11433.213125 y: 9687.831875
End x: 11488.511381 y: 9634.831324

Streamline #191

Coordinates of Streamline:

Start x: 11434.818906 y: 9693.862344
End x: 11495.918430 y: 9647.722581

Streamline #192

Coordinates of Streamline:

Start x: 11436.424688 y: 9699.892812
End x: 11493.268485 y: 9664.316364

Streamline #193

Coordinates of Streamline:

Start x: 11438.030469 y: 9705.923281
End x: 11498.495700 y: 9677.362273

Streamline #194

Coordinates of Streamline:

Start x: 11439.636250 y: 9711.953750
End x: 11502.372113 y: 9688.717097

Streamline #195

Coordinates of Streamline:

Start x: 11441.242031 y: 9717.984219
End x: 11505.419157 y: 9698.425190

Streamline #196

Coordinates of Streamline:

Start x: 11442.847813 y: 9724.014687
End x: 11508.044814 y: 9707.656453

Streamline #197

Coordinates of Streamline:

Start x: 11444.453594 y: 9730.045156
End x: 11510.393650 y: 9716.633579

Streamline #198

Coordinates of Streamline:

Start x: 11446.059375 y: 9736.075625
End x: 11512.452688 y: 9724.971048

Streamline #199

Coordinates of Streamline:

Start x: 11447.665156 y: 9742.106094
End x: 11514.296710 y: 9732.761212

Streamline #200

Coordinates of Streamline:

Start x: 11449.270938 y: 9748.136563
End x: 11515.953051 y: 9739.748414

Streamline #201

Coordinates of Streamline:

Start x: 11450.876719 y: 9754.167031
End x: 11517.489090 y: 9745.756954

Streamline #202

Coordinates of Streamline:

Start x: 11452.482500 y: 9760.197500
End x: 11518.983850 y: 9750.865949

Streamline #203

Coordinates of Streamline:
Start x: 11454.088281 y: 9766.227969
End x: 11520.448884 y: 9755.694193

Streamline #204

Coordinates of Streamline:
Start x: 11455.694063 y: 9772.258437
End x: 11521.882570 y: 9760.541680

Streamline #205

Coordinates of Streamline:
Start x: 11457.299844 y: 9778.288906
End x: 11523.284985 y: 9765.419651

Streamline #206

Coordinates of Streamline:
Start x: 11458.905625 y: 9784.319375
End x: 11524.519295 y: 9770.013825

Streamline #207

Coordinates of Streamline:
Start x: 11460.511406 y: 9790.349844
End x: 11517.118657 y: 9779.149920

Streamline #208

Coordinates of Streamline:
Start x: 11462.117188 y: 9796.380312
End x: 11518.586037 y: 9784.497331

Streamline #209

Coordinates of Streamline:
Start x: 11463.722969 y: 9802.410781
End x: 11519.988595 y: 9789.598258

Streamline #210

Coordinates of Streamline:
Start x: 11465.328750 y: 9808.441250
End x: 11521.349735 y: 9794.597159

Streamline #211

Coordinates of Streamline:
Start x: 11466.934531 y: 9814.471719
End x: 11522.679633 y: 9799.556035

Streamline #212

Coordinates of Streamline:
Start x: 11468.540313 y: 9820.502188
End x: 11523.981676 y: 9804.495748

Streamline #213

Coordinates of Streamline:
Start x: 11470.146094 y: 9826.532656
End x: 11525.255981 y: 9809.421402

Streamline #214

Coordinates of Streamline:
Start x: 11471.751875 y: 9832.563125
End x: 11526.500478 y: 9814.330538

Streamline #215

Coordinates of Streamline:
Start x: 11473.357656 y: 9838.593594
End x: 11527.711350 y: 9819.216666

Streamline #216

Coordinates of Streamline:
Start x: 11474.963438 y: 9844.624062
End x: 11528.883294 y: 9824.071312

Streamline #217

Coordinates of Streamline:
Start x: 11476.569219 y: 9850.654531
End x: 11530.009798 y: 9828.885588

Streamline #218

Coordinates of Streamline:
Start x: 11478.175000 y: 9856.685000
End x: 11531.083530 y: 9833.651736

Streamline #219

Coordinates of Streamline:
Start x: 11479.780781 y: 9862.715469
End x: 11532.096962 y: 9838.364875

Streamline #220

Coordinates of Streamline:
Start x: 11481.386563 y: 9868.745938
End x: 11533.043330 y: 9843.025073

Streamline #221

Coordinates of Streamline:
Start x: 11482.992344 y: 9874.776406
End x: 11533.918077 y: 9847.639811

Streamline #222

Coordinates of Streamline:
Start x: 11484.598125 y: 9880.806875
End x: 11543.254560 y: 9847.790034

Streamline #223

Coordinates of Streamline:
Start x: 11486.203906 y: 9886.837344
End x: 11543.782648 y: 9851.998803

Streamline #224

Coordinates of Streamline:
Start x: 11487.809688 y: 9892.867812
End x: 11544.194194 y: 9856.188811

Streamline #225

Coordinates of Streamline:
Start x: 11489.415469 y: 9898.898281
End x: 11544.496274 y: 9860.420475

Streamline #226

Coordinates of Streamline:
Start x: 11491.021250 y: 9904.928750
End x: 11544.717149 y: 9864.795112

Streamline #227

Coordinates of Streamline:
Start x: 11492.627031 y: 9910.959219
End x: 11544.921882 y: 9869.474990

Streamline #228

Coordinates of Streamline:
Start x: 11494.232813 y: 9916.989687
End x: 11545.332579 y: 9874.784844

Streamline #229

Coordinates of Streamline:
Start x: 11495.838594 y: 9923.020156
End x: 11547.398637 y: 9881.580851

Streamline #230

Coordinates of Streamline:
Start x: 11497.444375 y: 9929.050625
End x: 11553.672932 y: 9880.293882

Streamline #231

Coordinates of Streamline:
Start x: 11499.050156 y: 9935.081094
End x: 11558.194748 y: 9870.943458

Streamline #232

Coordinates of Streamline:
Start x: 11500.655938 y: 9941.111563
End x: 11554.666062 y: 9861.224342

Streamline #233

Coordinates of Streamline:
Start x: 11502.261719 y: 9947.142031
End x: 11580.970946 y: 9894.607465

Streamline #234

Coordinates of Streamline:
Start x: 11503.867500 y: 9953.172500
End x: 11587.563740 y: 9907.191445

Streamline #235

Coordinates of Streamline:
Start x: 11505.473281 y: 9959.202969
End x: 11592.413954 y: 9918.834265

Streamline #236

Coordinates of Streamline:
Start x: 11507.079063 y: 9965.233437
End x: 11596.292153 y: 9929.732328

Streamline #237

Coordinates of Streamline:
Start x: 11508.684844 y: 9971.263906
End x: 11599.515446 y: 9939.889666

Streamline #238

Coordinates of Streamline:
Start x: 11510.290625 y: 9977.294375
End x: 11602.320723 y: 9949.498935

Streamline #239

Coordinates of Streamline:
Start x: 11511.896406 y: 9983.324844
End x: 11604.566958 y: 9958.021439

Streamline #240

Coordinates of Streamline:
Start x: 11513.502188 y: 9989.355313
End x: 11597.866893 y: 9970.482457

Streamline #241

Coordinates of Streamline:
Start x: 11515.107969 y: 9995.385781
End x: 11599.694536 y: 9977.431944

Streamline #242

Coordinates of Streamline:

Start x: 11516.713750 y: 10001.416250
End x: 11601.343417 y: 9983.489966

Streamline #243

Coordinates of Streamline:
Start x: 11518.319531 y: 10007.446719
End x: 11602.888117 y: 9989.159221

Streamline #244

Coordinates of Streamline:
Start x: 11519.925313 y: 10013.477188
End x: 11604.354268 y: 9994.560380

Streamline #245

Coordinates of Streamline:
Start x: 11521.531094 y: 10019.507656
End x: 11605.752352 y: 9999.745816

Streamline #246

Coordinates of Streamline:
Start x: 11523.136875 y: 10025.538125
End x: 11607.085222 y: 10004.743796

Streamline #247

Coordinates of Streamline:
Start x: 11524.742656 y: 10031.568594
End x: 11608.351364 y: 10009.572051

Streamline #248

Coordinates of Streamline:
Start x: 11526.348438 y: 10037.599063
End x: 11609.546438 y: 10014.243261

Streamline #249

Coordinates of Streamline:
Start x: 11527.954219 y: 10043.629531
End x: 11610.664070 y: 10018.767741

Streamline #250

Coordinates of Streamline:
Start x: 11529.560000 y: 10049.660000
End x: 11611.696282 y: 10023.155049

Particle Traces

Number of Particle-traces = 0

APPENDIX C-5

**GROUNDWATER MODELING OF
REMEDIAL ALTERNATIVES – AREA BCE**

**Area BCE Constituent Migration
Analysis Worksheets**

Worksheet C-5.1
Predicted Aniline Concentrations Downgradient of Area B

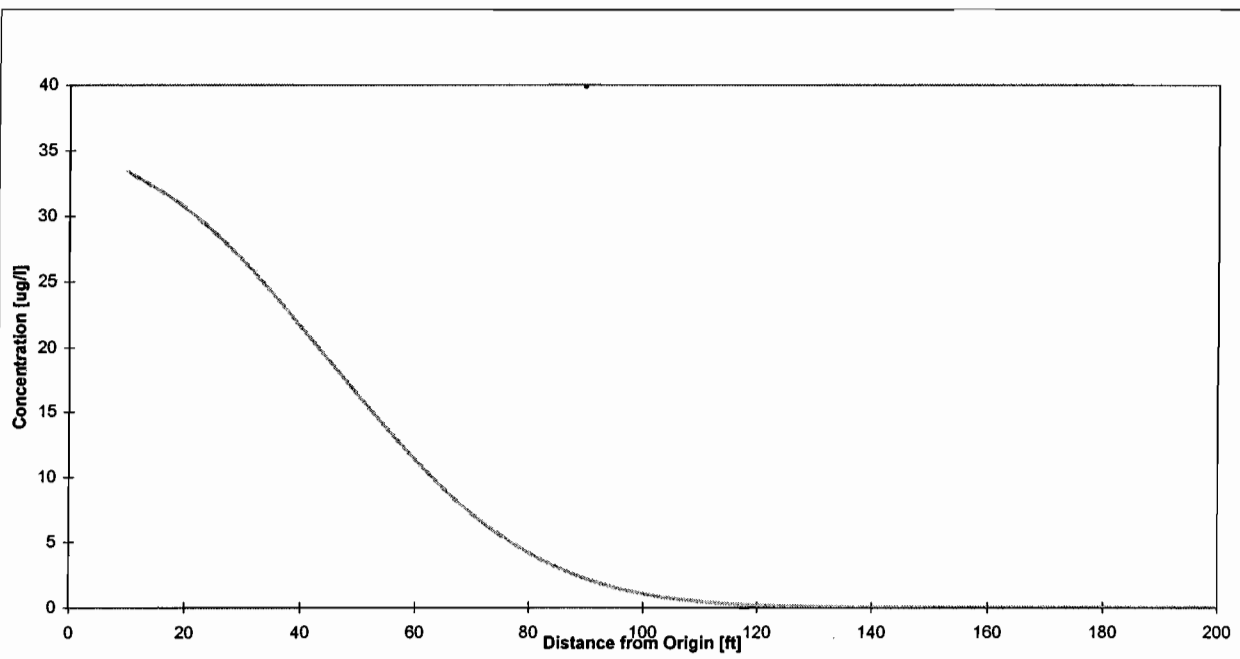
Steady State One-Dimensional Advection/Dispersion Model with Reaction Terms (Degradation)

$$C(x,t) = \frac{C_o}{2} \exp\left(\frac{Ux}{2D}\right) \left\{ \exp(-Bx) \operatorname{erfc}\left[\frac{x - t\sqrt{(U/\omega R)^2 + 4\lambda D/\omega R}}{2\sqrt{Dt/\omega R}}\right] + \exp(Bx) \operatorname{erfc}\left[\frac{x + t\sqrt{(U/\omega R)^2 + 4\lambda D/\omega R}}{2\sqrt{Dt/\omega R}}\right] \right\}$$

where: $B = \sqrt{(U/2D)^2 + (\lambda\omega R/D)}$

Model Input Parameters

Darcy Velocity	$U = KI$	0.0003	[ft/day]
Dispersivity	a	10	[ft]
Dispersion Coefficient	$D = a*U$	0.0034	[ft ² /day]
Total Porosity	ω	0.1	[Dimensionless]
Initial Concentration	C_o	35	[ug/l]
Retardation Factor	$R = 1 + K_d \rho_b/n$	2.40	[Dimensionless]
Bulk Density	ρ_b	2.15	[g/cm ³]
Distribution Coefficient	K_d	0.065	[cm ³ /g] [ml/g]
Decay Coefficient	$\lambda = (\ln 2) / t_{1/2}$	0	[day ⁻¹]
Half-Life Time	$t_{1/2}$	NA	[days]
	$t_{1/2}$	NA	[years]
Simulation Time	t	31025	[days]
	t	85	[years]



Notes: Hydraulic Conductivity = .00782 ft/day
 Hydraulic Gradient = .043
 Soil Organic Carbon = .005 (0.5%)
 Octanol/Water Partition. Coeff. For Aniline = 13

Worksheet C-5.2
Predicted Chlorobenzene Concentrations Downgradient of the Area E Tank Farm

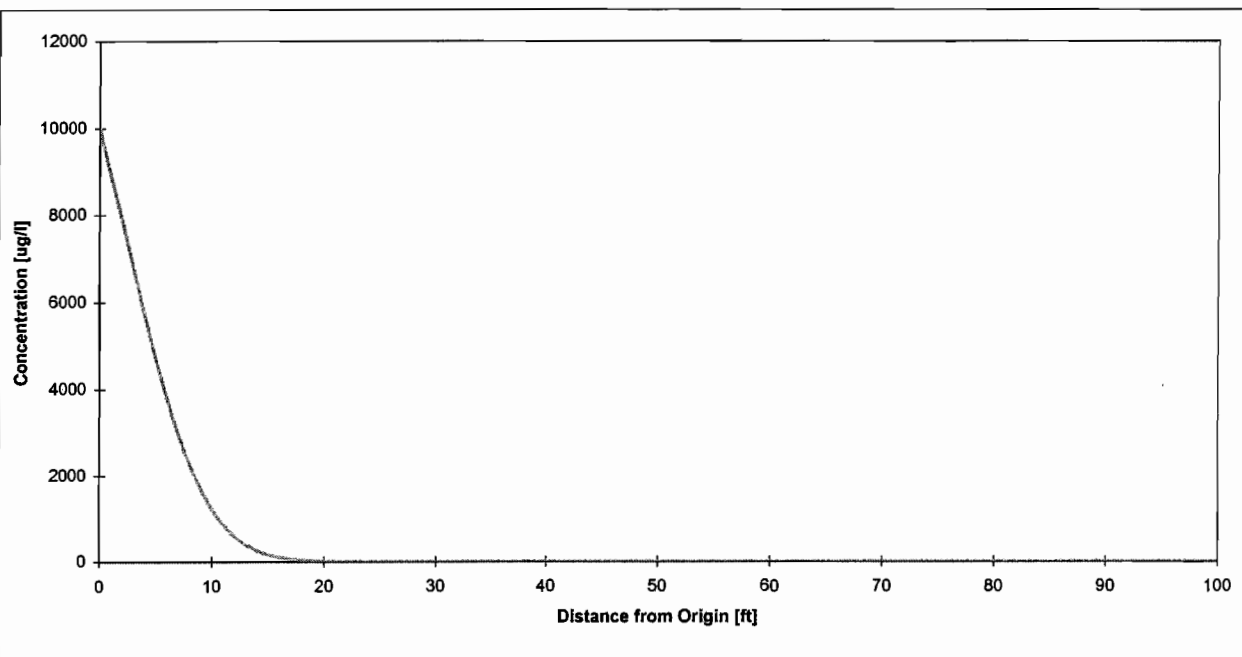
Steady State One-Dimensional Advection/Dispersion Model with Reaction Terms (Degradation)

$$C(x,t) = \frac{C_o}{2} \exp\left(\frac{Ux}{2D}\right) \left\{ \exp(-Bx) \operatorname{erfc}\left[\frac{x - t\sqrt{(U/\omega R)^2 + 4\lambda D/\omega R}}{2\sqrt{Dt/\omega R}}\right] + \exp(Bx) \operatorname{erfc}\left[\frac{x + t\sqrt{(U/\omega R)^2 + 4\lambda D/\omega R}}{2\sqrt{Dt/\omega R}}\right] \right\}$$

where: $B = \sqrt{(U/2D)^2 + (\lambda\omega R/D)}$

Model Input Parameters

Darcy Velocity	$U = K I$	0.0003	[ft/day]
Dispersivity	a	10	[ft]
Dispersion Coefficient	$D = a \cdot U$	0.0031	[ft ² /day]
Total Porosity	ω	0.1	[Dimensionless]
Initial Concentration	C_o	10000	[ug/l]
Retardation Factor	$R = 1 + K_d \rho_b/n$	35.19	[Dimensionless]
Bulk Density	ρ_b	2.15	[g/cm ³]
Distribution Coefficient	K_d	1.59	[cm ³ /g] [ml/g]
Decay Coefficient	$\lambda = (\ln 2) / t_{1/2}$	0	[day ⁻¹]
Half-Life Time	$t_{1/2}$	NA	[days]
	$t_{1/2}$	NA	[years]
Simulation Time	t	18250	[days]
	t	50	[years]



Notes: Hydraulic Conductivity = .00782
 Hydraulic Gradient = .04
 Soil Organic Carbon = .005 (0.5%)
 Octanol/Water Partition. Coeff. For Chlorobenzene = 318

Worksheet C-5.3
Predicted Chloroform Concentrations Downgradient of the Former Lagoons

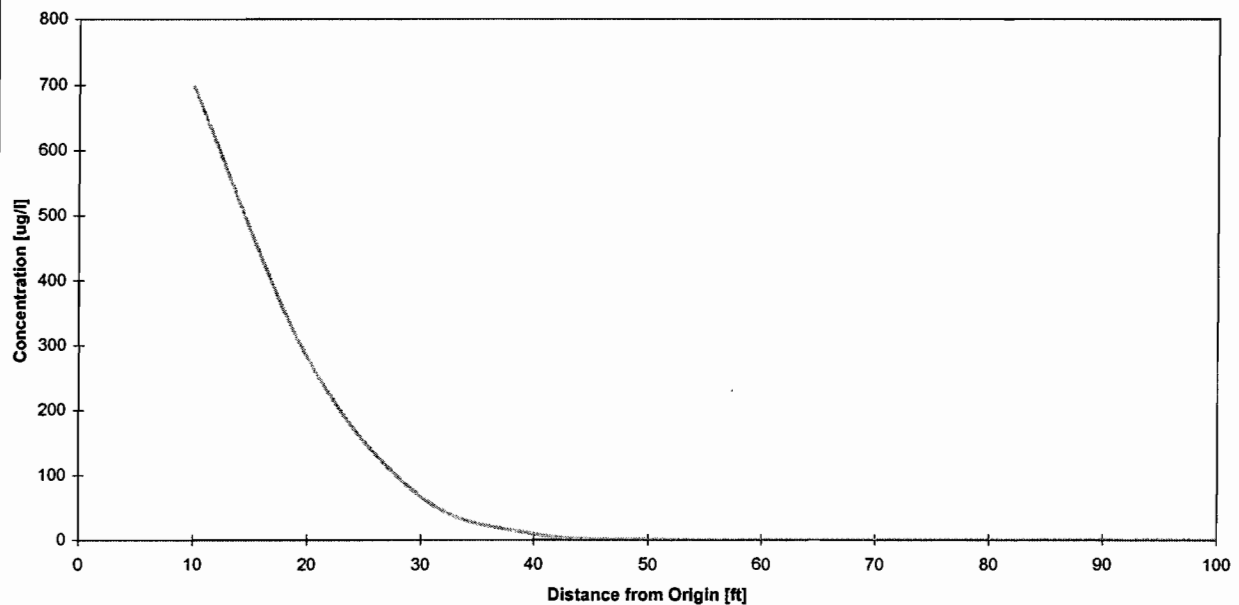
Steady State One-Dimensional Advection/Dispersion Model with Reaction Terms (Degradation)

$$C(x,t) = \frac{C_o}{2} \exp\left(\frac{Ux}{2D}\right) \left\{ \exp(-Bx) \operatorname{erfc}\left[\frac{x - t\sqrt{(U/\omega R)^2 + 4\lambda D/\omega R}}{2\sqrt{Dt/\omega R}}\right] + \exp(Bx) \operatorname{erfc}\left[\frac{x + t\sqrt{(U/\omega R)^2 + 4\lambda D/\omega R}}{2\sqrt{Dt/\omega R}}\right] \right\}$$

where: $B = \sqrt{(U/2D)^2 + (\lambda\omega R/D)}$

Model Input Parameters

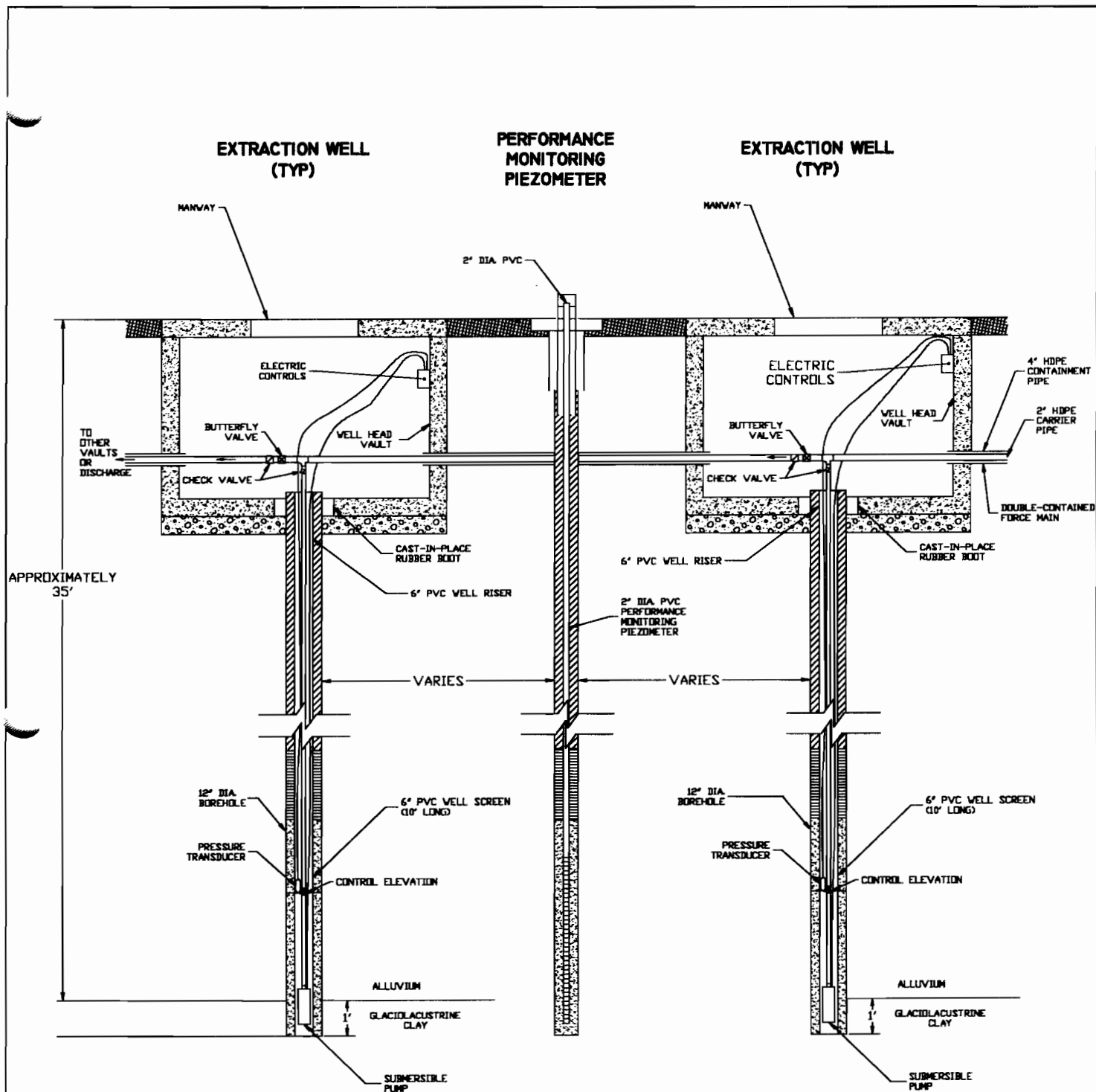
Darcy Velocity	$U = KI$	0.0003	[ft/day]
Dispersivity	a	10	[ft]
Dispersion Coefficient	$D = a*U$	0.0031	[ft ² /day]
Total Porosity	ω	0.1	[Dimensionless]
Initial Concentration	C_o	1100	[ug/l]
Retardation Factor	$R = 1 + K_d \rho_b/n$	4.33	[Dimensionless]
Bulk Density	ρ_b	2.15	[g/cm ³]
Distribution Coefficient	K_d	0.155	[cm ³ /g] [ml/g]
Decay Coefficient	$\lambda = (\ln 2) / t_{1/2}$	0	[day ⁻¹]
Half-Life Time	$t_{1/2}$	NA	[days]
	$t_{1/2}$	NA	[years]
Simulation Time	t	10950	[days]
	t	30	[years]



Notes: Hydraulic Conductivity = .00782 ft/day
 Hydraulic Gradient = .04
 Soil Organic Carbon = .005 (0.5%)
 Octanol/Water Partition. Coeff. For Chloroform = 34

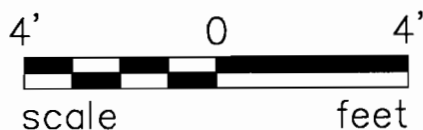
APPENDIX D

ANCILLARY CORRECTIVE MEASURES SCHEMATICS



LEGEND

	ASPHALT
	STONE BEDDING
	CEMENT/BENTONITE GROUT
	BENTONITE SEAL
	SAND

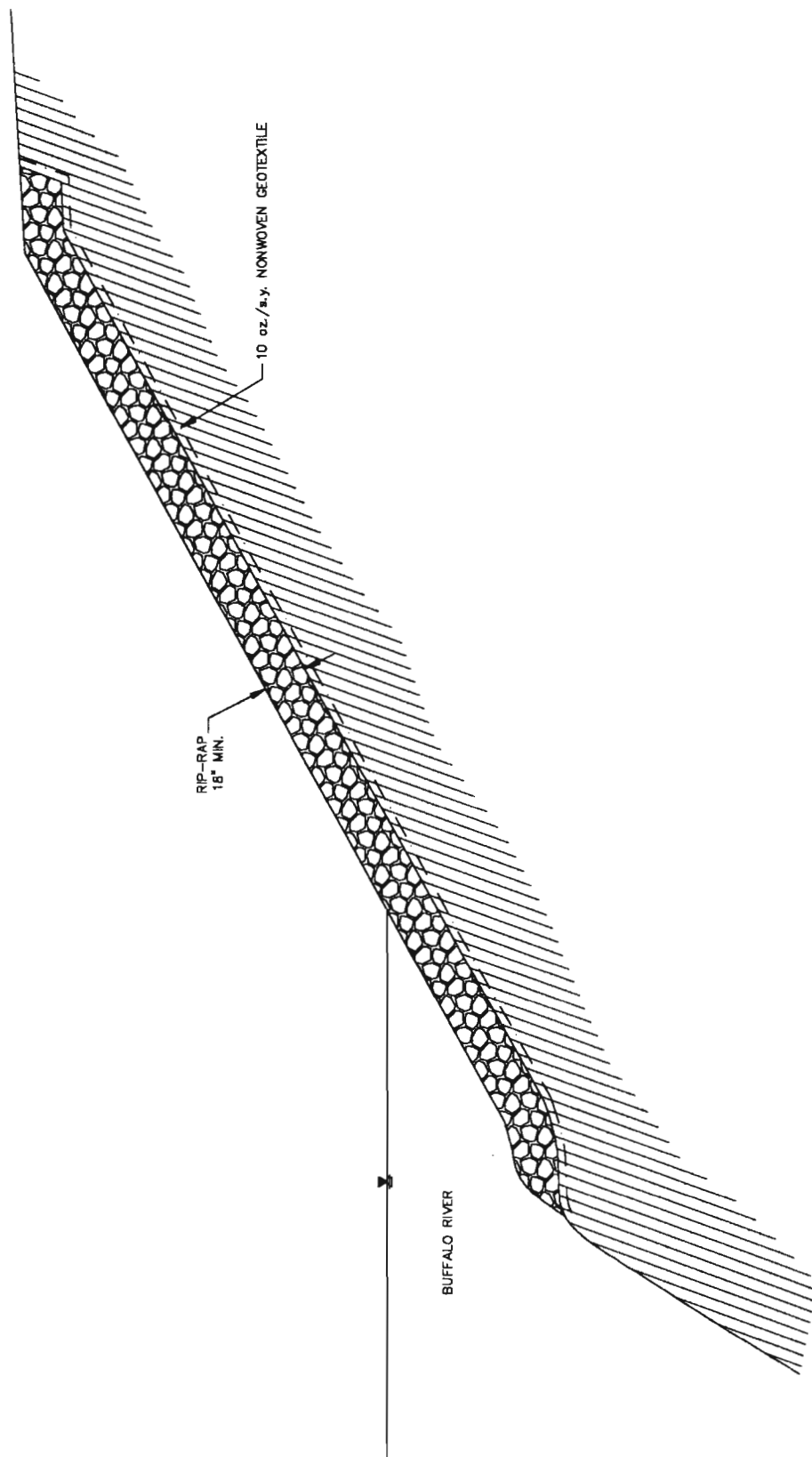


NOTES:

- SEE FIG B-13 FOR PROPOSED EXTRACTION WELL LAYOUT.

 Buffalo, New York		CONCEPTUAL DESIGN EXTRACTION WELL SYSTEM CORRECTIVE MEASURES STUDY AREA A.	
CLIENT/PROJECT	 CELION CORPORATION	DESIGNER	LPG
		DATE	11/17/99
		SCALE	1" = 4'
		JOB NO.	993-9206
		DWG. NO.	BCC-038
		DESIGNED	DJM
		FILE NO.	993-9206
		PROJECT NO.	D-1

DATE	11/18/99	JOB NO. 993-9206
ENGINEER	DCW	DATE
REVIEWED	DJM	FIGURE NO. D-3



CLIENT/PROJECT

BUFFALO COLOR CORP.



TITLE

CONCEPTUAL AREA A
BANK EROSION CONTROL
DESIGN

DRAWN

BEC

CHECKED

DJM

REVIEWED

DJM

DATE

12/9/99

SCALE

N.T.S.

FILE NO.

993-9206

JOB NO.

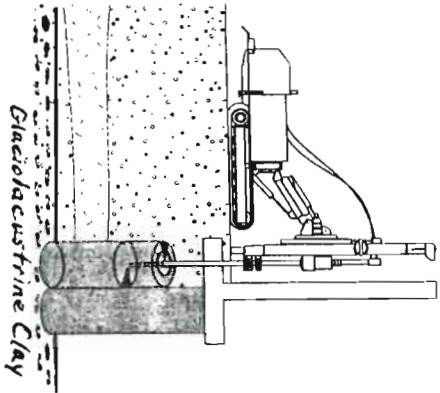
993-9206

DWG NO.

BCC046

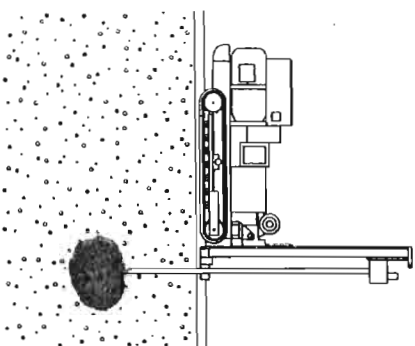
FIGURE

D-4



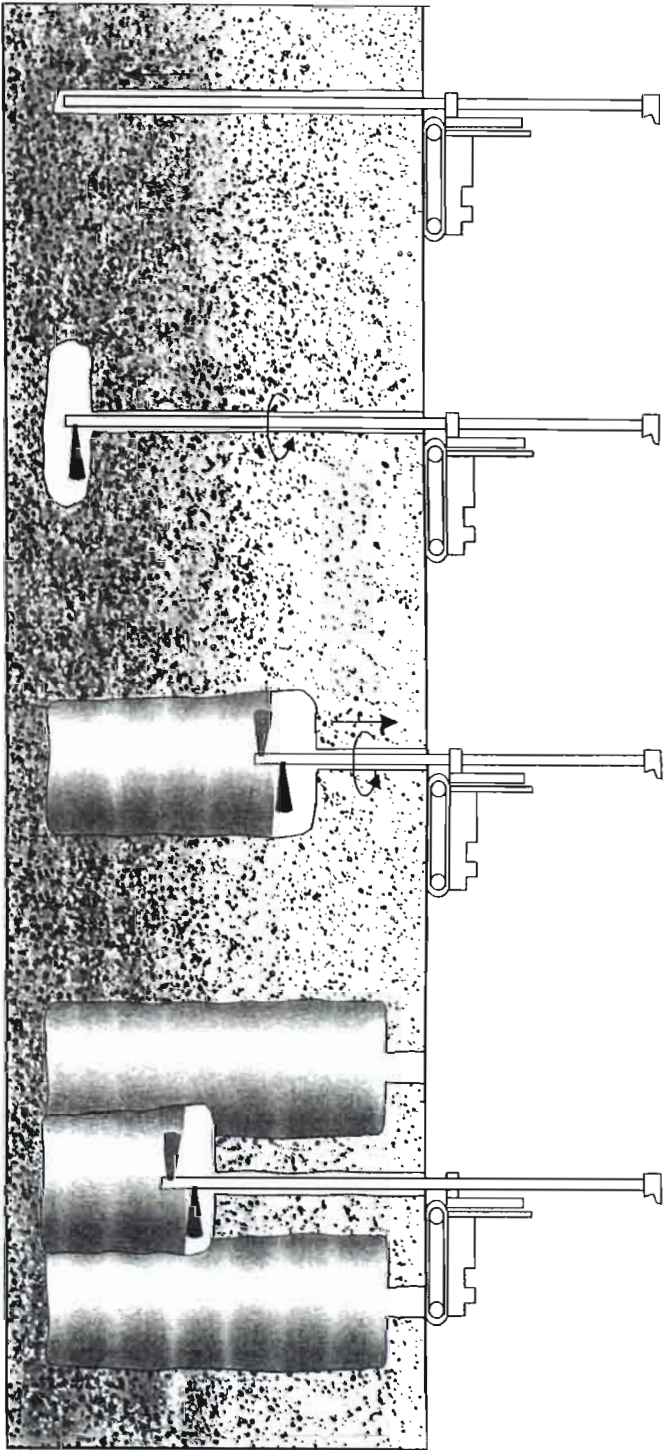
Jet Grouting

Effective across the widest range of soil types of any grouting technique, jet grouting is a versatile and valuable tool for underpinning, excavation support and groundwater control. As the in situ soil is eroded, it is simultaneously mixed with a cement grout to form low-permeability, solidified Soilcretesm of designed geometry. Jet grouting is particularly suited for use on sensitive structures or where access is limited.



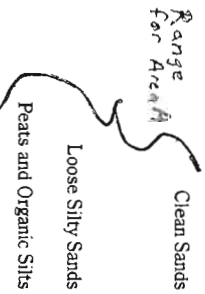
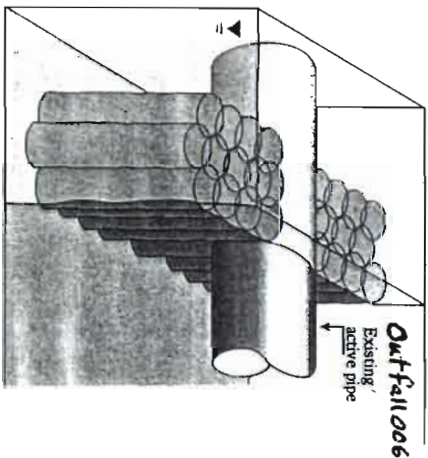
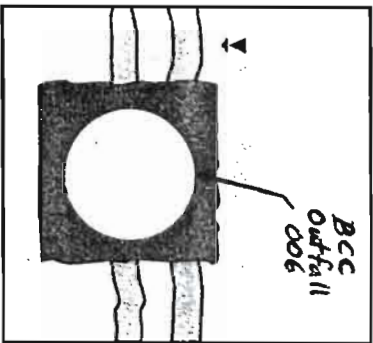
Chemical Grouting

The pressure-injection of very low viscosity chemical grouts into granular soils produces a stabilized mass of sandstone-like material with the strength to support and protect structures and utilities during nearby excavation. Less disruptive and often more economical than conventional open cut excavation, chemical grouting is extensively used in soft ground tunneling to prevent excessive ground loss.

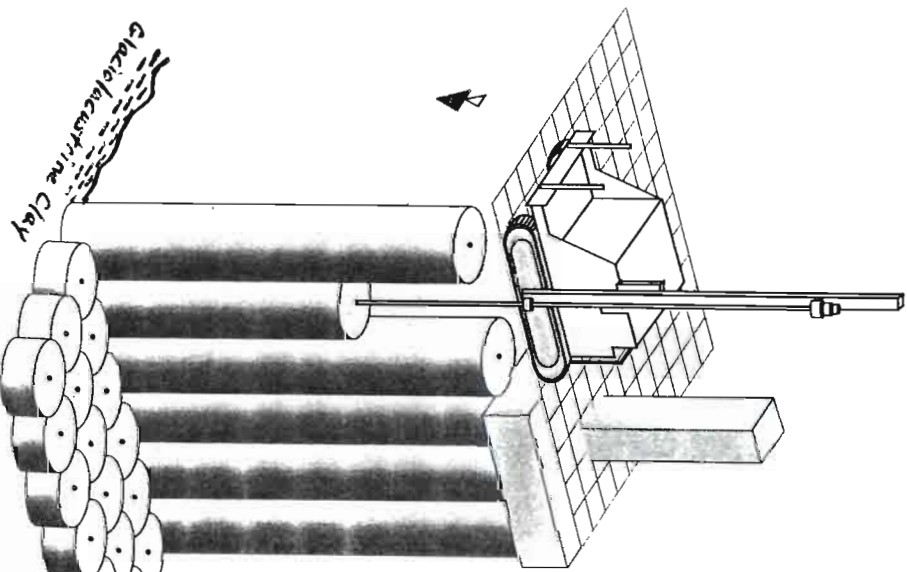


Jet Grouting Procedure

Predrilling or foundation coring may be necessary to access the treatment zone. The drilling rig is positioned and drilling (typ. 6" dia/150mm) is performed using grout or a drilling mud to stabilize the borehole. Since jet grouting is a bottom-up procedure, erosion is initiated at the design depth with high velocity injection of cutting and replacement fluids. This continues with consistent, uniform rotation and lifting to create column geometry, while expelling eroded spoil out of the top of the borehole. Designed integration of adjacent columns creates a Soilcrete mass. Since jet grout equipment operates from above foundation grade, and Soilcrete is constructed in a designed sequence, structural integrity is maintained and safety considerations are simplified. Jet grouting equipment is specially designed to be highly maneuverable and capable of low-headroom interior work as well as restricted-access exterior work.



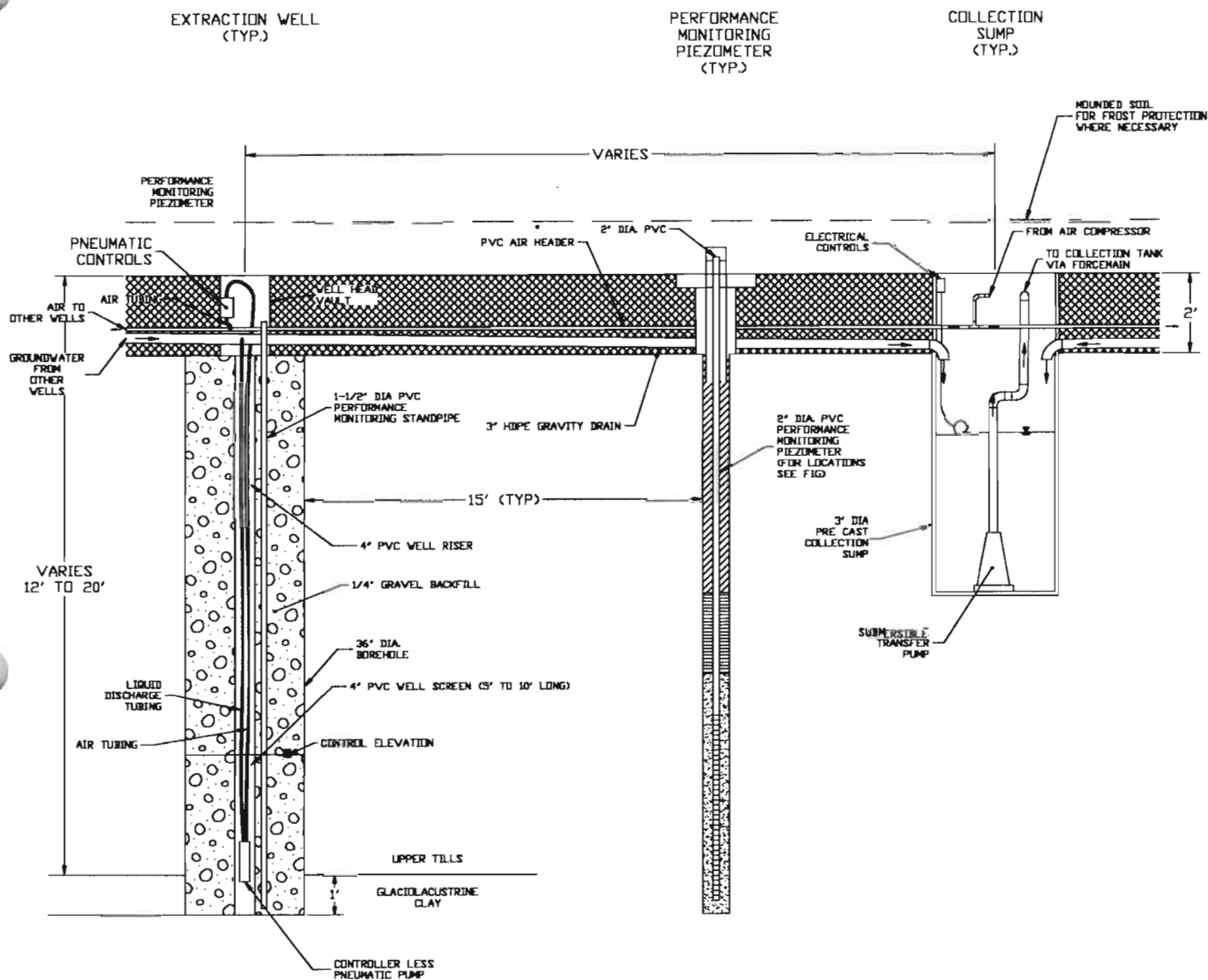
- Highly Erodible
- Cobbly Soils
- Gravelly Soils
- Clean Sands
- Loose Silty Sands
- Peats and Organic Silts
- Dense Silty Sands
- Loose Clayey Sands
- Low Plasticity Silts
- Dense Clayey Sands
- Low Plasticity Clays (soft)
- High Plasticity Silts
- Low Plasticity Clays (stiff)
- High Plasticity Clays
- Difficult to Erode



NOTE:

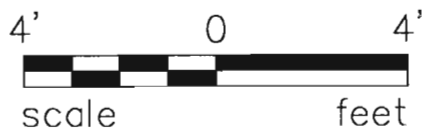
ALL FIGURES AND TECHNIQUE DESCRIPTIONS
OBTAINED FROM HAYWARD BAKER INC. PROMOTIONAL
BROCHURES.

TITLE		GROUT BARRIER CONCEPTS- AREA A	
CLIENT /PROJECT		DEAN	
 Golder Associates		LPg	
Buffalo, New York		DATE	
		12/2/99	
		JOB NO.	
		993-9206	
		CHECKED	
		DCW	
		SCALE	
		N.T.S	
		DWG. NO.	
		BCC-044	
		REVISED	
		DJM	
		FILE NO.	
		993-9206	
		FIGURE NO.	
		D-5	



NOTES:

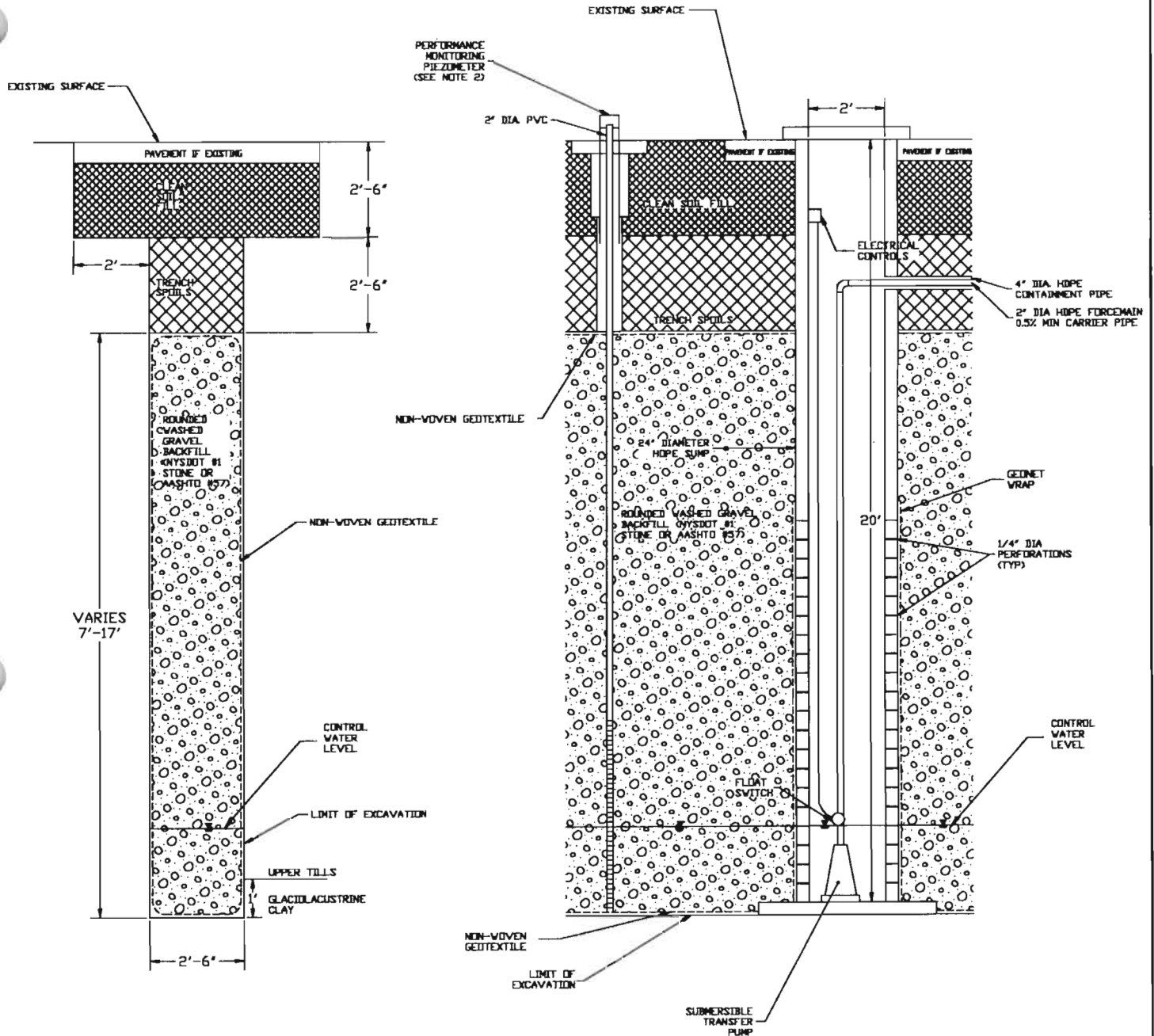
SEE FIG C-3 FOR PROPOSED EXTRACTION WELL LAYOUT.



		TITLE CONCEPTUAL DESIGN EXTRACTION WELL SYSTEM CORRECTIVE MEASURES STUDY AREAS B, C, E.	
CDDP/PROJECT 	DATE 11/09/99	JOB NO. 993-9206	DRAWING NO. BCC-037
DESIGNED DCW	SCALE 1"=4'	FILE NO. 993-9206	PICTURE NO. D-6
CHECKED DJM			

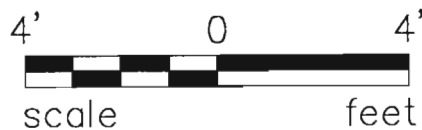
X-SECTION OF TRENCH (TYP.)

SIDE VIEW OF TRENCH INCLUDING COLLECTION SUMP (TYP.)

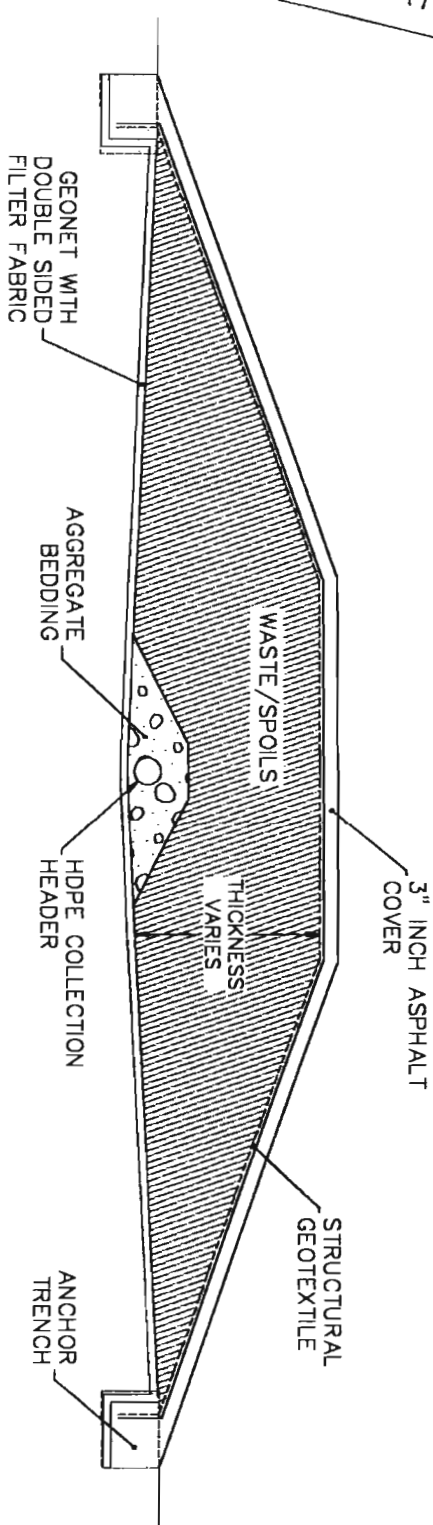
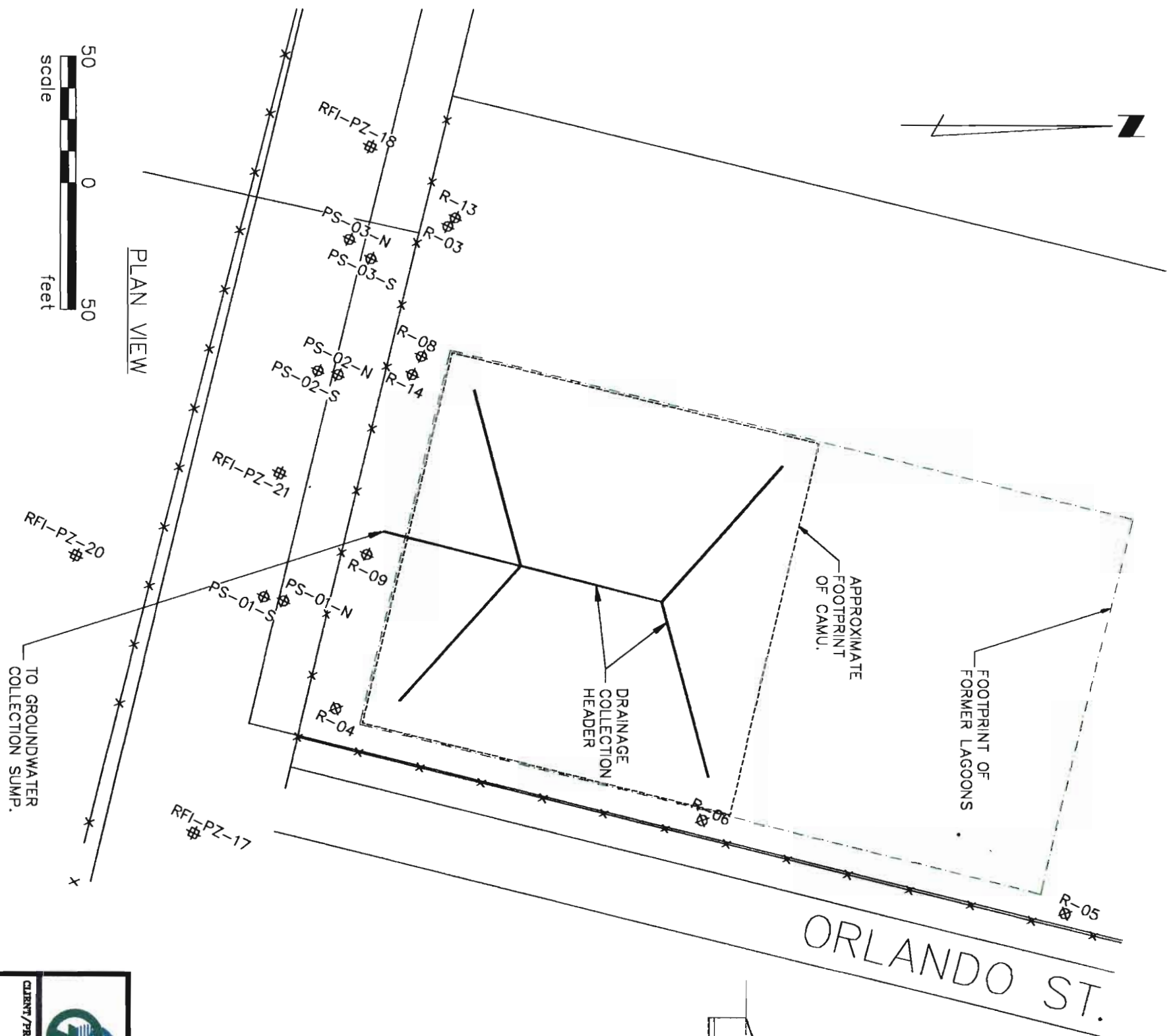


NOTES:

1. FOR PLAN LOCATIONS OF TRENCH LAYOUT SEE FIGURE C-5



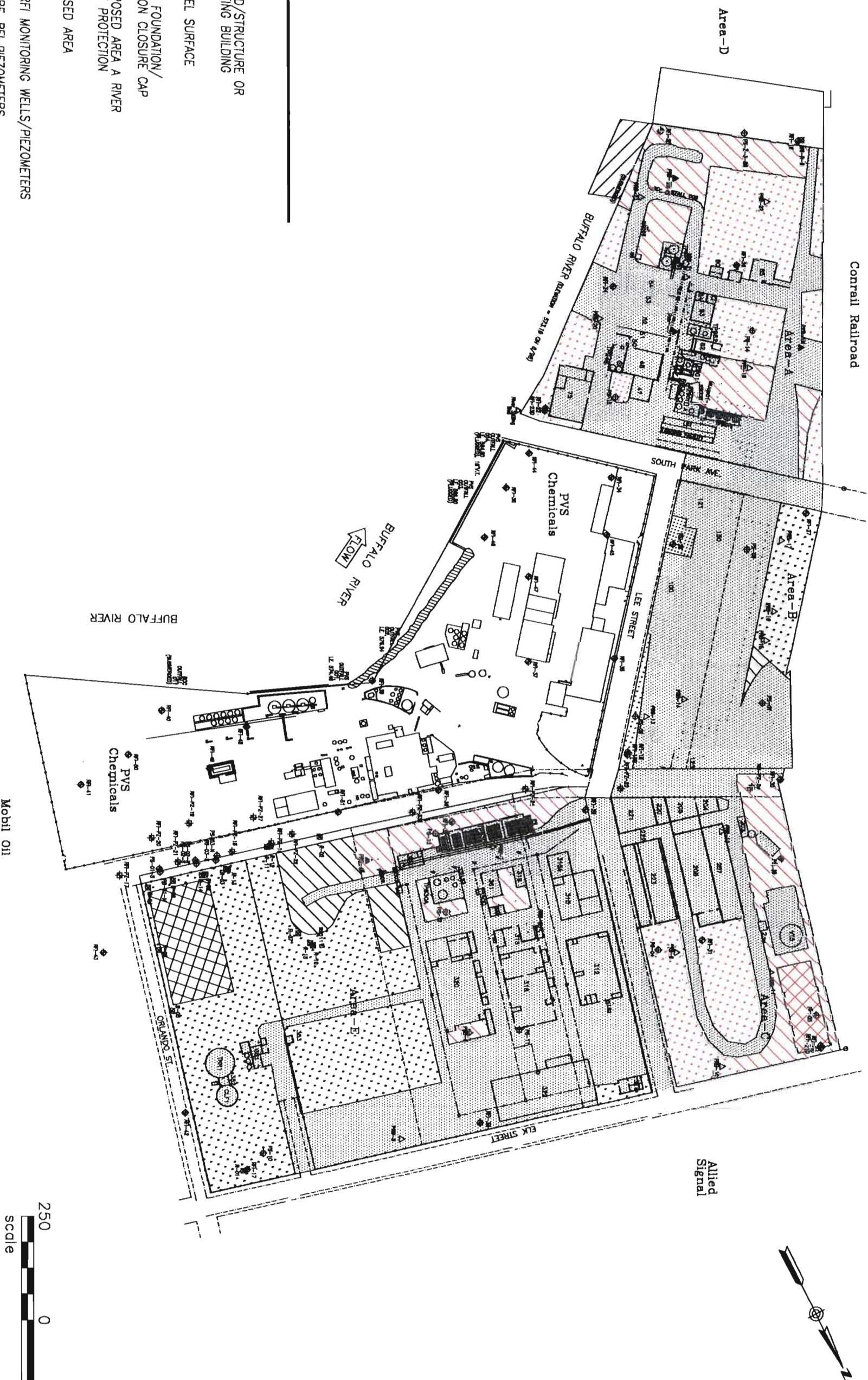
 Buffalo, New York		CONCEPTUAL DESIGN ENHANCED PERMEABILITY TRENCH CORRECTIVE MEASURES STUDY AREAS B, C, E.	
CLIENT/PROJECT	DCW	DATE	11/09/99
	LPG	SCALE	1"=4'
	DJM	FILE NO.	993-9208
		FIGURE NO.	D-7
		ADD. NO.	993-9206
		DOC. NO.	BCC-036



CUT VIEW
NTS.

NOTES:
THICKNESS VARIES WITH REMEDIAL OPTION AND FOOTPRINT AREA. A 150' x150' FOOTPRINT WOULD YIELD A RANGE OF AVERAGE THICKNESS OF SPOILS FROM 1.0 FT TO 4.6 FT FOR THE MINIMUM AND MAXIMUM DISPOSAL SCENARIOS, RESPECTIVELY. ADJUSTMENTS FOR BULKING AND COMPACTION NOT INCLUDED.

 Golder Associates		Buffalo, New York		TITLE CONCEPTUAL CORRECTIVE ACTION MANAGEMENT UNIT (CAMU) DESIGN	
CLIENT/PROJECT		DESIGN	DATE	JOB NO.	
 buffalo COLOR CORPORATION		LPG	12/1/99	993-9206	
		CHECKED	SCALE	DWG. NO.	
		DCW	AS SHOWN	BCC-043	
		REVIEWED	FILE NO.	FIGURE NO.	
		DJM	993-9206	D-8	



LEGEND

- PAVED/STRUCTURE OR EXISTING BUILDING
- GRAVEL SURFACE
- SLAB FOUNDATION/ LAGOON CLOSURE CAP
- PROPOSED AREA A RIVER BANK PROTECTION
- GRASSED AREA
- RFI-21 RFI MONITORING WELLS/PIEZOMETERS
- PS-01 PRE-RFI PIEZOMETERS
- R-04 PRE-RFI MONITORING WELLS
- PRB-20 RFI BORING
- PRB-1M RFI MULTIPLE DEPTH BORING
- ▲ RIVER STILLING WELL
- SURFACE SOIL SAMPLE

NOTES

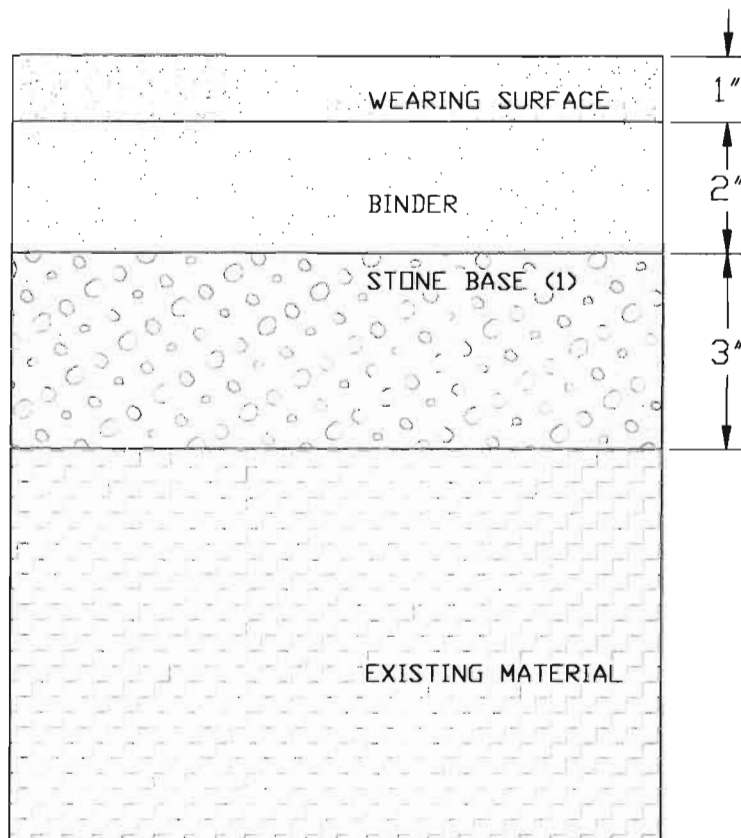
1. RED COLOR INDICATES PROPOSED PAVEMENT SOIL CAPPING AREAS

**Golder Associates**

Buffalo, New York

**buffalo**
COLOR CORPORATION

TITLE		CONCEPTUAL LAYOUT	
AREA A, B, C, E. - ALTERNATIVE 3		PAVEMENT SOIL CAPPING	
CLIENT/PROJECT	DRAWN	DATE	JOB NO.
	LPG	11/18/99	993-9206
CHECKED	BCS	SCALE	DWG. NO.
REVIEWED		AS SHOWN	BCC-041
		FILE NO.	FIGURE NO.
		993-9206	D-9



NOTES:

1. STONE BASE NOT REQUIRED WHEN PAVING OVER EXISTING GRAVEL AREAS.
2. FOR PROPOSED PAVED AREAS SEE FIGURE D-9.

 Buffalo, New York		TITLE CONCEPTUAL PAVEMENT DESIGN CORRECTIVE MEASURES STUDY AREAS A, B, C, E		
		DESIGN LPG	DATE 11/08/99	JOB NO. 993-9206
		CHECKED DCW	SCALE NTS	DWG. NO. BCC-035
		REVISION DJM	FILE NO. 993-9206	FIGURE NO. D-10

ALLIED SIGNAL
Buffalo Color Plant, Buffalo NY

OPERATIONAL AND **MAINTENANCE** **MANUAL**

prepared by

CSK TECHNICAL, Inc.
153 Wales Avenue
P.O. Box 784
Tonawanda, NY 14150

January 2, 1998

Version I

BUFFALO COLOR PROCESS DESCRIPTION:

Influent ground water from the Buffalo Color Area "D" site is delivered by others to the inlet of the treatment system. The contaminants in this water include heavy metals (arsenic, cadmium, chromium, copper, iron, lead, mercury), oils and various volatile and semi-volatile organics. Removal of these contaminants to below discharge levels will be accomplished with the CSK treatment system. Unit processes include an oil/water separator, multiple treatment unit (MTU), a multi-media vessel and dual carbon vessels. The MTU consists of pH adjustment, chemical addition, flocculation, and clarification.

Brief Overview of the Treatment Process:

Influent ground water will be pumped from ground water extraction wells by Allied Signal to the CSK system and will collect in the oil/water separator (OWS-10). A bypass of the oil/water separator is provided to run the influent directly to the equalization tank. This bypass would be used if no oils are present. Heavy oils, are collected in a cone bottom, while light oils, greases and solvents are skimmed off the top. Both of these are collected in waste storage drums. Oil free water next is collected in a 2,000 gallon equalization tank (T-10). Two 12.5 gallon per minute centrifugal pumps (P-10 & P-11) transfer the influent to the MTU. In the MTU a coagulant, sodium hydroxide, and a flocculation polymer are added to precipitate out the heavy metals present. These metals will form a solid sludge that collects in the bottom of the clarifier (CL-20). Metals free water will collect in a clearwell (T-20) at the end of the MTU unit. Two 12.5 gallon per minute centrifugal pumps (P-20 & P-21) will pump from the clearwell through a multi-media vessel and two carbon adsorption units. The multi-media vessel will filter out any particulate larger than 10 microns. The carbon adsorption units are piped in series. They will remove any organics present. After the carbon units, the pH of the water is measured, and if the pH is between 6-10, then the treated water will be discharged to the Buffalo River.

The sludge collected in the clarifier will be slowly drawn to the bottom and transferred by a diaphragm pump (P-22) to sludge thickening tank (T-90). After a time period, the sludge will be fed into a filter press for de-watering. The sludge collected in the filter press will be trucked off site for disposal. The water separated from the sludge will be recycled back to the equalization tank for retreatment.

APPENDIX E

BUFFALO COLOR CORPORATION
BSA DISCHARGE PERMIT, CORRESPONDENCE, AND
ESTIMATED DISCHARGE CONCENTRATIONS

**AUTHORIZATION TO DISCHARGE UNDER THE BUFFALO
POLLUTANT DISCHARGE ELIMINATION SYSTEM**

PERMIT NO. 99-05-BU021

In accordance with the provisions of the Federal Water Pollution Control Act, as amended, and the Sewer Regulations of the Buffalo Sewer Authority, authorization is hereby granted to:

BUFFALO COLOR CORPORATION

to discharge wastewater from a facility located at:

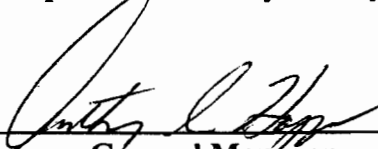
100 LEE STREET, BUFFALO NEW YORK 14210

to the Buffalo Municipal Sewer System.

Issuance of this permit is based upon a permit application filed on **November 20, 1998** and analytical data. This permit is granted in accordance with discharge limitations, monitoring requirements and other conditions set forth in Parts I and II hereof.

Effective this 1st day of June, 1999

To Expire the 31th day of May, 2002



General Manager

Signed this 2nd day of June, 1999

PART I: SPECIFIC CONDITIONS**A. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS**

During the period beginning the effective date of this Permit and lasting until the expiration date, discharge from the permitted facility outfall (see attached map) shall be limited and monitored by the permittee as specified below:

Sample Point	Parameter	Discharge Limitations		Sampling Requirements	
		Daily Maximum	M.A.I.D.* (mg/L)	Type	Frequency
002	pH ⁽¹⁾	5.0 - 12.0 SU		Probe	Continuous
	Total Flow	500,000 gallons		Flow Meter ⁽²⁾	Continuous
	Physical Observations ⁽³⁾	N/A		Grab	Every 15 minutes
	Amenable Cyanide	19.91 lbs.	6.2	Grab ⁽⁷⁾	Monthly
	BOD ₅	250 mg/L ⁽⁴⁾		Composite ⁽⁵⁾	Weekly
	Total Suspended Solids	250 mg/L ⁽⁴⁾		Composite	Monthly
	Total Phosphate	15.35 mg/L ⁽⁴⁾		Composite	Monthly
	Total Phenol ⁽⁶⁾	12.84 lbs.	20.0	Composite	Monthly
	Aniline	1150 lbs.		Composite	Monthly
	N,N'-Dimethylaniline	1150 lbs.		Composite	Monthly
	N-Methylaniline	750 lbs.		Composite	Monthly
	N,N'-Diethylaniline	500 lbs.		Composite	Monthly
	N-Ethylaniline	500 lbs.		Composite	Monthly
	Total Nickel	8.99 lbs.	14.0	Composite	Monthly
	Total Copper	5.14 lbs.	16.0	Composite	Quarterly
	Total Chromium	6.42 lbs.	40.0	Composite	Quarterly
	Purgeables-EPA Test Methods 601 & 602	No Limit		Grab ⁽⁷⁾	Annual
	Base/Neutrals & Acid Extractable-EPA Test Method 625 ⁽⁸⁾	No Limit		Composite	Annual
	Total PCB's - EPA Test Method 608	0.001 lbs.	.002	Composite	Annual

The sampling period for all parameters is a minimum of a one 24 hour day

* M.A.I.D. - Maximum Allowable Instantaneous Discharge - Slug Limit.

SEE PAGE SIX (6) FOR EXPLANATION OF SPECIFIC REQUIREMENTS.

PART I: SPECIFIC CONDITIONS**A. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS (continued)**

The following mass limits apply to the combined discharge of sample points 003 & 004 if and only if, the loading of contaminant(s) at sample location 002 cannot be determined to be in compliance due to elevated limits of detection in the analytical method(s) for any parameters.

The daily maximum and monthly average discharge limitations for the following parameters are the combined total mass based on the average flow of 257,000 gallons/day for SP003 and 123,000 gallons/day for SP004 and the concentrations limits as stated in 40 CFR Part 414.111:

Sample Point	Parameter	Discharge Limitations					Sampling Requirements	
		Daily Max.		Mo. Avg.		M.A.I.D.	Type	Frequency
		ug/L	Lbs.	ug/L	Lbs.			
002	1,1-Dichloroethane	59	0.19	22	0.07		Grab	Quarterly
	1,1-Dichloroethylene	60	0.19	22	0.07		Grab	Quarterly
	1,1,1-Trichloroethane	59	0.19	22	0.07		Grab	Quarterly
	1,1,2-Trichloroethane	127	0.40	32	0.10		Grab	Quarterly
	1,2-Dichlorobenzene	794	2.52	196	0.62		Grab	Quarterly
	1,2-Dichloroethane	574	1.82	180	0.57		Grab	Quarterly
	1,2-Dichloropropane	794	2.52	196	0.62		Grab	Quarterly
	1,2-Trans-Dichloroethylene	66	0.21	180	0.08		Grab	Quarterly
	1,2,4-Trichlorobenzene	10	0.032	10	0.032	0.8	Composite	Quarterly
	1,3-Dichlorobenzene	380	1.2	142	0.45		Grab	Quarterly
	1,3-Dichloropropylene	794	2.52	196	0.62		Grab	Quarterly
	1,4-Dichlorobenzene	380	1.2	142	0.45		Grab	Quarterly
	2-Nitrophenol	231	0.73	65	0.21		Composite	Quarterly
	4-Nitrophenol	576	1.83	162	0.51		Composite	Quarterly
	4,6-Dinitro-o-cresol	277	0.88	78	0.25		Composite	Quarterly
	Acenaphthene	47	0.15	19	0.06		Composite	Quarterly
	Anthracene	47	0.15	19	0.06		Composite	Quarterly
	Benzene	134	0.42	57	0.18		Grab	Quarterly
	Bis (2-ethylhexyl)phthalate	258	0.82	95	0.30		Composite	Quarterly
	Carbon Tetrachloride	380	1.2	142	0.45		Grab	Quarterly
	Chlorobenzene	380	1.2	142	0.45		Grab	Quarterly
	Chloroethane	295	0.93	110	0.35		Grab	Quarterly
	Chloroform	325	1.03	111	0.35	8.5	Grab	Quarterly
	Di-ethylphthalate	113	0.36	46	0.15		Composite	Quarterly
	Di-methylphthalate	47	0.15	19	0.06		Composite	Quarterly
	Di-n-butylphthalate	43	0.14	20	0.06		Composite	Quarterly
	Ethylbenzene	380	1.2	142	0.45		Grab	Quarterly
	Fluoranthene	54	0.17	22	0.07	0.1	Composite	Quarterly

PART I: SPECIFIC CONDITIONS**A. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS (continued)**

Sample Point	Parameter	Discharge Limitations				M.A.I.D.	Sampling Type	Requirements Frequency
		Daily Max.	Mo. Avg.					
		ug/L	Lbs.	ug/L	Lbs.	mg/L		
002	Fluorene	47	0.15	19	0.06		Composite	Quarterly
	Hexachlorobenzene	794	2.52	196	0.62		Composite	Quarterly
	Hexachlorobutadiene	380	1.2	142	0.45		Composite	Quarterly
	Hexachloroethane	794	2.52	196	0.62		Composite	Quarterly
	Methyl Chloride	295	0.93	110	0.35		Grab	Quarterly
	Methylene Chloride	170	0.54	36	0.11		Grab	Quarterly
	Naphthalene	47	0.15	19	0.06		Composite	Quarterly
	Nitrobenzene	3201	10.14	2237	7.09		Composite	Quarterly
	Phenanthrene	47	0.15	19	0.06		Composite	Quarterly
	Pyrene	48	0.15	20	0.06	0.1	Composite	Quarterly
	Tetrachloroethylene	164	0.52	52	0.16		Grab	Quarterly
	Toluene	74	0.23	28	0.09		Grab	Quarterly
	Trichloroethylene	69	0.22	26	0.08		Grab	Quarterly
	Vinyl Chloride	172	0.55	97	0.31		Grab	Quarterly
	Total Lead	690	2.19	320	1.01	65.0	Composite	Quarterly
	Total Zinc	2610	8.27	1050	3.33	25.0	Composite	Quarterly

003&

004 Total Flow

No Limit

Flow meter⁽⁹⁾ Continuous

The sampling period for all parameters is a minimum of a one 24 hour day.

SEE PAGE SIX (6) FOR AN EXPLANATION OF SPECIFIC REQUIREMENTS.

PART I: SPECIFIC CONDITIONS**B. DISCHARGE MONITORING REPORTING REQUIREMENTS**

During the period beginning the effective date of this permit and lasting until the expiration date, discharge monitoring results shall be summarized and reported by the permittee on the days specified below:

Sample Point	Parameter	Reporting Requirements	
		Initial Report	Subsequent Reports
002, 003 & 004	All Analytes* and the Cyanide Treatment Record - except analytes tested annually	July 25, 1999	Every July 25, October 25 January 25, April 25
	EPA Method 601, 602, 608 and 625	July 25, 1999	July 25, 2000, July 25, 2001.

- * pH results of composites only - strip chart reading of SP002 shall be available upon request. These records must be maintained for a minimum of three (3) years, in accordance with 40 CFR Parts 403.12(o) and 403.14(c).

PART I. SPECIFIC CONDITIONS

C. SPECIAL REQUIREMENTS FOR PART 1 A.

- (1) The pH meter must be calibrated and maintained in accordance with the manufacturer's specifications. The calibrations and the person(s) responsible for it must be recorded in a bound logbook. This logbook must be available for BSA inspection at all times.
- (2) All flow meters must be calibrated and certified by a certified manufacturer's representative at least once per year. This report must be submitted with the annual report. All flow meters must be serviced and maintained in accordance with the manufacturer's specifications.
The BSA must be notified of any malfunctions which lasts for more than 24 hours within three (3) days of the malfunction. If a flow meter, especially at SP 002, remains out of service for more than five (5) consecutive days, the permittee must install a temporary meter until such time as the defective meter is repaired or replaced. The BSA at its option, may require a written report on any malfunctions
- (3) All grabs must be saved three days and available for BSA inspection. Four consecutive 15 minute grabs may be composited into one sample bottle.
- (4) Surchargeable limit only.
- (5) All composites shall be flow proportioned.
- (6) EPA Test Method 604.
- (7) Four grab samples must be properly taken and preserved over an equally spaced time period during a normal discharge day. The four grab samples must be flow proportionally composited at a New York State Department of Health certified lab.
- (8) All samples collected for the base neutral and acid extractable EPA analytical test procedures must go through a special cleanup to prevent aniline and aniline derivative interference of the analytical method.
- (9) When sample points 003 & 004 have to be monitored instead of sample point 002, the daily flows for each discharge must be recorded and submitted with the report.

PART I: SPECIFIC CONDITIONS

D. SPECIAL REQUIREMENTS FOR QUARTERLY MONITORING REPORTS OF CYANIDE TREATMENT FOR THE FISHED SALT WASTESTREAM.

The following format must be used to document the sodium hypochlorite addition to the fished salt wastestream and submitted with the quarterly monitoring reports:

QUARTERLY CYANIDE TREATMENT RECORD

1st Month

2nd Month

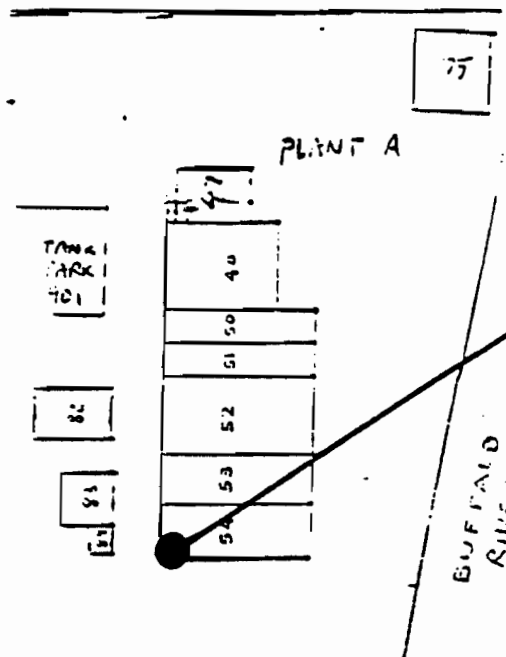
3rd Month

(1)	Days In Month	Days
(2)	Days Operating	Days
(3)	Days Feeding Hypo	Days
(4)	Time Efficiency	(%)
(5)	Hypo Volume added	Gallons
(6)	Hypo Weight added	Lbs NaOCl
(7)	Total Cyanide Equivalent (60%)	Lbs TCN
(8)	Total Cyanide Equivalent Rate	Lbs/Day

SAMPLING

LOCATIONS

SOUTH PARK AVENUE



SAMPLING LOCATION 003

Indoors at the South-West corner of Building 54

Grabs: 2nd floor VT-4 Outlet
pH probe chamber

Continuous: 3rd floor VT-4
top Tygon sampling tube

Sampling personnel must be
accompanied by BCC supervision.

SAMPLING LOCATION 004

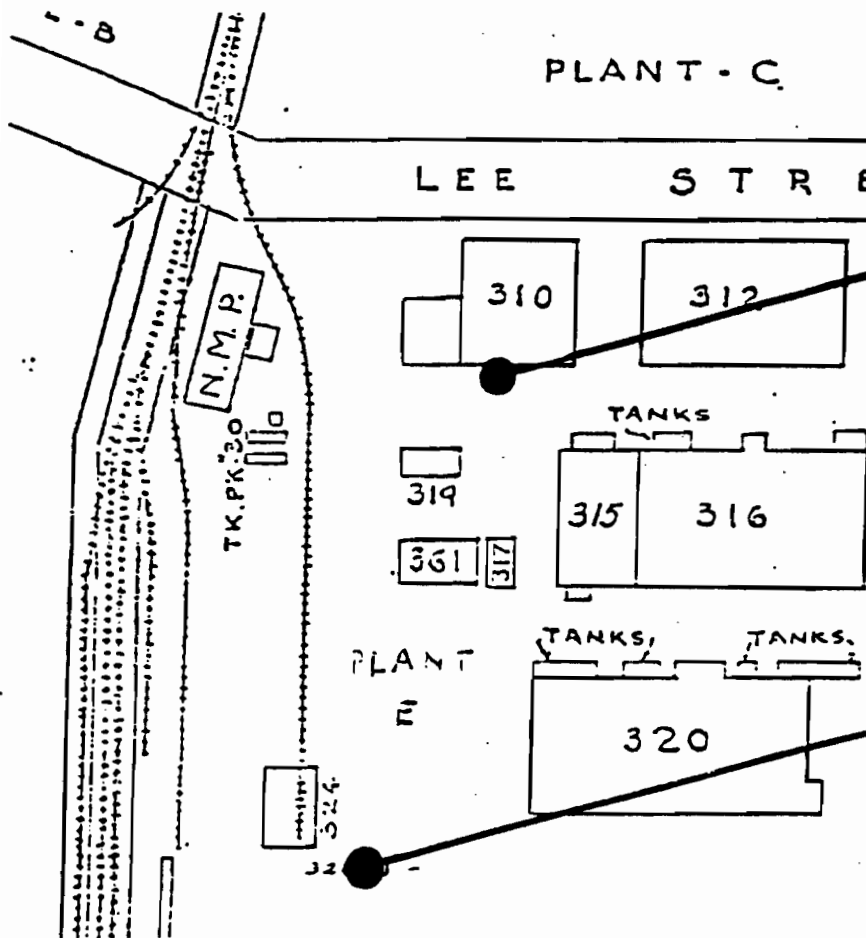
At Separator East of Bldg. 310

Grabs: Dipped through opening
in decking

Continuous: Sampler set up on
decking

PLANT - C

LEE STREET



SAMPLING LOCATION 002

Indoors at Building 326 shed

Grabs and Continuous: at
sampling trough

Scale 150 Feet

BUFFALO POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

PART II: GENERAL CONDITIONS

A. MONITORING AND REPORTING

1. Local Limits

Except as otherwise specified in this permit, the permit holder shall comply with all specific prohibitions, limits on pollutants or pollutant parameters set forth in the Buffalo Sewer Authority Sewer Use Regulations, as amended from time to time, and such prohibitions, limits and parameters shall be deemed pretreatment standards for purposes for the Clean Water Act.

2. Definitions

Definitions of terms contained in this permit are as defined in the Buffalo Sewer Authority Sewer Use Regulations.

3. Discharge Sampling Analysis

All Wastewater discharge samples and analyses and flow measurements shall be representative of the volume and character of the monitored discharge. Methods employed for flow measurements and sample collections and analyses shall conform to the Buffalo Sewer Authority "Sampling Measurement and Analytical Guidelines Sheet".

4. Recording of Results

For each measurement or sample taken pursuant to the requirements of the permit, the permittee shall record the information as required in the "Sampling Measurement and Analytical Guidelines Sheet".

5. Additional Monitoring by Permittee

If the permittee monitors any pollutants at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified in 40CFR136 the results of such monitoring shall be included in the calculation and reporting of values required under Part I,B. Such increased frequency shall also be indicated.

6. Reporting

All reports prepared in accordance with this Permit shall be submitted to:

**Industrial Waste Section
Buffalo Sewer Authority Treatment Plant
90 West Ferry Street
Buffalo, New York 14213**

All self monitoring reports shall be prepared in accordance with the BSA "Sampling Measurement and Analytical Guidelines Sheet". These reporting requirements shall not relieve the permittee of any other reports which may be required by the N.Y.S.D.E.C. or the U.S.E.P.A.

B. PERMITTEE REQUIREMENTS

1. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit and with the information contained in the BPDES permit application on which basis this permit is granted. In the event of any facility expansions, production increases, process modifications or the installation, modification or repair of any pretreatment equipment which may result in new, different or increased discharges of pollutants, a new BPDES Permit application must be submitted prior to any change. Following receipt of an amended application, the BSA may modify this permit to specify and limit any pollutants not previously limited. In the event that the proposed change will be covered under an applicable Categorical Standard, a Baseline Monitoring Report must be submitted at least ninety (90) days prior to any discharge.

2. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed, calibration and maintenance of instrumentation, and recordings from continuous monitoring instrumentation shall be retained at this facility for a minimum of three (3) years, or longer if requested by the General Manager.

3. Notification of Slug, Accidental Discharge or Spill

In the event that a slug, accidental discharge or any spill occurs at the facility for which this permit is issued, it is the responsibility of the permittee to immediately notify the B.S.A. Treatment Plant at 883-1820 or 853-2459 of the quantity and character of such discharge. If requested by the B.S.A., within five (5) days following all such discharges, the permittee shall submit a report describing the character and duration of the discharge, the cause of the discharge, and measures taken or that will be taken to prevent a recurrence of such discharge.

4. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any discharge limitation specified in this permit, the permittee or their assigns must verbally notify the Industrial Waste Section at 883-1820 within twenty-four (24) hours

of becoming aware of the violation. The permittee shall provide the Industrial Waste Section with the following information, in writing, within five (5) days of becoming aware of such condition:

- a. a description of the discharge and cause of noncompliance and;
- b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

5. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the Buffalo Sewerage System resulting from noncompliance with any discharge limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

6. Waste Residuals

Solids, sludges, filter backwash or other pollutants removed in the course of treatment or control of wastewaters and/or the treatment of intake waters, shall be disposed of in a manner such as to prevent any pollutant from such materials from entering the Buffalo Sewer System.

7. Power Failures

In order to maintain compliance with the discharge limitations and prohibitions of this permit, the permittee shall provide an alternative power source sufficient to operate the wastewater control facilities; or, if such alternative power source is not provided the permittee shall halt, reduce or otherwise control production and/or controlled discharges upon the loss of power to the wastewater control facilities.

8. Treatment Upsets

- a. Any industrial user which experiences an upset in operations that places it in a temporary state of noncompliance, which is not the result of operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation, shall inform the Industrial Waste Section immediately upon becoming aware of the upset. Where such information is given verbally, a written report shall be filed by the user within five (5) days. The report shall contain:
 - (i) A description of the upset, its cause(s) and impact on the discharger's compliance status.

- (ii) The duration of noncompliance, including exact dates and times of noncompliance, and if the non-compliance is continuing, the time by which compliance is reasonably expected to be restored
 - (iii) All steps taken or planned to reduce, eliminate, and prevent recurrence of such an upset.
- b. An industrial user which complies with the notification provisions of this Section in a timely manner shall have an affirmative defense to any enforcement action brought by the Industrial Waste Section for any noncompliance of the limits in this permit, which arises out of violations attributable to and alleged to have occurred during the period of the documented and verified upset.

9. Treatment Bypasses

- a. A bypass of the treatment system is prohibited unless the following conditions are met:
 - (i) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; or
 - (ii) There was no feasible alternative to the bypass, including the use of auxiliary treatment or retention of the wastewater; and
 - (iii) The industrial user properly notified the Industrial Waste Section as described in paragraph b. below.
- b. Industrial users must provide immediate notice to the Industrial Waste Section upon discovery of an unanticipated bypass. If necessary, the Industrial Waste Section may require the industrial user to submit a written report explaining the cause(s), nature, and duration of the bypass, and the steps being taken to prevent it's recurrence.
- c. An industrial user may allow a bypass to occur which does not cause pretreatment standards or requirements to be violated, but only if it is for essential maintenance to ensure efficient operation of the treatment system. Industrial users anticipating a bypass must submit notice to the Industrial Waste Section at least ten (10) days in advance. The Industrial Waste Section may only approve the anticipated bypass if the circumstances satisfy those set forth in paragraph a. above.

C. PERMITTEE RESPONSIBILITIES

1. Permit Availability

The originally signed permit must be available upon request at all times for review at the address stated on the first page of this permit.

2. Inspections

The permittee shall allow the General Manager of the Buffalo Sewer Authority and/or his authorized representatives, upon the presentation of credentials and during normal working hours or at any other reasonable times, to have access to and copy any records required in this permit; and to sample any discharge of pollutants.

3. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities for which this permit has been issued the permit shall become null and void. The succeeding owner shall submit a completed Buffalo Sewer Authority permit application prior to discharge to the sewer system.

D. PERMITTEE LIABILITIES

1. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to the following:

- a. Violation of any terms or conditions of this permit,
- b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts,
- c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

2. Imminent Danger

In the event there exists an imminent danger to health or property, the permitter reserves the right to take immediate action to halt the permitted discharge to the sewerage works.

3. Civil and Criminal Liability

Nothing in this permit shall relieve the permittee from any requirements, liabilities, or penalties under provisions of the "Sewer Regulations of the Buffalo Sewer Authority" or any Federal, State and/or local laws or regulations.

E. NATIONAL PRETREATMENT STANDARDS

If a pretreatment standard or prohibition (including any Schedule of Compliance specified in such pretreatment standard or prohibition) is established under Section 307 (b) of the Act for a pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with such pretreatment standard or prohibition.

F. PLANT CLOSURE

In the event of plant closure, the permittee is required to notify the Industrial Waste Section or in writing as soon as an anticipated closure date is determined, but in no case later than five days of the actual closure.

G. CONFIDENTIALITY

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Buffalo Sewer Authority. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

H. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.



p.o. box 7027 / buffalo, new york 14240-7027
716-827-4500

GOLDER ASSOCIATES		
REC'D	PN	
	FN	
CC	DEC 8 1999	ROUTE
BUFFALO, NY		

December 3, 1999

Mr. James Caruso
Buffalo Sewer Authority
90 West Ferry Street
Buffalo, NY 14213-1799

Dear Mr. Caruso,

This is to confirm our telephone conversation on November 12. As part of its Corrective Measures Study (CMS) now nearing completion, Buffalo Color Corporation is searching for cost-effective means to remediate environmental impact related to migration of groundwater. Preliminary results from modeling under various scenarios have indicated that, while groundwater from Areas B, C, and E is not migrating to the Buffalo River, a series of extraction wells placed roughly parallel to the bank could completely intercept riverward migration from Area A while generating an average pumped volume of 16-48 gallons per minute.

As we discussed, Buffalo Color is seeking agreement from the BSA that the next revision of its BPDES Permit (No. 99-05-BU021 expiring May 31, 2002) include provisions for the discharge of extracted groundwater into its process waste sewer in Area A. From your comments, Buffalo Color understands that any such arrangement is subject to the following requirements:

- (1) That NYSDEC grant prior approval. It is understood that this proposal will be discussed with the state and their consent in principle would be obtained.
- (2) That a continuous flow meter with an integrator would be constructed in the extracted groundwater sewer line such that the additional flow to the BSA could be measured, billed, and included in the calculation of contaminant loadings.

- (3) That the discharged groundwater be monitored (at tentative new sampling location S/L 005) for those contaminants regulated under 40 CFR 414 at the same times and frequencies as the total discharge (at S/L 002).
- (4) That the discharged groundwater also be monitored for any additional contaminants regulated under the BSA Sewer Ordinance at the same times and frequencies as the total discharge.
- (5) That the *allowable* loading discharged to the BSA at S/L 002 for each of the contaminants regulated under 40 CFR 414 be calculated so as to prevent the groundwater from acting as dilution water - by multiplying the concentration limits in the federal rule times the sum of the average flows at processing area sampling locations S/L 003 and S/L 004 less the average flow from the groundwater S/L 005.

Groundwater---(S/L 005)---\

Indigo Process W.Water-----\---(S/L 003)-----\

Building 312 W.Water-----\---(S/L 004)---\

Power, Other Services W.Water-----\---(S/L 002)---BSA

- (6) That the *allowable* loading discharged to the BSA at S/L 002 for each of any other contaminants regulated under the BSA Sewer Ordinance be determined by means of the Sewer Authority's formal mass allocation procedure.
- (7) That the *reportable* loading discharged to the BSA for each of the contaminants regulated under either 40 CFR 414 be calculated by subtracting the groundwater component (concentration times measured flow at S/L 005) from the gross loading (concentration times measured combined flows at S/L 002).
- (8) That discharge of extracted groundwater into Buffalo Color's process waste sewer be halted during events of combined sewer overflow (CSO) into the Buffalo River at the BSA outfall at the foot of Babcock Street.

Attached are tables showing the results of groundwater monitoring in Area A collected as part of the RCRA Facility Investigation (RFI) together with calculations converting them into expected mass loadings to the BSA for two cases:

- * No barrier to Buffalo River in-migration yielding an average pumped flow to the BSA of 30 gallons per minute of groundwater extracted from Area A
- * Barrier preventing Buffalo River in-migration yielding an average flow to the BSA of 10 gallons per minute of groundwater extracted from Area A

In our conversation you mentioned that it may take several weeks for the NYSDEC to review this option. We would appreciate your promptness in forwarding it to them with your recommendations. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "David E. Sauer", written over a horizontal line.

David E. Sauer

Senior Environmental Engineer

cc: P. Mescall
W. Garrow
D. Darragh (Buchanan-Ingersoll)
D. Paley (Allied-Signal)
✓ B. Senefelder (Golder)
3.4.1.7
4.3.5.32

TABLE
BUFFALO COLOR CORPORATION
GROUND WATER QUALITY COMPARED TO BSA DISCHARGE LIMITS
(ROUND 1 - JUNE 1996)
SHALLOW AQUIFER - WITHOUT BARRIER
(DETECTIONS ONLY)

Analytes (Organic Volatiles)	Sample Identification (Detection Only)				Area A (mg/l)	Estimated Conc. (mg/l) 60% dilution	Estimated Loading (lbs./day) @30 gpm	BSA Discharge Limits			
	RF122 Area A	RF124 Area A	RF125 Area A	RF126 Area A				(mg/l)	(lbs./day)	(mg/l)	(lbs./day)
Organic Compounds											
BENZENE	0.046	0.014			0.0163	0.0065	0.0023	0.0570	0.18	0.134	0.42
CHLOROBENZENE	0.26		4.6	5.2	2.5156	1.0063	0.3608	0.142	0.45	0.38	1.20
ETHYLBENZENE	0.1				0.0269	0.0108	0.0039	0.142	0.45	0.38	1.20
TETRACHLOROETHENE					0.0025	0.0010	0.0004	0.052	0.16	0.164	0.52
TOLUENE	0.0062	0.0065			0.0044	0.0018	0.0006	0.028	0.09	0.074	0.23
M+P-XYLENE	0.04				0.0119	0.0048	0.0017	-	-	-	-
O-XYLENE	0.033				0.0101	0.0041	0.0015	-	-	-	-
Organic Compounds											
ACENAPHTHENE	0.0061	0.02	0.01		0.0097	0.0039	0.0014	0.019	0.06	0.047	0.15
ANILINE	0.29	2.3	1.6	13	4.2975	1.7190	0.6164			276	1150
ANTHRACENE		0.0078			0.0038	0.0015	0.0005	0.019	0.06	0.047	0.15
BUTYL BENZYL PHTHALATE					0.0025	0.0010	0.0004	-	-	-	-
CARBAZOLE		0.022			0.0074	0.0030	0.0011	-	-	-	-
4-CHLOROANILINE			0.023		0.0076	0.0031	0.0011	-	-	-	-
2-CHLOROPHENOL			0.01		0.0063	0.0025	0.0009	-	-	20	12.84
CHRYSENE		0.0051			0.0032	0.0013	0.0005	-	-	-	-
DIBENZOFURAN	0.0071	0.018			0.0075	0.0030	0.0011	-	-	-	-
1,2-DICHLOROBENZENE			0.052		0.0149	0.0060	0.0021	0.196	0.62	0.794	2.52
1,3-DICHLOROBENZENE			0.0058		0.0033	0.0013	0.0005	0.142	0.45	0.38	1.2
1,4-DICHLOROBENZENE			0.046		0.0134	0.0054	0.0019	0.142	0.45	0.38	1.2
N,N-DIETHYLANILINE			0.014		0.0073	0.0029	0.0010	-	-	0.119	500
DIETHYL PHTHALATE					0.0025	0.0010	0.0004	0.0460	0.1500	0.113	0.3600
N,N-DIMETHYLANILINE	0.031	0.088			0.0323	0.0129	0.0046	-	-	0.276	1150
BIS(2-ETHYLHEXYL)PHTHALATE	0.007		0.009		0.0059	0.0024	0.0008	0.0950	0.30	0.258	0.82
FLUORANTHENE		0.015	0.01		0.0075	0.0030	0.0011	0.022	0.07	0.054	0.17
N-METHYLANILINE		0.16			0.0419	0.0168	0.0060	-	-	180	750
NAPHTHALENE	0.087	0.072	0.012		0.0434	0.0174	0.0062	0.019	0.06	0.047	0.15
1-NAPHTHYLAMINE		0.5	0.045		0.1388	0.0555	0.0199	-	-	-	-
2-NAPHTHYLAMINE		0.073	0.016		0.0248	0.0099	0.0035	-	-	-	-
NITROBENZENE					0.0025	0.0010	0.0004	2.237	7.09	3.2	10.14
N-NITROSODIPHENYLAMINE		0.091	0.036		0.0330	0.0132	0.0047	-	-	-	-
PHENANTHRENE		0.019			0.0066	0.0027	0.0010	0.019	0.06	0.047	0.15
PYRENE		0.011	0.0061		0.0055	0.0022	0.0008	0.020	0.06	0.048	0.15
O+P-TOLUIDINE	0.051	0.14	0.034		0.0563	0.0225	0.0081	-	-	-	-
1,2,4-TRICHLOROBENZENE		0.0025	0.0025		0.0025	0.0010	0.0004	0.010	0.03	0.01	0.03

TABLE
BUFFALO COLOR CORPORATION
GROUND WATER QUALITY COMPARED TO BSA DISCHARGE LIMITS
(ROUND 1 - JUNE 1996)
SHALLOW AQUIFER - WITHOUT BARRIER
(DETECTIONS ONLY)

Analytes (BS)	BSA Discharge Limits (Round 1 - June 1996)					Estimated Conc.	Estimated Loading	BSA Discharge Limits	
	RF122	RF124	RF125	RF126	RF127			RF128	RF129
Metals									
ALUMINUM	45.4	71.2	27.8	6.06	37.6150	-60% dilution 15.0460	@30 gpm 5.3949	-	-
ARSENIC	0.0638	0.169	0.0828	0.819	0.2837	0.1135	0.0407	-	-
BARIUM	4.66	0.311	0.297	0.216	1.3710	0.5484	0.1966	-	-
CADMIUM	0.103				0.0276	0.0111	0.0040	-	-
CHROMIUM	0.398	0.147	0.358	0.217	0.2800	0.1120	0.0402	-	40
COBALT		0.0682			0.0189	0.0076	0.0027	-	-
COPPER	1.02	0.358	0.126	0.0498	0.3885	0.1554	0.0557	-	16
IRON	101	225	78.7	20.2	106.2250	42.4900	15.2352	-	-
LEAD	1.27	0.377	0.0799		0.4324	0.1729	0.0620	0.32	1.01
MANGANESE	0.413	2.38	2.3	0.282	1.3438	0.5375	0.1927	-	-
MERCURY	0.00306	0.00344		0.00187	0.0021	0.0009	0.0003	-	-
NICKEL	0.197	0.217	0.0765	0.0526	0.1358	0.0543	0.0195	-	14
VANADIUM	0.18	0.182	0.064	0.648	0.2685	0.1074	0.0385	-	-
ZINC	1.85	1.22	0.63	0.2	0.9750	0.3900	0.1398	1.050	3.33
Non-Metals									
CHLORIDE	189	118	238	1050	398.75	159.50	57.1903	-	-
TOTAL CYANIDE	0.894	0.103	0.0192	6.56	1.89	0.76	0.2717	-	6.2
TOTAL DISSOLVED SOLIDS	NA	884	NA	NA	221.00	88.40	31.6967	-	-
TOTAL HARDNESS	NA	695	NA	NA	173.75	69.50	24.9199	-	-
HEXAVALENT CHROMIUM	0.0253	0.0297			0.02	0.01	0.0023	-	-
NITRATE NITROGEN	0.226		0.354	0.0939	0.17	0.07	0.0251	-	-
NITRATE/NITRITE NITROGEN	0.226		0.354	0.0939	0.17	0.07	0.0251	-	-
NITRITE NITROGEN					0.01	0.00	0.0014	-	-
pH	9.3	10.6	8.2	10.8	9.73	-	-	-	5.0-12.0
TOTAL PHOSPHORUS	18.8	9.3	1.6	13	10.68	4.27	1.5311	-	15.35
SULFATE	690	25.9	518	560	448.48	179.39	64.3221	-	-
TOTAL SULFIDE	0.5	2.7	5.4	44.8	13.35	5.34	1.9147	-	-

Notes: (1) Analysis performed in accordance with USEPA Methods identified in Quality Assurance Project Plan (Golder Associates, Inc. 1995).

(2) Detections only reported.

(3) Non-detect values (blank cells) considered as 1/2 the detection limit for calculating average concentrations.

(4) Buffalo Color Discharge Point 002/003/004 limitations from Buffalo Sewer Authority Permit No. 99-05-BU021 effective for Class GA groundwaters as amended, June 1999.

Analytes, concentrations, and limits italicized regulated under 40CFR 414.

pH determined by field measurement

(-) = No standard

Estimated loading calculated by: $\text{mg/L} \times 3.785\text{L/gal} \times \text{g/1000mg} \times \text{lb/453.6g} \times 30 \text{ gal/min} \times 1440 \text{ min/day} = \text{lb/day}$

TABLE
BUFFALO COLOR CORPORATION
GROUND WATER QUALITY COMPARED TO BSA DISCHARGE LIMITS
(ROUND 1 - JUNE 1996)
SHALLOW AQUIFER - WITH BARRIER
(DETECTIONS ONLY)

Analytes (p)	Sample Results (ppm) (Detection Limit)				Actual Avg. Conc. (mg/l)	Estimated Loading (lbs./day) @ 10 gpm	BSA Discharge Limits			
	RF122 AREA A	RF124 AREA A	RF125 AREA A	RF126 AREA A			(mg/l)	(lbs./day)	(mg/l)	(lbs./day)
Organic Compounds										
BENZENE	0.046	0.014			0.0163	0.0019	0.0570	0.18	0.134	0.42
CHLOROBENZENE	0.26		4.6	5.2	2.5156	0.3007	0.142	0.45	0.38	1.20
ETHYLBENZENE	0.1				0.0269	0.0032	0.142	0.45	0.38	12.00
TETRACHLOROETHENE					0.0025	0.0003	0.052	0.16	0.164	0.52
TOLUENE	0.0062	0.0065			0.0044	0.0005	0.028	0.09	0.074	0.23
M+P-XYLENE	0.04				0.0119	0.0014	-	-	-	-
O-XYLENE	0.033				0.0101	0.0012	-	-	-	-
Semi-Volatile Organic Compounds										
ACENAPHTHENE	0.0061	0.02	0.01		0.0097	0.0012	0.019	0.06	0.047	0.15
ANILINE	0.29	2.3	1.6	13	4.2975	0.5136			276	1150
ANTHRACENE		0.0078			0.0038	0.0005	0.019	0.06	0.047	0.15
BUTYL BENZYL PHTHALATE					0.0025	0.0003	-	-	-	-
CARBAZOLE		0.022			0.0074	0.0009	-	-	-	-
4-CHLOROANILINE			0.023		0.0076	0.0009	-	-	-	-
2-CHLOROPHENOL			0.01		0.0063	0.0007	-	-	20	12.84
CHRYSENE		0.0051			0.0032	0.0004	-	-	-	-
DIBENZOFURAN	0.0071	0.018			0.0075	0.0009	-	-	-	-
1,2-DICHLOROBENZENE			0.052		0.0149	0.0018	0.196	0.62	0.794	2.52
1,3-DICHLOROBENZENE			0.0058		0.0033	0.0004	0.142	0.45	0.38	1.2
1,4-DICHLOROBENZENE			0.046		0.0134	0.0016	0.142	0.45	0.38	1.2
N,N-DIETHYLANILINE			0.014		0.0073	0.0009	-	-	0.119	500
DIETHYLPHTHALATE					0.0025	0.0003	0.0460	0.1500	0.113	0.3600
N,N-DIMETHYLANILINE	0.031	0.088			0.0323	0.0039	-	-	0.276	1150
BIS(2-ETHYLHEXYL)PHTHALATE	0.007		0.009		0.0059	0.0007	0.0950	0.30	0.258	0.82
FLUORANTHENE		0.015	0.01		0.0075	0.0009	0.022	0.07	0.054	0.17
N-METHYLANILINE		0.16			0.0419	0.0050	-	-	180	750
NAPHTHALENE	0.087	0.072	0.012		0.0434	0.0052	0.019	0.06	0.047	0.15
1-NAPHTHYLAMINE		0.5	0.045		0.1388	0.0166	-	-	-	-
2-NAPHTHYLAMINE		0.073	0.016		0.0248	0.0030	-	-	-	-
NITROBENZENE					0.0025	0.0003	2.237	7.09	3.2	10.14
N-NITROSODIPHENYLAMINE		0.091	0.036		0.0330	0.0039	-	-	-	-
PHENANTHRENE		0.019			0.0066	0.0008	0.019	0.06	0.047	0.15
PYRENE		0.011	0.0061		0.0055	0.0007	0.020	0.06	0.048	0.15
O+P-TOLUIDINE	0.051	0.14	0.034		0.0563	0.0067	-	-	-	-
1,2,4-TRICHLOROBENZENE					0.0025	0.0003	0.01	0.032	0.01	0.032

TABLE
BUFFALO COLOR CORPORATION
GROUND WATER QUALITY COMPARED TO BSA DISCHARGE LIMITS
(ROUND 1 - JUNE 1996)
SHALLOW AQUIFER - WITH BARRIER
(DETECTIONS ONLY)

Analytes (in) MEANS	Sample Identification Concentrations (mg/L)					Estimated Loading @ 10 gpm	BSA Discharge Limits		
	RF122	RF124	RF125	RF126			mg/L	MOVA	BSA
ALUMINUM	45.4	71.2	27.8	6.06		37.6150	-	-	-
ARSENIC	0.0638	0.169	0.0828	0.819		0.2837	-	-	-
BARIUM	4.66	0.311	0.297	0.216		1.3710	-	-	-
CADMIUM	0.103					0.0276	-	-	-
CHROMIUM	0.398	0.147	0.358	0.217		0.2800	-	-	40
COBALT		0.0682				0.0189	-	-	-
COPPER	1.02	0.358	0.126	0.0498		0.3885	-	-	16
IRON	101	225	78.7	20.2		106.2250	-	-	-
LEAD	1.27	0.377	0.0799			0.4324	0.0517	1.01	0.69
MANGANESE	0.413	2.38	2.3	0.282		1.3438	0.1606	-	-
MERCURY	0.00306	0.00344		0.00187		0.0021	0.0003	-	-
NICKEL	0.197	0.217	0.0765	0.0526		0.1358	0.0162	-	14
VANADIUM	0.18	0.182	0.064	0.648		0.2685	0.0321	-	-
ZINC	1.85	1.22	0.63	0.2		0.9750	0.1165	1.050	2.61
Inorganic									
CHLORIDE	189	118	238	1050		398.75	47.6586	-	-
TOTAL CYANIDE	0.894	0.103	0.0192	6.56		1.89	0.2264	-	6.2
TOTAL DISSOLVED SOLIDS	NA	884	NA	NA		221.00	26.4139	-	-
TOTAL HARDNESS	NA	695	NA	NA		173.75	20.7666	-	-
HEXAVALENT CHROMIUM	0.0253	0.0297				0.02	0.0019	-	-
NITRATE NITROGEN	0.226		0.354	0.0939		0.17	0.0209	-	-
NITRATE/NITRITE NITROGEN	0.226		0.354	0.0939		0.17	0.0209	-	-
NITRITE NITROGEN						0.01	0.0012	-	-
pH	9.3	10.6	8.2	10.8		9.73	-	-	5.0-12.0
TOTAL PHOSPHORUS	18.8	9.3	1.6	13		10.68	1.2759	-	15.35
SULFATE	690	25.9	518	560		448.48	53.6017	-	-
TOTAL SULFIDE	0.5	2.7	5.4	44.8		13.35	1.5956	-	-

Notes: (1) Analysis performed in accordance with USEPA Methods identified in Quality Assurance Project Plan (Golder Associates, Inc. 1995).

(2) Detections only reported.

(3) Non-detect values (blank cells) considered as 1/2 the detection limit for calculating average concentrations.

(4) Buffalo Color Discharge Point 002/003/004 limitations from Buffalo Sewer Authority Permit No. 99-05-BU021 effective for Class GA groundwaters as amended, June 1999.

Analytes, concentrations, and limits italicized regulated under 40CFR 414.

pH determined by field measurement

(-) = No standard

Estimated loading calculated by: $\text{mg/L} \times 3.785 \text{ L/gal} \times \text{g/1000mg} \times \text{lb/453.6g} \times 10 \text{ gal/min} \times 1440 \text{ min/day} = \text{lb/day}$



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716-827-4500

January 14, 2000

Mr. James Kruszka
Buffalo Sewer Authority
90 West Ferry Street
Buffalo, NY 14213

Dear Mr. Kruszka,

GOLDER ASSOCIATES		
EC'D	PN	
	FN	
CC	JAN 9 2000	ROUTE
BUFFALO, NY		

These are Buffalo Color's comments to Mr. Caruso's letter of December 30, 1999 presenting a draft B.P.D.E.S. Permit No. 99-12-BU021 and to your fax of January 13, 2000 concerning revised language in the draft revision. Reference is also made to my letter to Mr. Caruso of December 3, 1999 concerning provision for the discharge of extracted groundwater into Buffalo Color's process waste sewer in the next revision of BCC's permit.

Attached are proposed changes and additions to the text of the permit.

Given its current financial condition, resolution of the terms and conditions under which pumped groundwater will be handled in the future is considered a critical issue by Buffalo Color Corporation.

If there are any questions, please feel free to call me at 827-4525. Thank you.

Sincerely,

David E. Sauer
Senior Environmental Engineer

cc: E. Schultz
M. Lindaman
D. Darragh (Buchanan-Ingersoll)
D. Paley (Honeywell)
✓ B. Senefelder (Golder)
3.4.1.7 and 4.3.5.32

DRAFT B.P.D.E.S. PERMIT NUMBER 99-12-BU021
Proposed Changes and Additions

Page 2 Table - change item in the table of the draft:

<u>Sample Point</u>	<u>Parameter</u>	<u>Discharge Limitations</u>	<u>Sampling Requirements Type</u>	<u>Frequency</u>
002	Total Flow	572,000 gallons	Flow Meter ⁽²⁾	Continuous

Page 3 1st Paragraph - insert before the 1st sentence of the revised draft:

The following mass loading limits apply at sampling point 002.

Page 3 1st Paragraph - insert after 1st sentence of the revised draft:

If the loading of any of the following parameters at sampling location 002 and/or at sampling locations 003 and 004 cannot be determined to be in compliance due to elevated concentrations from the discharge of groundwater pumped into the plant sewer system from beneath the facility, the net loading will be reported. The net loading will be calculated by subtracting the groundwater loading simultaneously metered, sampled, and analyzed at (groundwater) sampling location 005 from the loading at sampling location 002 and/or sampling locations 003 and 004. The groundwater loading from sampling location 005 will also be reported.

Page 4 Table - insert before note at end of table of the draft:

<u>Sample Point</u>	<u>Parameter</u>	<u>Discharge Limitations</u>	<u>Sampling Requirements Type</u>	<u>Frequency</u>
005 ⁽¹¹⁾	Flow	72,000 gal/day	Flow Meter ⁽¹⁰⁾	Continuous

Page 5 Table - change item in the table of the draft:

<u>Sample Point</u>	<u>Parameter</u>	<u>Reporting Requirements</u>	
		<u>Initial Report</u>	<u>Subsequent Reports</u>
002, 003, 004, & 005	All Analytes* and the Cyanide Treatment Record - except those analytes tested annually	January 31, 2000	Every April 30, July 31, October 31, & January 31

Page 6 Special Requirements - change or add items in the draft:

- (10) When sample points 003 & 004 and/or 005 have to be monitored instead of or in addition to sample point 002, the daily flows for each discharge must be recorded and submitted with the report.
- (11) A groundwater metering and sampling station (sampling location 005) is to be constructed on the basis of a remediation program currently under negotiation between Buffalo Color and NYSDEC. Buffalo Color will supply a modified "Sampling Locations" drawing prior to activation of groundwater pumping activities.

BUFFALO SEWER AUTHORITY

WASTEWATER TREATMENT PLANT



Anthony A. Hazzan
General Manager

Daniel Bentivogli
Treatment Plant Superintendent

Anthony J. Barone
Director of Sewer Maintenance

December 30, 1999

Mr. David Sauer
Manager Environmental Affairs
Buffalo Color Corporation
P.O. Box 7027
Buffalo, New York 14240

Re: Draft B.P.D.E.S. Permit 99-12-BU021

Dear Mr. Sauer:

Recently, a USEPA representative inspected your facility. In accordance with the inspector's report dated September 16, 1999 and your response dated October 11, 1999, we have re-calculated Buffalo Color's categorical discharge limits using a daily average flow of 334,000 gallons.

Enclosed is a draft B.P.D.E.S. Permit No. 99-12-BU021 which incorporates the new discharge limits. You will note that EPA Test Methods 601 and 602 have been replaced with EPA Test Method 624.

Please review this draft carefully. Any comments must be submitted by January 12, 2000. If we do not hear from you by this date, this permit will become final.

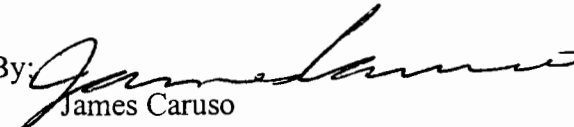
If you have any questions, please call Mr. James L. Kruszka at 883-1820 ext. 256.

Very truly yours,

BUFFALO SEWER AUTHORITY

Anthony A. Hazzan
General Manager

By:


James Caruso
Associate Chemist
Industrial Waste Section

JC:JK:ks

Enc.

cc: D. Bentivogli
I:\WPDOCS\UK\LTR\DBCC

**AUTHORIZATION TO DISCHARGE UNDER THE BUFFALO
POLLUTANT DISCHARGE ELIMINATION SYSTEM**

PERMIT NO. 99-12-BU021

DRAFT

In accordance with the provisions of the Federal Water Pollution Control Act, as amended, and the Sewer Regulations of the Buffalo Sewer Authority, authorization is hereby granted to:

BUFFALO COLOR CORPORATION

to discharge wastewater from a facility located at:

100 LEE STREET, BUFFALO NEW YORK 14210

to the Buffalo Municipal Sewer System.

Issuance of this permit is based upon a permit application filed on **November 20, 1998** and analytical data. This permit is granted in accordance with discharge limitations, monitoring requirements and other conditions set forth in Parts I and II hereof.

Effective this 15th day of January, 2000

To Expire the 14th day of January, 2003

General Manager

Signed this _____ day of _____, 19

PART I: SPECIFIC CONDITIONS**A. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS**

During the period beginning the effective date of this Permit and lasting until the expiration date, discharge from the permitted facility outfall (see attached map) shall be limited and monitored by the permittee as specified below:

Sample Point	Parameter	Discharge Limitations			Sampling Requirements	
		Daily Max. (mg/L)	Mo. Avg.	M.A.I.D.*	Type	Frequency
002	pH ⁽¹⁾	5.0 - 12.0 SU			Probe	Continuous
	Total Flow	500,000 gallons			Flow Meter ⁽²⁾	Continuous
	Physical Observations ⁽³⁾	N/A			Grab	Every 15 minutes
	Amenable Cyanide	24.3 lbs.	17.1 lbs	6.2	Grab ⁽⁸⁾	Monthly
	BOD ₅	250 mg/L ⁽⁴⁾			Composite ⁽⁵⁾	Weekly
	Total Suspended Solids	250 mg/L ⁽⁴⁾			Composite	Monthly
	Total Phosphate	15.35 mg/L ⁽⁴⁾			Composite	Monthly
	Total Phenol ⁽⁶⁾	12.84 lbs.		20.0	Composite	Monthly
	Aniline	1150 lbs.			Composite	Monthly
	N,N'-Dimethylaniline	750 lbs.			Composite	Monthly
	N-Methylaniline	1150 lbs.			Composite	Monthly
	N,N'-Diethylaniline	500 lbs.			Composite	Monthly
	N-Ethylaniline	500 lbs.			Composite	Monthly
	Total Nickel	8.99 lbs.		14.0	Composite	Monthly
	Total Copper	5.14 lbs.		16.0	Composite	Quarterly
	Total Chromium	6.42 lbs.		40.0	Composite	Quarterly
	Purgeables-EPA Test Method 624	No Limit ⁽⁷⁾			Grab ⁽⁸⁾	Annual
	Base/Neutrals & Acid Extractable-EPA Test Method 625 ⁽⁹⁾	No Limit ⁽⁷⁾			Composite	Annual
	Total PCBs - EPA Test Method 608	0.0008 lbs.		.002	Composite	Annual

The sampling period for all parameters is a minimum of a one 24 hour day

* M.A.I.D. - Maximum Allowable Instantaneous Discharge - Slug Limit.

SEE PAGE SIX (6) FOR EXPLANATION OF SPECIFIC REQUIREMENTS.

PART I: SPECIFIC CONDITIONS**A. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS (continued)**

The following mass limits apply to the combined discharge of sample points 003 & 004 if and only if, the loading of any contaminant at sample location 002 cannot be determined to be in compliance due to elevated limits of detection in the analytical method(s) for such contaminant.

The daily maximum and monthly average discharge limitations for the following parameters are the combined total mass based on the combined average flow of 334,000 gpd for SP003 & SP004 and the concentration limits as stated in 40 CFR Part 414.111:

Sample Point	Parameter	Discharge Limitations				M.A.I.D. mg/L	Sampling Requirements		
		Daily Max.		Mo. Avg.			Type	Frequency	
		ug/L	Lbs.	ug/L	Lbs.				
002	1,1-Dichloroethane	59	0.164	22	0.061	0.8	Grab	Quarterly	
	1,1-Dichloroethylene	60	0.167	22	0.061		Grab	Quarterly	
	1,1,1-Trichloroethane	59	0.164	22	0.061		Grab	Quarterly	
	1,1,2-Trichloroethane	127	0.354	32	0.089		Grab	Quarterly	
	1,2-Dichlorobenzene	794	2.212	196	0.546		Grab	Quarterly	
	1,2-Dichloroethane	574	1.599	180	0.501		Grab	Quarterly	
	1,2-Dichloropropane	794	2.212	196	0.546		Grab	Quarterly	
	1,2-Trans-Dichloroethylene	66	0.184	180	0.070		Grab	Quarterly	
	1,2,4-Trichlorobenzene	10	0.028	10	0.028		Composite	Quarterly	
	1,3-Dichlorobenzene	380	1.059	142	0.396		Grab	Quarterly	
	1,3-Dichloropropylene	794	2.212	196	0.546	Grab	Quarterly		
	1,4-Dichlorobenzene	380	1.059	142	0.396	Grab	Quarterly		
	2-Nitrophenol	231	0.643	65	0.181	Composite	Quarterly		
	4-Nitrophenol	576	1.604	162	0.451	Composite	Quarterly		
	4,6-Dinitro-o-cresol	277	0.772	78	0.217	Composite	Quarterly		
	Acenaphthene	47	0.131	19	0.053	Composite	Quarterly		
	Anthracene	47	0.131	19	0.053	Composite	Quarterly		
	Benzene	134	0.373	57	0.159	Grab	Quarterly		
	Bis (2-ethylhexyl)phthalate	258	0.719	95	0.265	Composite	Quarterly		
	Carbon Tetrachloride	380	1.059	142	0.396	Grab	Quarterly		
	Chlorobenzene	380	1.059	142	0.396	Grab	Quarterly		
	Chloroethane	295	0.822	110	0.306	Grab	Quarterly		
	Chloroform	325	0.905	111	0.309	8.5	Grab	Quarterly	
	Di-ethylphthalate	113	0.315	46	0.128		Composite	Quarterly	
	Di-methylphthalate	47	0.131	19	0.053		Composite	Quarterly	
	Di-n-butylphthalate	43	0.120	20	0.056		Composite	Quarterly	
		Ethylbenzene	380	1.059	142	0.396	0.1	Grab	Quarterly
		Fluoranthene	54	0.150	22	0.061		Composite	Quarterly

A. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS (continued)

Sample Point	Parameter	Discharge Limitations				M.A.I.D. mg/L	Sampling Type	Requirements Frequency
		Daily Max. ug/L	Lbs.	Mo. Avg. ug/L	Lbs.			
002	Fluorene	47	0.131	19	0.053		Composite	Quarterly
	Hexachlorobenzene	794	2.212	196	0.546		Composite	Quarterly
	Hexachlorobutadiene	380	1.059	142	0.396		Composite	Quarterly
	Hexachloroethane	794	2.212	196	0.546		Composite	Quarterly
	Methyl Chloride	295	0.822	110	0.306		Grab	Quarterly
	Methylene Chloride	170	0.474	36	0.100		Grab	Quarterly
	Naphthalene	47	0.131	19	0.053		Composite	Quarterly
	Nitrobenzene	3201	8.917	2237	6.231		Composite	Quarterly
	Phenanthrene	47	0.131	19	0.053		Composite	Quarterly
	Pyrene	48	0.134	20	0.056	0.1	Composite	Quarterly
	Tetrachloroethylene	164	0.457	52	0.145		Grab	Quarterly
	Toluene	74	0.206	28	0.078		Grab	Quarterly
	Trichloroethylene	69	0.192	26	0.072		Grab	Quarterly
	Vinyl Chloride	172	0.479	97	0.270		Grab	Quarterly
	Total Lead	690	1.922	320	0.891	65.0	Composite	Quarterly
	Total Zinc	2610	7.270	1050	2.925	25.0	Composite	Quarterly

003&

004 Total Flow

No Limit

Flow meter ⁽¹⁰⁾ Continuous

The sampling period for all parameters is a minimum of a one 24 hour day.

SEE PAGE SIX (6) FOR AN EXPLANATION OF SPECIFIC REQUIREMENTS.

PART I: SPECIFIC CONDITIONS**B. DISCHARGE MONITORING REPORTING REQUIREMENTS**

During the period beginning the effective date of this permit and lasting until the expiration date, discharge monitoring results shall be summarized and reported by the permittee on the days specified below:

Sample Point	Parameter	Reporting Requirements	
		Initial Report	Subsequent Reports
002, 003 & 004	All Analytes* and the Cyanide Treatment Record - except analytes tested annually	January 31, 2000	Every July 31, October 31 January 31, April 30
	EPA Method 624, 608 and 625	July 31, 2000	every July 31st

- * pH results of composites only - strip chart reading of SP002 shall be available upon request. These records must be maintained for a minimum of three (3) years, in accordance with 40 CFR Parts 403.12(o) and 403.14(c).

PART I. SPECIFIC CONDITIONS

C. SPECIAL REQUIREMENTS FOR PART 1 A.

- (1) The pH meter must be calibrated and maintained in accordance with the manufacturer's specifications. The calibrations and the person(s) responsible for it must be recorded in a bound logbook. This logbook must be available for BSA inspection at all times.
- (2) All flow meters must be calibrated and certified by a certified manufacturer's representative at least once per year. This report must be submitted with the annual report. All flow meters must be serviced and maintained in accordance with the manufacturer's specifications.
The BSA must be notified of any malfunctions which lasts for more than 24 hours within three (3) days of the malfunction. If a flow meter, especially at SP 002, remains out of service for more than five (5) consecutive days, the permittee must install a temporary meter until such time as the defective meter is repaired or replaced. The BSA at its option, may require a written report on any malfunctions.
- (3) All grabs must be saved three days and available for BSA inspection. Four consecutive 15 minute grabs may be composited into one sample bottle.
- (4) Surchargeable limit only.
- (5) All composites shall be flow proportioned.
- (6) EPA Test Method 604.
- (7) The permittee must report any compound whose concentration is greater than 0.01 mg/l. The permittee is not authorized to discharge any of the parameters evaluated by these test procedures which may cause or contribute to a violation of water quality standards or harm the sewerage system. Any parameter detected may, at the discretion of the Buffalo Sewer Authority, be specifically limited and incorporated into this permit.
- (8) Four grab samples must be properly taken and preserved over an equally spaced time period during a normal discharge day. The four grab samples must be flow proportionally composited at a New York State Department of Health certified lab.
- (9) All samples collected for the base neutral and acid extractable EPA analytical test procedures must go through a special cleanup to prevent aniline and aniline derivative interference of the analytical method.
- (10) When sample points 003 & 004 have to be monitored instead of sample point 002, the daily flows for each discharge must be recorded and submitted with the report.

PART I: SPECIFIC CONDITIONS

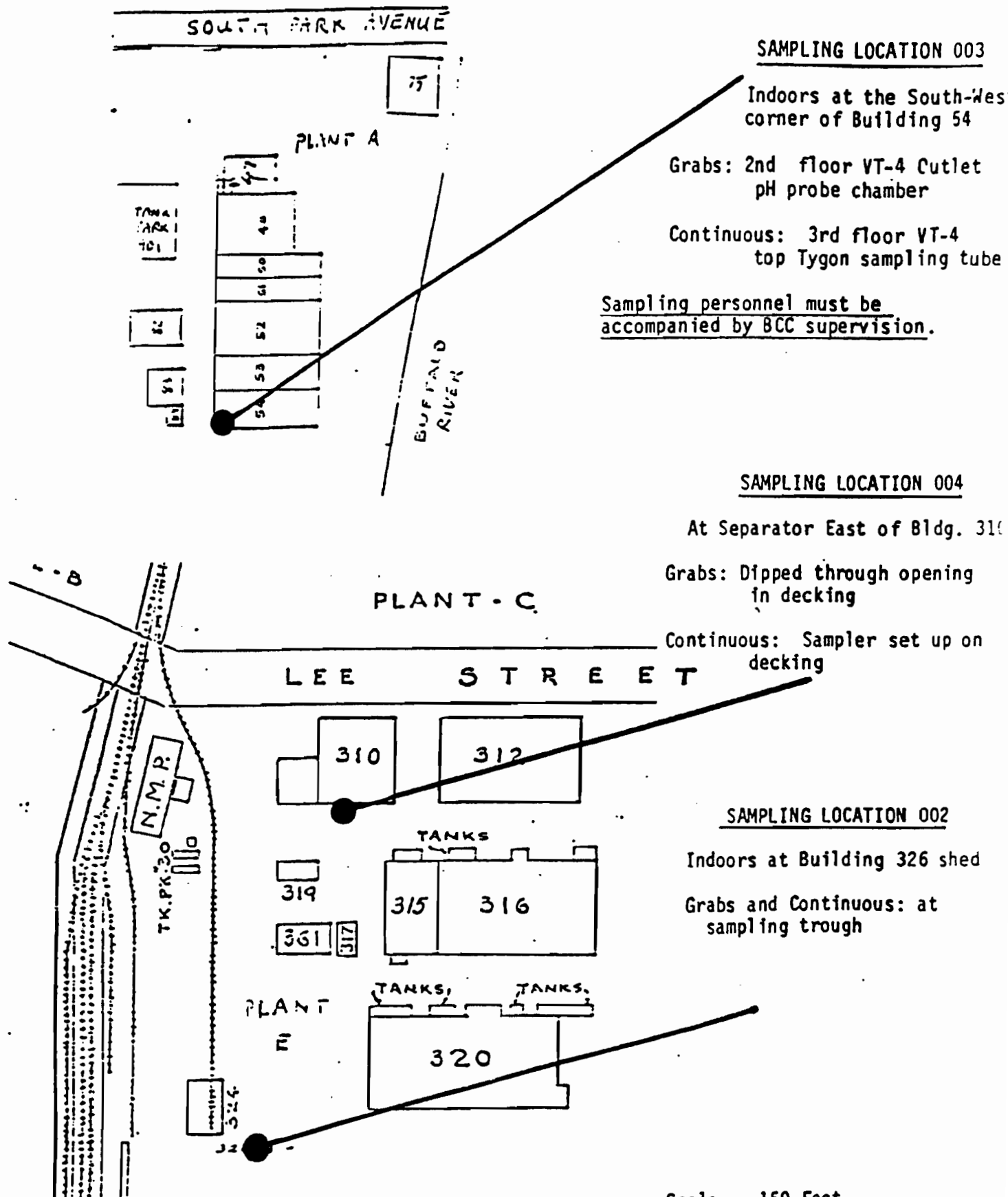
D. SPECIAL REQUIREMENTS FOR QUARTERLY MONITORING REPORTS OF CYANIDE TREATMENT FOR THE FISHED SALT WASTESTREAM.

The following format must be used to document the sodium hypochlorite addition to the fished salt wastestream and submitted with the quarterly monitoring reports:

QUARTERLY CYANIDE TREATMENT RECORD

	1st Month	2nd Month	3rd Month
(1) Days In Month			Days
(2) Days Operating			Days
(3) Days Feeding Hypo			Days
(4) Time Efficiency			(%)
(5) Hypo Volume added			Gallons
(6) Hypo Weight added			Lbs NaOCl
(7) Total Cyanide Equivalent (60%)			Lbs TCN
(8) Total Cyanide Equivalent Rate			Lbs/Day

SAMPLING LOCATIONS



BUFFALO POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

PART II: GENERAL CONDITIONS

A. MONITORING AND REPORTING

1. Local Limits

Except as otherwise specified in this permit, the permit holder shall comply with all specific prohibitions, limits on pollutants or pollutant parameters set forth in the Buffalo Sewer Authority Sewer Use Regulations, as amended from time to time, and such prohibitions, limits and parameters shall be deemed pretreatment standards for purposes for the Clean Water Act.

2. Definitions

Definitions of terms contained in this permit are as defined in the Buffalo Sewer Authority Sewer Use Regulations.

3. Discharge Sampling Analysis

All Wastewater discharge samples and analyses and flow measurements shall be representative of the volume and character of the monitored discharge. Methods employed for flow measurements and sample collections and analyses shall conform to the Buffalo Sewer Authority "Sampling Measurement and Analytical Guidelines Sheet".

4. Recording of Results

For each measurement or sample taken pursuant to the requirements of the permit, the permittee shall record the information as required in the "Sampling Measurement and Analytical Guidelines Sheet".

5. Additional Monitoring by Permittee

If the permittee monitors any pollutants at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified in 40 CFR Part 136 the results of such monitoring shall be included in the calculation and reporting of values required under Part I,B. Such increased frequency shall also be indicated.

6. Reporting

All reports prepared in accordance with this Permit shall be submitted to:

**Industrial Waste Section
Buffalo Sewer Authority Treatment Plant
90 West Ferry Street
Buffalo, New York 14213**

All self monitoring reports shall be prepared in accordance with the BSA "Sampling Measurement and Analytical Guidelines Sheet". These reporting requirements shall not relieve the permittee of any other reports which may be required by the N.Y.S.D.E.C. or the U.S.E.P.A.

B. PERMITTEE REQUIREMENTS

1. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit and with the information contained in the BPDES permit application on which basis this permit is granted. In the event of any facility expansions, production increases, process modifications or the installation, modification or repair of any pretreatment equipment which may result in new, different or increased discharges of pollutants, a new BPDES Permit application must be submitted prior to any change. Following receipt of an amended application, the BSA may modify this permit to specify and limit any pollutants not previously limited. In the event that the proposed change will be covered under an applicable Categorical Standard, a Baseline Monitoring Report must be submitted at least ninety (90) days prior to any discharge.

2. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed, calibration and maintenance of instrumentation, and recordings from continuous monitoring instrumentation shall be retained at this facility for a minimum of three (3) years, or longer if requested by the General Manager.

3. Notification of Slug, Accidental Discharge or Spill

In the event that a slug, accidental discharge or any spill occurs at the facility for which this permit is issued, it is the responsibility of the permittee to immediately notify the B.S.A. Treatment Plant at 883-1820 of the quantity and character of such discharge. If requested by the B.S.A., within five (5) days following all such discharges, the permittee shall submit a report describing the character and duration of the discharge, the cause of the discharge, and measures taken or that will be taken to prevent a recurrence of such discharge.

4. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any discharge limitation specified in this permit, the permittee or their assigns must verbally notify the Industrial Waste Section at 883-1820 within twenty-four (24) hours

of becoming aware of the violation. The permittee shall provide the Industrial Waste Section with the following information, in writing, within five (5) days of becoming aware of such condition:

- a. a description of the discharge and cause of noncompliance and;
- b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

5. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the Buffalo Sewerage System resulting from noncompliance with any discharge limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

6. Waste Residuals

Solids, sludges, filter backwash or other pollutants removed in the course of treatment or control of wastewaters and/or the treatment of intake waters, shall be disposed of in a manner such as to prevent any pollutant from such materials from entering the Buffalo Sewer System.

7. Power Failures

In order to maintain compliance with the discharge limitations and prohibitions of this permit, the permittee shall provide an alternative power source sufficient to operate the wastewater control facilities; or, if such alternative power source is not provided the permittee shall halt, reduce or otherwise control production and/or controlled discharges upon the loss of power to the wastewater control facilities.

8. Treatment Upsets

- a. Any industrial user which experiences an upset in operations that places it in a temporary state of noncompliance, which is not the result of operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation, shall inform the Industrial Waste Section immediately upon becoming aware of the upset. Where such information is given verbally, a written report shall be filed by the user within five (5) days. The report shall contain:
 - (i) A description of the upset, its cause(s) and impact on the discharger's compliance status;

- (ii) The duration of noncompliance, including exact dates and times of noncompliance, and if the non-compliance is continuing, the time by which compliance is reasonably expected to be restored;
 - (iii) All steps taken or planned to reduce, eliminate, and prevent recurrence of such an upset.
- b. An industrial user which complies with the notification provisions of this Section in a timely manner shall have an affirmative defense to any enforcement action brought by the Industrial Waste Section for any noncompliance of the limits in this permit, which arises out of violations attributable to and alleged to have occurred during the period of the documented and verified upset.

9. Treatment Bypasses

- a. A bypass of the treatment system is prohibited unless the following conditions are met:
 - (i) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; or
 - (ii) There was no feasible alternative to the bypass, including the use of auxiliary treatment or retention of the wastewater; and
 - (iii) The industrial user properly notified the Industrial Waste Section as described in paragraph b. below.
- b. Industrial users must provide immediate notice to the Industrial Waste Section upon discovery of an unanticipated bypass. If necessary, the Industrial Waste Section may require the industrial user to submit a written report explaining the cause(s), nature, and duration of the bypass, and the steps being taken to prevent it's recurrence.
- c. An industrial user may allow a bypass to occur which does not cause pretreatment standards or requirements to be violated, but only if it is for essential maintenance to ensure efficient operation of the treatment system. Industrial users anticipating a bypass must submit notice to the Industrial Waste Section at least ten (10) days in advance. The Industrial Waste Section may only approve the anticipated bypass if the circumstances satisfy those set forth in paragraph a. above.

C. PERMITTEE RESPONSIBILITIES

1. Permit Availability

The originally signed permit must be available upon request at all times for review at the address stated on the first page of this permit.

2. Inspections

The permittee shall allow the General Manager of the Buffalo Sewer Authority and/or his authorized representatives, upon the presentation of credentials and during normal working hours or at any other reasonable times, to have access to and copy any records required in this permit; and to sample any discharge of pollutants.

3. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities for which this permit has been issued the permit shall become null and void. The succeeding owner shall submit a completed Buffalo Sewer Authority permit application prior to discharge to the sewer system.

D. PERMITTEE LIABILITIES

1. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to the following:

- a. Violation of any terms or conditions of this permit,
- b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts,
- c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

2. Imminent Danger

In the event there exists an imminent danger to health or property, the permitter reserves the right to take immediate action to halt the permitted discharge to the sewerage works.

3. Civil and Criminal Liability

Nothing in this permit shall relieve the permittee from any requirements, liabilities, or penalties under provisions of the "Sewer Regulations of the Buffalo Sewer Authority" or any Federal, State and/or local laws or regulations.

E. NATIONAL PRETREATMENT STANDARDS

If a pretreatment standard or prohibition (including any Schedule of Compliance specified in such pretreatment standard or prohibition) is established under Section 307 (b) of the Act for a pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with such pretreatment standard or prohibition.

F. PLANT CLOSURE

In the event of plant closure, the permittee is required to notify the Industrial Waste Section in writing as soon as an anticipated closure date is determined, but in no case later than five days of the actual closure.

G. CONFIDENTIALITY

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Buffalo Sewer Authority. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

H. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

Fax

Phone: (716) 883-1820

Fax: (716) 883-3789

To: Dave SauerOf: Bello Color CorpFax: 827-4717

Phone: _____

Pages: 2, including this cover sheet.Date: 1/13/00

Dave:

We made a language change on
page 3 of your permit, per comments
made by US EPA. If we don't
hear from you by Mon. 1/17/00,
your permit will be finalized.

Jim Knight

From the desk of...

Buffalo Sewer Authority
90 W. FERRY, FT OF W. FERRY
Buffalo, NY 14213

Permit No. 99-12-BU021

Part I

Page 3

PART I: SPECIFIC CONDITIONS**A. DISCHARGE LIMITATIONS & MONITORING REQUIREMENTS (continued)**

If the loading of any of the following parameters sampled at location 002 cannot be determined to be in compliance due to elevated limits of detection in the analytical method(s) for such contaminant, sample points 003 & 004 must be sampled instead

The daily maximum and monthly average discharge limitations for the following parameters are the combined total mass based on the combined average flow of 334,000 gpd for SP003 & SP004 and the concentration limits as stated in 40 CFR Part 414.111:

Sample Point	Parameter	Discharge Limitations				Sampling Requirements	
		Daily Max.		Mo. Avg.		M.A.I.D.	Frequency
		ug/L	Lbs.	ug/L	Lbs.	mg/L	Type
002	1,1-Dichloroethane	59	0.164	22	0.061		Grab Quarterly
	1,1-Dichloroethylene	60	0.167	22	0.061		Grab Quarterly
	1,1,1-Trichloroethane	59	0.164	22	0.061		Grab Quarterly
	1,1,2-Trichloroethane	127	0.354	32	0.089		Grab Quarterly
	1,2-Dichlorobenzene	794	2.212	196	0.546		Grab Quarterly
	1,2-Dichloroethane	574	1.599	180	0.501		Grab Quarterly
	1,2-Dichloropropane	794	2.212	196	0.546		Grab Quarterly
	1,2-Trans-Dichloroethylene	66	0.184	180	0.070		Grab Quarterly
	1,2,4-Trichlorobenzene	10	0.028	10	0.028	0.8	Composite Quarterly
	1,3-Dichlorobenzene	380	1.059	142	0.396		Grab Quarterly
	1,3-Dichloropropylene	794	2.212	196	0.546		Grab Quarterly
	1,4-Dichlorobenzene	380	1.059	142	0.396		Grab Quarterly
	2-Nitrophenol	231	0.643	65	0.181		Composite Quarterly
	4-Nitrophenol	576	1.604	162	0.451		Composite Quarterly
	4,6-Dinitro-o-cresol	277	0.772	78	0.217		Composite Quarterly
	Acenaphthene	47	0.131	19	0.053		Composite Quarterly
	Anthracene	47	0.131	19	0.053		Composite Quarterly
	Benzene	134	0.373	57	0.159		Grab Quarterly
	Bis (2-ethylhexyl)phthalate	258	0.719	95	0.265		Composite Quarterly
	Carbon Tetrachloride	380	1.059	142	0.396		Grab Quarterly
	Chlorobenzene	380	1.059	142	0.396		Grab Quarterly
	Chloroethane	295	0.822	110	0.306		Grab Quarterly
	Chloroform	325	0.905	111	0.309	8.5	Grab Quarterly
	Di-ethylphthalate	113	0.315	46	0.128		Composite Quarterly
	Di-methylphthalate	47	0.131	19	0.053		Composite Quarterly
	Di-n-butylphthalate	43	0.120	20	0.056		Composite Quarterly
	Ethylbenzene	380	1.059	142	0.396		Grab Quarterly
	Fluoranthene	54	0.150	22	0.061	0.1	Composite Quarterly

APPENDIX F

**COST ESTIMATES FOR
CORRECTIVE MEASURES ALTERNATIVES**

APPENDIX F-1

**COST ESTIMATES FOR
CORRECTIVE MEASURES ALTERNATIVES**

**Remedial Alternatives
Cost Estimate Summary Tables**

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

**ALTERNATIVE 1 - Area A Ground Water
Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Total	\$506,418

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
Former Lagoons Cap Maintenance	Ea. yr.	1-30	\$960	\$14,546
Total	Ea. yr.	1-30	\$91,286	\$1,383,184

PRESENT WORTH TOTAL COST

\$1,889,602

NOTES:

- (1) Refer to individual cost sheets for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes off-site disposal of soils and debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

**ALTERNATIVE 1A - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
*Installation of Area A Groundwater Barrier***

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area A Grout Barrier	\$1,627,119
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Total	\$2,133,537

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$17,828	\$270,133
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
Former Lagoons Cap Maintenance	Ea. yr.	1-30	\$960	\$14,546
Total	Ea. yr.	1-30	\$82,545	\$1,250,738

PRESENT WORTH TOTAL COST**\$3,384,275****NOTES:**

- (1) Refer to individual cost sheets for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes off-site disposal of soils and debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

**ALTERNATIVE 2A - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Area BCE Ground Water Extraction System
Area BCE Extraction Wells**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area BCE Extraction Wells	\$729,835
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Total	\$1,236,253

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area BCE Groundwater Extraction Wells	Ea. yr.	1-30	\$9,584	\$145,219
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
Former Lagoons Cap Maintenance	Ea. yr.	1-30	\$960	\$14,546
Total	Ea. yr.	1-30	\$100,870	\$1,528,403

PRESENT WORTH TOTAL COST

\$2,764,656

NOTES:

- (1) Refer to individual cost sheets for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes off-site disposal of soils and debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

**ALTERNATIVE 2B - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Area BCE Ground Water Extraction System
Area BCE Extraction Trenches**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area BCE Extraction Trenches	\$775,683
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Total	\$1,282,101

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area BCE Extraction Trenches	Ea. yr.	1-30	\$9,584	\$145,219
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
Former Lagoons Cap Maintenance	Ea. yr.	1-30	\$960	\$14,546
Total	Ea. yr.	1-30	\$100,870	\$1,528,403

PRESENT WORTH TOTAL COST

\$2,810,504

NOTES:

- (1) Refer to individual cost sheets in Appendix B for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes off-site disposal of soils and debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

**ALTERNATIVE 2C - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Area BCE Ground Water Extraction System
Extraction Wells in Area B and Collection Trench in Area C/E**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area B Extraction Wells; Area C/E Trench	\$819,336
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Total	\$1,325,754

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area B Extraction Wells; Area C/E Trench	Ea. yr.	1-30	\$9,584	\$145,219
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
Former Lagoons Cap Maintenance	Ea. yr.	1-30	\$960	\$14,546
Total	Ea. yr.	1-30	\$100,870	\$1,528,403

PRESENT WORTH TOTAL COST

\$2,854,157

NOTES:

- (1) Refer to individual cost sheets in Appendix B for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes off-site disposal of soils and debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

**ALTERNATIVE 3 - Area A Ground Water
Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Soil Capping**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Soil Capping	\$604,637
Total	\$1,111,055

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
Former Lagoons Cap and Asphalt Cap Maintenance	Ea. yr.	1-30	\$14,543	\$220,358
Total	Ea. yr.	1-30	\$104,869	\$1,588,996

PRESENT WORTH TOTAL COST

\$2,700,051

NOTES:

- (1) Refer to individual cost sheets in Appendix B for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes off-site disposal of soils and debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

**ALTERNATIVE 3A- Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control, Soil
Installation of Area A Groundwater Barrier**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area A Grout Barrier	\$1,627,119
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Soil Capping	\$604,637
Total	\$2,738,174

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$17,828	\$270,133
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
Former Lagoons Cap and Asphalt Cap Maintenance	Ea. yr.	1-30	\$14,543	\$220,358
Total	Ea. yr.	1-30	\$96,128	\$1,456,550

PRESENT WORTH TOTAL COST

\$4,194,724

NOTES:

- (1) Refer to individual cost sheets in Appendix B for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes off-site disposal of soils and debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

**ALTERNATIVE 4A - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Area BCE Ground Water Extraction System, Soil Capping
Area BCE Extraction Wells**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area BCE Extraction Wells	\$729,835
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Soil Capping	\$604,637
Total	\$1,840,890

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area BCE Groundwater Extraction Wells	Ea. yr.	1-30	\$9,584	\$145,219
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
Former Lagoons Cap and Asphalt Cap Maintenance	Ea. yr.	1-30	\$14,543	\$220,358
Total	Ea. yr.	1-30	\$114,453	\$1,734,215

PRESENT WORTH TOTAL COST

\$3,575,105

NOTES:

- (1) Refer to individual cost sheets in Appendix B for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes off-site disposal of soils and debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

**ALTERNATIVE 4B - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Area BCE Ground Water Extraction System, Soil Capping
Area BCE Extraction Trenches**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area BCE Extraction Trenches	\$775,683
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Soil Capping	\$604,637
Total	\$1,886,738

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area BCE Extraction Trenches	Ea. yr.	1-30	\$9,584	\$145,219
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
Former Lagoons Cap and Asphalt Cap Maintenance	Ea. yr.	1-30	\$14,543	\$220,358
Total	Ea. yr.	1-30	\$114,453	\$1,734,215

PRESENT WORTH TOTAL COST**\$3,620,953**NOTES:

- (1) Refer to individual cost sheets in Appendix B for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes off-site disposal of soils and debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

**ALTERNATIVE 4C - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Area BCE Ground Water Extraction System, Soil Capping
Extraction Wells in Area B and Collection Trench in Area C/E**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area B Extraction Wells; Area C/E Trench	\$819,336
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Soil Capping	\$604,637
Total	\$1,930,391

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area B Extraction Wells; Area C/E Trench	Ea. yr.	1-30	\$9,584	\$145,219
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
Former Lagoons Cap and Asphalt Cap Maintenance	Ea. yr.	1-30	\$14,543	\$220,358
Total	Ea. yr.	1-30	\$114,453	\$1,734,215

PRESENT WORTH TOTAL COST

\$3,664,606

NOTES:

- (1) Refer to individual cost sheets in Appendix B for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes off-site disposal of soils and debris.

SUMMARY
 REMEDIAL ALTERNATIVES
 AREA ABCE COST COMPARISON
 BUFFALO COLOR CORPORATION
 BUFFALO, NEW YORK

REMEDIAL ALTERNATIVE	30 YEAR PRESENT WORTH TOTAL COST
ALTERNATIVE 1	\$1,889,602
ALTERNATIVE 1A	\$3,384,275
ALTERNATIVE 2A	\$2,764,656
ALTERNATIVE 2B	\$2,810,504
ALTERNATIVE 2C	\$2,854,157
ALTERNATIVE 3	\$2,700,051
ALTERNATIVE 3A	\$4,194,724
ALTERNATIVE 4A	\$3,575,105
ALTERNATIVE 4B	\$3,620,953
ALTERNATIVE 4C	\$3,664,606

Assumes off site soil/debris disposal

ALTERNATIVE 2A	\$2,810,326
ALTERNATIVE 2B	\$2,584,056
ALTERNATIVE 2C	\$2,670,721
ALTERNATIVE 4A	\$3,620,775
ALTERNATIVE 4B	\$3,394,505
ALTERNATIVE 4C	\$3,481,170

Assumes CAMU soil/debris disposal

**REMEDIAL ALTERNATIVES
AREA A ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

**Area D Waste Water Treatment Plant
Expansion for Area A Groundwater
(Without Area A Grout Barrier)**

CAPITAL COST ITEMS (2)	TOTAL COST
Treatment Plant Expansion	\$476,500
Additional Treatability Study	\$5,000
Contingency (5%)	\$23,500
Total	\$505,000

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Expanded Treatment Plant	Ea. yr.	1-30	\$597,648	\$9,055,682
Total	Ea. yr.	1-30	\$597,648	\$9,055,682

PRESENT WORTH TOTAL COST

\$9,560,682

NOTES:

- (1) Assumes 30 gpm flow; \$0.03/gallon treatment costs (from Allied Signal Inc.).
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522

**REMEDIAL ALTERNATIVES
AREA A ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

**Discharge of Groundwater to BSA
Sewer (Without Area A Grout Barrier)**

CAPITAL COST ITEMS (2)	TOTAL COST
Existing VT Tanks Retrofit	\$10,000
Contingency (25%)	\$2,500
Total	\$12,500

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Discharge to BSA Sewer	Ea. yr.	1-30	\$26,569	\$402,579
Total	Ea. yr.	1-30	\$26,569	\$402,579

PRESENT WORTH TOTAL COST

\$415,079

NOTES:

- (1) Assumes 30 gpm flow; \$0.00077/gallon treatment costs based on current BSA charge of \$0.77/1000 gallons.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

CAMU SOIL DISPOSAL

**ALTERNATIVE 2A - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Area BCE Ground Water Extraction System
Area BCE Extraction Wells**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area BCE Extraction Wells	\$649,317
CAMU	\$108,293
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Total	\$1,264,028

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area BCE Groundwater Extraction Wells	Ea. yr.	1-30	\$9,584	\$145,219
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
CAMU Cap Maintenance	Ea. yr.	1-30	\$1,181	\$17,895
Former Lagoons Cap Maintenance	Ea. yr.	1-30	\$960	\$14,546
Total	Ea. yr.	1-30	\$102,051	\$1,546,298

PRESENT WORTH TOTAL COST

\$2,810,326

NOTES:

- (1) Refer to individual cost sheets for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes on-site disposal of soils in CAMU and off site disposal of debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

CAMU SOIL DISPOSAL

**ALTERNATIVE 2B - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Area BCE Ground Water Extraction System
Area BCE Extraction Trenches**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area BCE Extraction Trenches	\$423,047
CAMU	\$108,293
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Total	\$1,037,758

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area BCE Extraction Trenches	Ea. yr.	1-30	\$9,584	\$145,219
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
CAMU Cap Maintenance	Ea. yr.	1-30	\$1,181	\$17,895
Former Lagoons Cap Maintenance	Ea. yr.	1-30	\$960	\$14,546
Total	Ea. yr.	1-30	\$102,051	\$1,546,298

PRESENT WORTH TOTAL COST

\$2,584,056

NOTES:

- (1) Refer to individual cost sheets in Appendix B for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes on-site disposal of soils in CAMU and off site disposal of debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

CAMU SOIL DISPOSAL

**ALTERNATIVE 2C - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Area BCE Ground Water Extraction System
Extraction Wells in Area B and Collection Trench in Area C/E**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area B Extraction Wells; Area C/E Trench	\$509,712
CAMU	\$108,293
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Total	\$1,124,423

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area B Extraction Wells; Area C/E Trench	Ea. yr.	1-30	\$9,584	\$145,219
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
CAMU Cap Maintenance	Ea. yr.	1-30	\$1,181	\$17,895
Former Lagoons Cap Maintenance	Ea. yr.	1-30	\$960	\$14,546
Total	Ea. yr.	1-30	\$102,051	\$1,546,298

PRESENT WORTH TOTAL COST

\$2,670,721

NOTES:

- (1) Refer to individual cost sheets in Appendix B for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes on-site disposal of soils in CAMU and off site disposal of debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

CAMU SOIL DISPOSAL

**ALTERNATIVE 4A - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Area BCE Ground Water Extraction System, Soil Capping
Area BCE Extraction Wells**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area BCE Extraction Wells	\$649,317
CAMU	\$108,293
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Soil Capping	\$604,637
Total	\$1,868,665

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area BCE Groundwater Extraction Wells	Ea. yr.	1-30	\$9,584	\$145,219
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
CAMU Cap Maintenance	Ea. yr.	1-30	\$1,181	\$17,895
Former Lagoons Cap and Asphalt Cap Maintenance	Ea. yr.	1-30	\$14,543	\$220,358
Total	Ea. yr.	1-30	\$115,634	\$1,752,110

PRESENT WORTH TOTAL COST

\$3,620,775

NOTES:

- (1) Refer to individual cost sheets in Appendix B for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes on-site disposal of soils in CAMU and off site disposal of debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

CAMU SOIL DISPOSAL

**ALTERNATIVE 4B - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Area BCE Ground Water Extraction System, Soil Capping
Area BCE Extraction Trenches**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area BCE Extraction Trenches	\$423,047
CAMU	\$108,293
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Soil Capping	\$604,637
Total	\$1,642,395

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area BCE Extraction Trenches	Ea. yr.	1-30	\$9,584	\$145,219
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
CAMU Cap Maintenance	Ea. yr.	1-30	\$1,181	\$17,895
Former Lagoons Cap and Asphalt Cap Maintenance	Ea. yr.	1-30	\$14,543	\$220,358
Total	Ea. yr.	1-30	\$115,634	\$1,752,110

PRESENT WORTH TOTAL COST

\$3,394,505

NOTES:

- (1) Refer to individual cost sheets in Appendix B for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes on-site disposal of soils in CAMU and off site disposal of debris.

**REMEDIAL ALTERNATIVES
AREA ABCE ESTIMATED COSTS
BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

CAMU SOIL DISPOSAL

**ALTERNATIVE 4C - Area A Ground
Water Extraction System, Institutional
Controls, Groundwater Monitoring,
Repair Sheet Piling Breach (Area E),
Area A Bank Erosion Control
Area BCE Ground Water Extraction System, Soil Capping
Extraction Wells In Area B and Collection Trench in Area C/E**

CAPITAL COST ITEMS (1)(2)	TOTAL COST
Area A Groundwater Extraction System	\$288,607
Area B Extraction Wells; Area C/E Trench	\$509,712
CAMU	\$108,293
Institutional Controls	\$25,440
Repair Sheet Piling Area E	\$14,500
Area A Erosion Control	\$177,871
Soil Capping	\$604,637
Total	\$1,729,060

O & M COST ITEMS (1)	UNIT	YEARS INCURRED	ANNUAL O&M COSTS	PRESENT WORTH COSTS (3)
Groundwater Monitoring (Analytical / Reporting)	Ea. yr.	1-30	\$42,580	\$645,181
Area A Groundwater Extraction System	Ea. yr.	1-30	\$17,577	\$266,330
Groundwater Discharge to BSA	Ea. yr.	1-30	\$26,569	\$402,579
Area B Extraction Wells; Area C/E Trench	Ea. yr.	1-30	\$9,584	\$145,219
Area A Retaining Wall Survey	Ea. yr.	1-30	\$3,600	\$54,548
CAMU Cap Maintenance	Ea. yr.	1-30	\$1,181	\$17,895
Former Lagoons Cap and Asphalt Cap Maintenance	Ea. yr.	1-30	\$14,543	\$220,358
Total	Ea. yr.	1-30	\$115,634	\$1,752,110

PRESENT WORTH TOTAL COST

\$3,481,170

NOTES:

- (1) Refer to individual cost sheets in Appendix B for costs/assumptions.
- (2) Capital costs include engineering design and CQA costs.
- (3) Based upon a 5% interest rate for a 30-year O&M period. P/A factor = 15.1522
- (4) Assumes on-site disposal of soils in CAMU and off site disposal of debris.

APPENDIX F-2

**COST ESTIMATES FOR
CORRECTIVE MEASURES ALTERNATIVES**

**Remedial Alternatives
Detailed Cost Estimates**

**AREA A
CONTAINMENT ALTERNATIVE 1
COLLECTION BY EXTRACTION WELLS
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color		Area A Extraction Wells		
	Technology/Process:	Unit Cost	Quantity	Unit of Measure	Total Cost
Assembly					
Well Extraction System					
Rubber Tire Backhoe (header excavation)		6.00	239	CY	1,434
Submersible Pump 1/2 hp 4-13 gpm		1,320.00	5	Each	6,600
Pump Electrical/Mechanical Controls		15,000.00	5	Each	75,000
In-vault plumbing/flowmeter/valving/controls		3,000.00	5	Each	15,000
Precast Pump Vault		2,500.00	5	Each	12,500
Drill Rig Mob/demob		1,000.00	1	Each	1,000
12" Borehole		24.00	160	LF	3,840
6" PVC Riser Pipe - installed		24.00	95	LF	2,280
6" PVC Well Screen - installed		24.00	65	LF	1,560
Extraction system performance monitoring piezometers		1,000.00	5	Each	5,000
Disposal of soil (90% of excavated material) - hazardous	**	79.80	6.5	Ton	519
Disposal of debris (10% of excavated material) - haz	**	79.80	0.5	CY	40
Transportation of excavated material	**	20.00	7.2	Ton	144
Soil Testing for disposal (3)		600.00	1	Sample	600
Transfer and Storage System					
W.L. Sensor Float Switch		200.00	2	Each	400
Check valve		300.00	2	Each	600
Flow meter		2,000.00	1	Each	2,000
Electrical/Mechanical Controls		1,000.00	1	Each	1,000
2" HDPE Force Main Carrier Pipe		5.50	1,075	LF	5,913
4" HDPE Force Main Containment Pipe		8.00	1,075	LF	8,600
Heat Tracing		7.00	100	LF	700
Existing VT tanks (two) retrofit		5,000.00	2	Each	10,000

**AREA A
CONTAINMENT ALTERNATIVE 1
COLLECTION BY EXTRACTION WELLS
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color		Area A Extraction Wells		
	Technology/Process:	Unit Cost	Quantity	Unit of Measure	Total Cost
Assembly					
Contractor Field Office & Facilities					
Trailer		500.00	6	Month	3,000
Water & Electricity		500.00	6	Month	3,000
Portable Toilets (2)		400.00	6	Month	2,400
Telephones/Fax		500.00	6	Month	3,000
Health & Safety and Decontamination					
Decon Pad Installation		2,500.00	1	LS	2,500
Decon Pad O&M		250.00	6	Month	1,500
H&S Disposables		1,000.00	6	Month	6,000
Mobilization/Demobilization					
Equipment		2,500.00	1	LS	2,500
Personnel		2,500.00	1	LS	2,500
Work Plans		2,500.00	1	LS	2,500
Bonds & Insurance		5,000.00	1	LS	5,000
Permits		500.00	1	LS	500
Erosion Control					
Silt Fence (along misc. areas)		3.00	500	LF	1,500
Miscellaneous Site Restoration					
6' Topsoil, Seeding, and Mulching		11,800.00	1	AC	11,800
TOTAL					\$202,430

Notes:

Costs from contractor supplier estimates; Golder project related experience;
or from R.S Means Environmental Restoration Assemblies Cost Book, 1997.

** Disposal costs include 14% local disposal tax.

**AREA A
CONTAINMENT ALTERNATIVE 1
COLLECTION BY EXTRACTION WELLS
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Well Extraction System		
Rubber Tire Backhoe (header excavation)		1,434
Submersible Pump 1/2 hp 4-13 gpm	6,600 *	
Pump Electrical/Mechanical Controls	75,000 *	
In-vault plumbing/flowmeter/valving/controls	15,000 *	
Precast Pump Vault	12,500	
Drill Rig Mob/demob	1,000 *	
12" Borehole		3,840 *
6" PVC Riser Pipe - installed	2,280 *	
6" PVC Well Screen - installed	1,560 *	
Extraction system performance monitoring piezometers		5,000 *
Soil Testing for disposal (3)	600 *	
Transfer and Storage System		
W.L. Sensor Float Switch	400	
Check valve	600	
Flow meter	2,000	
Electrical/Mechanical Controls	1,000	
2" HDPE Force Main Carrier Pipe	5,913	
4" HDPE Force Main Containment Pipe	8,600	
Heat Tracing	700	
Existing VT tanks retrofit	10,000 *	

**AREA A
CONTAINMENT ALTERNATIVE 1
COLLECTION BY EXTRACTION WELLS
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Contractor Field Office & Facilities		
Trailer	3,000 *	
Water & Electricity	3,000 *	
Portable Toilets (2)	2,400 *	
Telephones/Fax	3,000 *	
Health & Safety and Decontamination		
Decon Pad Installation	2,500 *	
Decon Pad O&M	1,500 *	
H&S Disposables	6,000 *	
Mobilization/Demobilization		
Equipment	2,500 *	
Personnel	2,500 *	
Work Plans	2,500 *	
Bonds & Insurance	5,000 *	
Permits	500 *	
Erosion Control		
Silt Fence (along misc. areas)	1,500 *	
Miscellaneous Site Restoration		
6' Topsoil, Seeding, and Mulching	11,800 *	
Total for All Sites	\$ 191,453	\$ 10,274
Design/CQA (20%)	38,291	1,541
Overhead and Profit (15%)	4,757	215
Contingencies	38,291	3,082
Disposal of soil (90% of excavated material) - hazardous	519 **	
Disposal of debris (10% of excavated material) - haz	40 **	
Transportation of excavated material	144 **	
Task Subtotals	\$ 273,495	\$ 15,112
Total		\$ 288,607

* Overhead and profit included in cost.

** Disposal costs include 14% local disposal tax.

CQA = Construction Quality Assurance.

**AREA A
CONTAINMENT ALTERNATIVE 1
COLLECTION BY EXTRACTION WELLS
OPERATION AND MAINTENANCE
30 YEAR COSTS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color				
	Technology/Process: Area A Extraction Wells				
Assembly	Unit Cost	Quantity	Unit of Measure	Total Cost	
Well Extraction System					
Well casing / screen	1,224	1	EACH	1,224	
Drilling	768	1	EACH	768	
All well pumps	6,600	3	EACH	19,800	
All automated controls	5,000	3	EACH	15,000	
Transfer and Storage System					
Piping Replacement	108	14	LF	1,512	
Electricity	5,250	30	year	157,500	
Systems Inspections/Reporting	10,000	30	year	300,000	
Subtotal				495,804	
Contingencies (20%)				31,500	
Task Total (30 years)				527,304	
				Annual costs	\$17,577

Notes:

Assumes replacement of one well over 30-year period.

Assumes replacement of all pumps and controls once every ten years; 10% of piping and electrical over 30 years.

Assumes 12 cents kilowatt hour rate.

**ANNUAL OPERATION & MAINTENANCE COSTS
GROUNDWATER DISCHARGE TO BUFFALO SEWER AUTHORITY**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color		Technology/Process: GW Discharge to BSA		
		Unit Cost	Quantity	Unit of Measure	Total Cost
Assembly					
Discharge without grout barrier in Area A					
@ 30gpm = 43,200/day x 365 days		0.00077	15,768,000	Gallon	12,141
Monitoring/Analytical/Reporting		10000	1	LS	10,000
Subtotal					22,141
Contingencies (20%)					4,428
Task Total without grout barrier					26,569
Discharge with grout barrier in Area A					
@ 12 gpm = 17,280/day x 365 days		0.00077	6,307,200	Gallon	4,857
Monitoring/Analytical/Reporting		10000	1	LS	10,000
Subtotal					14,857
Contingencies (20%)					2,971
Task Total with grout barrier					17,828
Notes: Assume: Flow rate of 30 gpm includes safety factor Reduction of approximately 60% of groundwater flow with grout barrier based on modeling. Discharge rate estimate from current Buffalo Color BSA discharge cost @ \$0.77/1000 gal.					

**ANNUAL OPERATION & MAINTENANCE COSTS
GROUNDWATER TREATMENT IN AREA D TREATMENT PLANT
AND TREATED DISCHARGE TO BUFFALO RIVER**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color		Technology/Process: GWTreatment through Area D GWTS		
		Unit Cost	Quantity	Unit of Measure	Total Cost
Assembly					
Discharge without grout barrier in Area A					
@ 30gpm = 43,200/day x 365 days		0.03	15,768,000	Gallon	473,040
Monitoring/Analytical/Reporting		25000	1	LS	25,000
Subtotal					498,040
Contingencies (20%)					99,608
Task Total					597,648
Discharge with grout barrier in Area A					
@ 12 gpm = 17,280/day x 365 days		0.03	6,307,200	Gallon	189,216
Monitoring/Analytical/Reporting		25000	1	LS	25,000
Subtotal					214,216
Contingencies (20%)					42,843
Task Total					257,059
Notes:					
Assume:					
Flow rate of 30 gpm includes safety factor					
Reduction of approximately 60% of groundwater flow with grout barrier based on modeling.					
Treatment cost based on Allied Signal Inc. estimate for Area A groundwater based on Area D O&M costs and Area A treatability study.					
Assumes existing Area D GWTS would be used.					

INSTITUTIONAL CONTROLS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID: Buffalo Color				
	Task: Institutional Controls				
Item		Unit Cost	Quantity	Unit of Measure	Total Cost
Modify groundwater monitoring plan		\$2,500	1	Each	\$2,500
Excavation management plan		\$1,500	1	Each	\$1,500
Deed restriction preparation		\$1,000	1	Each	\$1,000
Site boundary survey		\$6,200	1	Each	\$6,200
RCRA Post closure permit modification		\$5,000	1	Each	\$5,000
BSA/SPDES permit modification		\$2,500	1	Each	\$2,500
ACOE permit		\$2,500	1	Each	\$2,500
Subtotal					21,200
Contingencies (20%)					4,240
Task Total					25,440
Notes: Cost estimates based on similar project experience.					

**GROUNDWATER SAMPLE COLLECTION
TWO-YEAR MONITORING PERIOD**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color				
	Task: Groundwater monitoring				
Item	Events Per 2 yrs.	Unit Cost	Quantity per Event	Unit of Measure	Total Cost
ANALYTICAL COSTS					
Confined Aquifer Samples (1)					
Volatile Organics	2	\$95	8	Sample	\$1,520
Semi-Volatile Organics	2	\$220	8	Sample	\$3,520
RCRA Metals	1	\$90	8	Sample	\$720
Inorganics	1	\$54	8	Sample	\$432
Shallow Aquifer Samples (2)					
Volatile Organics	4	\$95	23	Sample	\$8,740
Semi-Volatile Organics	4	\$220	23	Sample	\$20,240
RCRA Metals	2	\$90	23	Sample	\$4,140
Inorganics	2	\$54	23	Sample	\$2,484
SAMPLE COLLECTION COSTS					
Confined Aquifer Samples (1)					
Labor (8 hours x 2 men x 45/hr)	2	\$720	1	Day	\$1,440
Vehicle Cost	2	\$65	1	Day	\$130
Consumables	2	\$10	8	Sample	\$160
Shipping	2	\$10	8	Sample	\$160
Shallow Aquifer Samples (2)					
Labor (8 hours x 2 men x 45/hr)	4	\$720	4	Day	\$11,520
Vehicle Cost	4	\$65	4	Day	\$1,040
Consumables	4	\$10	23	Sample	\$920
Shipping	4	\$10	23	Sample	\$920
REPORTING COSTS					
Quarterly GW elev.-labor (8 hr x 45/hr)	8	360	1	Day	\$2,880
Sampling summary report	4	\$2,500	1	Report	\$10,000
TOTAL 2-YEAR COST					\$70,966
ANNUAL COST					\$35,483

Notes:

- 1) Confined aquifer wells consist of R-01, R-04, RFI-16, RFI-19D, RFI-21D, and RFI-23D.
- 2) Shallow aquifer wells consist of RFI-PZ-17, RFI-PZ-18, RFI-PZ-19, RFI-17, RFI-18, RFI-20, RFI-22, RFI-24, RFI-25, RFI-27, RFI-28, RFI-29, RFI-30, RFI-32, RFI-33, RFI-34, RFI-35, RFI-36, RFI-42, RFI-45, and RFI-51.
- 3) Sample quantity per event includes 1 duplicate and 1 MS/MSD per aquifer type.
- 4) Trip blanks will be included at no extra cost.
- 5) Costs from local contractor or Golder estimates.

**GROUNDWATER SAMPLE COLLECTION
TWO-YEAR MONITORING PERIOD**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary	
ANALYTICAL COSTS	
Confined Aquifer Samples (1)	
Volatile Organics	1,520
Semi-Volatile Organics	3,520
RCRA Metals	720
Inorganics	432
Shallow Aquifer Samples (2)	
Volatile Organics	8,740
Semi-Volatile Organics	20,240
RCRA Metals	4,140
Inorganics	2,484
SAMPLE COLLECTION COSTS	
Confined Aquifer Samples (1)	
Labor (8 hours x 2 men x 45/hr)	1,440
Vehicle Cost	130
Consumables	160
Shipping	160
Shallow Aquifer Samples (2)	
Labor (8 hours x 2 men x 45/hr)	11,520
Vehicle Cost	1,040
Consumables	920
Shipping	920
REPORTING COSTS	
Quarterly GW elev.-labor (8 hr x 45/hr)	2,880
Sampling summary report	10,000
Subtotal	\$ 70,966
Design/CQA (15%)	0
Overhead and Profit (15%)	0
Contingencies (20%)	14,193
Task Totals (2-year costs)	\$ 85,159
Task Totals (Annual)	\$ 42,580

Cost from local contractor or Golder initial estimates; overhead and profit included in cost.

CQA = Construction Quality Assurance.

**ANNUAL OPERATION & MAINTENANCE COSTS
AREA A RETAINING WALL SURVEY**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color				
	Technology/Process: Surveying				
Assembly		Unit Cost	Quantity	Unit of Measure	Total Cost
Surveying/Reporting		3000	1	LS	3,000
Subtotal					3,000
Design/CQA					0
Contingencies (20%)					600
Task Total					3,600
Notes: Assume: Survey semi-annually, \$1500/event					

**ANNUAL OPERATION & MAINTENANCE COSTS
AREA E FORMER LAGOONS CAP**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color				
	Technology/Process: Cap O&M				
Assembly	Events per year	Unit Cost	Quantity	Unit of Measure	Total Cost
Mowing	2	110	3	acre	660
Inspection	1	35	4	hour	140
Subtotal					800
Design/CQA					0
Contingencies (20%)					160
Task Total					960
Notes: Assume: The cost of mowing is estimated at \$110 per acre per mowing from similar project. Cut and inspected 2 times/year.					

AREA B, C, E
CONTAINMENT ALTERNATIVE 2A
COLLECTION BY EXTRACTION WELLS
OFFSITE DISPOSAL OF SOILS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID:		Buffalo Color		
	Technology/Process:		Extraction Wells		
Assembly		Unit Cost	Quantity	Unit of Measure	Total Cost
Well Extraction System					
Rubber Tire Backhoe (header excavation)		6.00	493	CY	2,958
Clean Soil Backfill and Placement		10.00	493	CY	4,930
Air Regulators/Gauges (well head)		275.00	60	Each	16,500
Air Regulators/Gauges (compressor)		235.00	1	Each	235
Air Aftercooler		530.00	1	Each	530
Air Compressor		20,000.00	1	Each	20,000
Dessicant Air Dryer		2,350.00	1	Each	2,350
Solenoid Pressure Dump Valve		135.00	1	Each	135
Pneumatic Pump		2,125.00	60	Each	127,500
Test borings, 4"		150.00	30	Each	4,500
36" Borehole		35.00	900	LF	31,500
4" PVC Riser Pipe		5.00	600	LF	3,000
4" PVC Well Screen		5.00	300	LF	1,500
Wellhead Vaults		475.00	60	Each	28,500
Gravel backfill 1/4"		22.00	236	CY	5,192
Air/Discharge Tubing (jacketed)		6.40	900	LF	5,760
Fittings		5,000.00	1	total	5,000
Extraction system performance monitoring piezometers		1,000.00	5	Each	5,000
Disposal of soil (90% of excavated material) - hazardous	**	79.80	1,009	Ton	80,518
Disposal of debris (10% of excavated material) - haz	**	79.80	92	CY	7,342
Transportation of excavated material	**	20.00	1,121	Ton	22,420
2" PVC Compressed Air Manifold		3.00	2,220	LF	6,660
Soil Testing for disposal (3)		600.00	3	Comp Sample	1,800
Transfer and Storage System					
HDPE, 2' dia.,10' deep sump		1,500.00	1	Each	1,500
HDPE, 2' dia.,10' deep sump		1,500.00	1	Each	1,500
Submersible Transfer Pump 4-13 gpm <180' h		1,200.00	2	Each	2,400
W.L. Sensor Float Switch		200.00	2	Each	400
Check valve		300.00	2	Each	600
Flow meter		2,000.00	2	Each	4,000
Electrical/Mechanical Controls		5,000.00	2	Each	10,000
3" HDPE Gravity Drain		5.00	1,960	LF	9,800
2" HDPE Force Main Carrier Pipe		5.50	1,070	LF	5,885
4" HDPE Force Main Containment Pipe		8.00	1,070	LF	8,560
Heat Tracing		7.00	25	LF	175
Concrete Pad for Compressor Building		2.10	300	SF	630
Compressor Building		10,000.00	1	Each	10,000
Building and Piping Insulation		7,000.00	1	Each	7,000
Tank Retrofit Area E		25,000.00	1	Each	25,000

AREA B, C, E
CONTAINMENT ALTERNATIVE 2A
COLLECTION BY EXTRACTION WELLS
OFFSITE DISPOSAL OF SOILS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID: Buffalo Color		Technology/Process: Extraction Wells		
	Assembly	Unit Cost	Quantity	Unit of Measure	Total Cost
Contractor Field Office & Facilities					
Trailer		500.00	6	Month	3,000
Water & Electricity		500.00	6	Month	3,000
Portable Toilets (2)		400.00	6	Month	2,400
Telephones/Fax		500.00	6	Month	3,000
Health & Safety and Decontamination					
Decon Pad Installation		5,000.00	1	LS	5,000
Decon Pad O&M		250.00	6	Month	1,500
H&S Disposables		1,000.00	6	Month	6,000
Mobilization/Demobilization					
Equipment		2,500.00	1	LS	2,500
Personnel		2,500.00	1	LS	2,500
Work Plans		2,500.00	1	LS	2,500
Bonds & Insurance		5,000.00	1	LS	5,000
Permits		500.00	1	LS	500
Erosion Control					
Silt Fence (along misc. areas)		3.00	500	LF	1,500
Miscellaneous Site Restoration					
6' Topsoil, Seeding, and Mulching		11,800.00	1	AC	11,800
TOTAL					\$521,480

Notes:

Costs from contractor supplier estimates; Golder project related experience;
or from R.S Means Environmental Restoration Assemblies Cost Book, 1997.

** Disposal costs include 14% local disposal tax.

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2A
COLLECTION BY EXTRACTION WELLS
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Well Extraction System		
Rubber Tire Backhoe (header excavation)		2,958
Clean Soil Backfill and Placement	4,930	
Air Regulators/Gauges (well head)	16,500	
Air Regulators/Gauges (compressor)	235	
Air Aftercooler	530	
Air Compressor	20,000 *	
Dessicant Air Dryer	2,350	
Solenoid Pressure Dump Valve	135	
Pneumatic Pump	127,500	
Test borings, 4"		4,500 *
36" Borehole		31,500 *
4" PVC Riser Pipe	3,000	
4" PVC Well Screen	1,500	
Wellhead Vaults	28,500	
Gravel backfill 1/4"	5,192	
Air/Discharge Tubing (jacketed)	5,760	
Fittings	5,000	
Extraction system performance monitoring piezometers		5,000 *
2" PVC Compressed Air Manifold	6,660	
Soil Testing for disposal (3)	1,800 *	
Transfer and Storage System		
HDPE, 2' dia., 10' deep sump	1,500	
HDPE, 2' dia., 10' deep sump	1,500	
Submersible Transfer Pump 4-13 gpm <180' h	2,400	
W.L. Sensor Float Switch	400	
Check valve	600	
Flow meter	4,000	
Electrical/Mechanical Controls	10,000 *	
3" HDPE Gravity Drain	9,800	
2" HDPE Force Main Carrier Pipe	5,885	
4" HDPE Force Main Containment Pipe	8,560	
Heat Tracing	175	
Concrete Pad for Compressor Building	630	
Compressor Building	10,000	
Building and Piping Insulation	7,000	
Tank Retrofit Area E	25,000 *	

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2A
COLLECTION BY EXTRACTION WELLS
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Contractor Field Office & Facilities		
Trailer	3,000 *	
Water & Electricity	3,000 *	
Portable Toilets (2)	2,400 *	
Telephones/Fax	3,000 *	
Health & Safety and Decontamination		
Decon Pad Installation	5,000 *	
Decon Pad O&M	1,500 *	
H&S Disposables	6,000 *	
Mobilization/Demobilization		
Equipment	2,500 *	
Personnel	2,500 *	
Work Plans	2,500 *	
Bonds & Insurance	5,000 *	
Permits	500 *	
Erosion Control		
Silt Fence (along misc. areas)	1,500 *	
Miscellaneous Site Restoration		
6' Topsoil, Seeding, and Mulching	11,800 *	
Total for All Sites	\$ 367,242	\$ 43,958
Design/CQA (20%)	73,448	8,792
Overhead and Profit (15%)	39,036	444
Contingencies	73,448	13,187
Disposal of soil (90% of excavated material) - hazardous	80,518 **	
Disposal of debris (10% of excavated material) - hazardous	7,342 **	
Transportation of excavated material	22,420 **	
Task Subtotals	\$ 663,454	\$ 66,381
Task Total		\$ 729,835

* Overhead and profit included in cost.

** Disposal costs include 14% local disposal tax.

CQA = Construction Quality Assurance.

AREA B, C, E
CONTAINMENT ALTERNATIVE 2A
COLLECTION BY EXTRACTION WELLS
ONSITE DISPOSAL OF SOILS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID: Buffalo Color		Extraction Wells		
	Technology/Process:	Unit Cost	Quantity	Unit of Measure	Total Cost
Assembly					
Well Extraction System					
Rubber Tire Backhoe (header excavation)		6.00	493	CY	2,958
Clean Soil Backfill and Placement		10.00	493	CY	4,930
Air Regulators/Gauges (well head)		275.00	60	Each	16,500
Air Regulators/Gauges (compressor)		235.00	1	Each	235
Air Aftercooler		530.00	1	Each	530
Air Compressor		20,000.00	1	Each	20,000
Dessicant Air Dryer		2,350.00	1	Each	2,350
Solenoid Pressure Dump Valve		135.00	1	Each	135
Pneumatic Pump		2,125.00	60	Each	127,500
Test borings, 4"		150.00	30	Each	4,500
36" Borehole		35.00	900	LF	31,500
4" PVC Riser Pipe		5.00	600	LF	3,000
4" PVC Well Screen		5.00	300	LF	1,500
Wellhead Vaults		475.00	60	Each	28,500
Gravel backfill 1/4"		22.00	236	CY	5,192
Air/Discharge Tubing (jacketed)		6.40	900	LF	5,760
Fittings		5,000.00	1	total	5,000
Extraction system performance monitoring piezometers		1,000.00	5	Each	5,000
Disposal of soil (90% of excavated material) - hazardous	**	0.00	1,009	Ton	0
Disposal of debris (10% of excavated material) - haz	**	79.80	92	CY	7,342
Transportation of excavated material	**	20.00	1,121	Ton	22,420
2" PVC Compressed Air Manifold		3.00	2,220	LF	6,660
Soil Testing for disposal (3)		600.00	3	Comp Sample	1,800
Transfer and Storage System					
HDPE, 2' dia., 10' deep sump		1,500.00	1	Each	1,500
HDPE, 2' dia., 10' deep sump		1,500.00	1	Each	1,500
Submersible Transfer Pump 4-13 gpm <180' h		1,200.00	2	Each	2,400
W.L. Sensor Float Switch		200.00	2	Each	400
Check valve		300.00	2	Each	600
Flow meter		2,000.00	2	Each	4,000
Electrical/Mechanical Controls		5,000.00	2	Each	10,000
3" HDPE Gravity Drain		5.00	1,960	LF	9,800
2" HDPE Force Main Carrier Pipe		5.50	1,070	LF	5,885
4" HDPE Force Main Containment Pipe		8.00	1,070	LF	8,560
Heat Tracing		7.00	25	LF	175
Concrete Pad for Compressor Building		2.10	300	SF	630
Compressor Building		10,000.00	1	Each	10,000
Building and Piping Insulation		7,000.00	1	Each	7,000
Tank Retrofit Area E		25,000.00	1	Each	25,000

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2A
COLLECTION BY EXTRACTION WELLS
ONSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color				
	Technology/Process: Extraction Wells				
Assembly	Unit Cost	Quantity	Unit of Measure	Total Cost	
Contractor Field Office & Facilities					
Trailer	500.00	6	Month	3,000	
Water & Electricity	500.00	6	Month	3,000	
Portable Toilets (2)	400.00	6	Month	2,400	
Telephones/Fax	500.00	6	Month	3,000	
Health & Safety and Decontamination					
Decon Pad Installation	5,000.00	1	LS	5,000	
Decon Pad O&M	250.00	6	Month	1,500	
H&S Disposables	1,000.00	6	Month	6,000	
Mobilization/Demobilization					
Equipment	2,500.00	1	LS	2,500	
Personnel	2,500.00	1	LS	2,500	
Work Plans	2,500.00	1	LS	2,500	
Bonds & Insurance	5,000.00	1	LS	5,000	
Permits	500.00	1	LS	500	
Erosion Control					
Silt Fence (along misc. areas)	3.00	500	LF	1,500	
Miscellaneous Site Restoration					
6' Topsoil, Seeding, and Mulching	11,800.00	1	AC	11,800	
TOTAL				\$440,962	

Notes:

Costs from contractor supplier estimates; Golder project related experience;
or from R.S Means Environmental Restoration Assemblies Cost Book, 1997.

** Disposal costs include 14% local disposal tax.

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2A
COLLECTION BY EXTRACTION WELLS
ONSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Well Extraction System		
Rubber Tire Backhoe (header excavation)		2,958
Clean Soil Backfill and Placement	4,930	
Air Regulators/Gauges (well head)	16,500	
Air Regulators/Gauges (compressor)	235	
Air Aftercooler	530	
Air Compressor	20,000 *	
Dessicant Air Dryer	2,350	
Solenoid Pressure Dump Valve	135	
Pneumatic Pump	127,500	
Test borings, 4"		4,500 *
36" Borehole		31,500 *
4" PVC Riser Pipe	3,000	
4" PVC Well Screen	1,500	
Wellhead Vaults	28,500	
Gravel backfill 1/4"	5,192	
Air/Discharge Tubing (jacketed)	5,760	
Fittings	5,000	
Extraction system performance monitoring piezometers		5,000 *
2" PVC Compressed Air Manifold	6,660	
Soil Testing for disposal (3)	1,800 *	
Transfer and Storage System		
HDPE, 2' dia., 10' deep sump	1,500	
HDPE, 2' dia., 10' deep sump	1,500	
Submersible Transfer Pump 4-13 gpm <180' h	2,400	
W.L. Sensor Float Switch	400	
Check valve	600	
Flow meter	4,000	
Electrical/Mechanical Controls	10,000 *	
3" HDPE Gravity Drain	9,800	
2" HDPE Force Main Carrier Pipe	5,885	
4" HDPE Force Main Containment Pipe	8,560	
Heat Tracing	175	
Concrete Pad for Compressor Building	630	
Compressor Building	10,000	
Building and Piping Insulation	7,000	
Tank Retrofit Area E	25,000 *	

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2A
COLLECTION BY EXTRACTION WELLS
ONSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Contractor Field Office & Facilities		
Trailer	3,000 *	
Water & Electricity	3,000 *	
Portable Toilets (2)	2,400 *	
Telephones/Fax	3,000 *	
Health & Safety and Decontamination		
Decon Pad Installation	5,000 *	
Decon Pad O&M	1,500 *	
H&S Disposables	6,000 *	
Mobilization/Demobilization		
Equipment	2,500 *	
Personnel	2,500 *	
Work Plans	2,500 *	
Bonds & Insurance	5,000 *	
Permits	500 *	
Erosion Control		
Silt Fence (along misc. areas)	1,500 *	
Miscellaneous Site Restoration		
6' Topsoil, Seeding, and Mulching	11,800 *	
Total for All Sites	\$ 367,242	\$ 43,958
Design/CQA (20%)	73,448	8,792
Overhead and Profit (15%)	39,036	444
Contingencies	73,448	13,187
Disposal of soil (90% of excavated material) - hazardous	0 *	
Disposal of debris (10% of excavated material) - hazardous	7,342 *	
Transportation of excavated material	22,420 *	
Task Subtotals	\$ 582,936	\$ 66,381
Task Total		\$ 649,317

* Overhead and profit included in cost.

** Disposal costs include 14% local disposal tax.

CQA = Construction Quality Assurance.

AREA B, C, E
CONTAINMENT ALTERNATIVE 2B
COLLECTION BY ENHANCED PERMEABILITY TRENCH
OFFSITE DISPOSAL OF SOILS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID:		Buffalo Color		
	Technology/Process:		Trench Unit		
Assembly		Unit Cost	Quantity	Unit of Measure	Total Cost
Trench					
Surface Clearing Bulldozer		4.50	1,745	CY	7,853
Cat 235, 1.5 CY, Soil/Sand, Trenching		4.50	2,280	CY	10,260
Clean Soil Backfill and Placement		10.00	1,745	CY	17,450
Spoils Placement		1.00	436	CY	436
Stone Backfill 1/2"-3/4"		22.00	1,844	CY	40,568
16 oz/yd Geotextile, Non-woven		0.50	6,290	SY	3,145
Disposal of soil (90% of excavated material) - hazardous	**	79.80	4,419	Ton	352,636
Disposal of debris (10% of excavated material) - haz	**	79.80	404	CY	32,239
Transportation of excavated material	**	20.00	4,910	Ton	98,200
Soil Testing for disposal (3)		600.00	3	Comp Sample	1,800
Sub-Surface Piping					
HDPE, 2' dia., 15' deep sump		2,000.00	1	Each	2,000
HDPE, 2' dia., 20' deep sump		2,500.00	1	Each	2,500
Submersible Transfer Pump 4-13 gpm <180' h		1,200.00	2	Each	2,400
W.L. Sensor Float Switch		200.00	2	Each	400
Check valve		300.00	2	Each	600
Flow meter		2,000.00	2	Each	4,000
Electrical/Mechanical Controls		5,000.00	2	Each	10,000
2" HDPE Force Main Carrier Pipe		5.50	700	LF	3,850
4" HDPE Force Main Containment Pipe		8.00	700	LF	5,600
Building and Piping Insulation		7,000.00	1	Each	7,000
Existing Tank Retrofit Area E		25,000.00	1	Each	25,000

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2B
COLLECTION BY ENHANCED PERMEABILITY TRENCH
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color		Trench Unit		
	Technology/Process:		Quantity	Unit of Measure	Total Cost
Assembly		Unit Cost			
Contractor Field Office & Facilities					
Trailer		500.00	6	Month	3,000
Water & Electricity		500.00	6	Month	3,000
Portable Toilets (2)		400.00	6	Month	2,400
Telephones/Fax		500.00	6	Month	3,000
Health & Safety and Decontamination					
Decon Pad Installation		5,000.00	1	LS	5,000
Decon Pad O&M		250.00	6	Month	1,500
H&S Disposables		1,000.00	6	Month	6,000
Mobilization/Demobilization					
Equipment		2,500.00	1	LS	2,500
Personnel		2,500.00	1	LS	2,500
Work Plans		2,500.00	1	LS	2,500
Bonds & Insurance		5,000.00	1	LS	5,000
Permits		500.00	1	LS	500
Erosion Control					
Silt Fence (along misc. areas)		3.00	500	LF	1,500
Miscellaneous Site Restoration					
6' Topsoil, Seeding, and Mulching		11,800.00	1	AC	11,800
					\$678,137

Notes:

Costs from contractor supplier estimates; Golder project related experience;
or from R.S Means Environmental Restoration Assemblies Cost Book, 1997.

** Disposal costs include 14% local disposal tax.

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2B
COLLECTION BY ENHANCED PERMEABILITY TRENCH
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Trench		
Surface Clearing Bulldozer		7,853
Cat 235, 1.5 CY, Soil/Sand, Trenching		10,260
Clean Soil Backfill and Placement	17,450	
Spoils Placement	436	
Stone Backfill 1/2"-3/4"	40,568	
16 oz/yd Geotextile, Non-woven	3,145	
Soil Testing for disposal (3)	1,800 *	
Sub-Surface Piping		
HDPE, 2' dia., 15' deep sump	2,000	
HDPE, 2' dia., 20' deep sump	2,500	
Submersible Transfer Pump 4-13 gpm <180' h	2,400	
W.L. Sensor Float Switch	400	
Check valve	600	
Flow meter	4,000	
Electrical/Mechanical Controls	10,000	
2" HDPE Force Main Carrier Pipe	3,850	
4" HDPE Force Main Containment Pipe	5,600	
Building and Piping Insulation	7,000	
Existing Tank Retrofit Area E	25,000 *	

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2B
COLLECTION BY ENHANCED PERMEABILITY TRENCH
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Contractor Field Office & Facilities		
Trailer	3,000 *	
Water & Electricity	3,000 *	
Portable Toilets (2)	2,400 *	
Telephones/Fax	3,000 *	
Health & Safety and Decontamination		
Decon Pad Installation	5,000 *	
Decon Pad O&M	1,500 *	
H&S Disposables	6,000 *	
Mobilization/Demobilization		
Equipment	2,500 *	
Personnel	2,500 *	
Work Plans	2,500 *	
Bonds & Insurance	5,000 *	
Permits	500 *	
Erosion Control		
Silt Fence (along misc. areas)	1,500 *	
Miscellaneous Site Restoration		
6' Topsoil, Seeding, and Mulching	11,800 *	
Total for All Sites	\$ 176,949	\$ 18,113
Design/CQA (20%)	35,390	3,623
Overhead and Profit (15%)	14,992	2,717
Contingencies	35,390	5,434
Disposal of soil (90% of excavated material) - hazardous	352,636 **	
Disposal of debris (10% of excavated material) - haz	32,239 **	
Transportation of excavated material	98,200 **	
Task Subtotals	\$ 745,796	\$ 29,887
Total		\$ 775,683

* Overhead and profit included in cost.

** Disposal costs include 14% local disposal tax.

CQA = Construction Quality Assurance.

AREA B, C, E
CONTAINMENT ALTERNATIVE 2B
COLLECTION BY ENHANCED PERMEABILITY TRENCH
ONSITE DISPOSAL OF SOILS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID: Buffalo Color		Trench Unit		
	Technology/Process:		Quantity	Unit of Measure	Total Cost
Assembly		Unit Cost			
Trench					
Surface Clearing Bulldozer		4.50	1,745	CY	7,853
Cat 235, 1.5 CY, Soil/Sand, Trenching		4.50	2,280	CY	10,260
Clean Soil Backfill and Placement		10.00	1,745	CY	17,450
Spoils Placement		1.00	436	CY	436
Stone Backfill 1/2"-3/4"		22.00	1,844	CY	40,568
16 oz/yd Geotextile, Non-woven		0.50	6,290	SY	3,145
Disposal of soil (90% of excavated material) - hazardous	**	0.00	4,419	Ton	0
Disposal of debris (10% of excavated material) - haz	**	79.80	404	CY	32,239
Transportation of excavated material	**	20.00	4,910	Ton	98,200
Soil Testing for disposal (3)		600.00	3	Comp Sample	1,800
Sub-Surface Piping					
HDPE, 2' dia., 15' deep sump		2,000.00	1	Each	2,000
HDPE, 2' dia., 20' deep sump		2,500.00	1	Each	2,500
Submersible Transfer Pump 4-13 gpm <180' h		1,200.00	2	Each	2,400
W.L. Sensor Float Switch		200.00	2	Each	400
Check valve		300.00	2	Each	600
Flow meter		2,000.00	2	Each	4,000
Electrical/Mechanical Controls		5,000.00	2	Each	10,000
2" HDPE Force Main Carrier Pipe		5.50	700	LF	3,850
4" HDPE Force Main Containment Pipe		8.00	700	LF	5,600
Building and Piping Insulation		7,000.00	1	Each	7,000
Existing Tank Retrofit Area E		25,000.00	1	Each	25,000

January 2000

993-9206

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2B
COLLECTION BY ENHANCED PERMEABILITY TRENCH
ONSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color			
	Technology/Process: Trench Unit			
Assembly	Unit Cost	Quantity	Unit of Measure	Total Cost
Contractor Field Office & Facilities				
Trailer	500.00	6	Month	3,000
Water & Electricity	500.00	6	Month	3,000
Portable Toilets (2)	400.00	6	Month	2,400
Telephones/Fax	500.00	6	Month	3,000
Health & Safety and Decontamination				
Decon Pad Installation	5,000.00	1	LS	5,000
Decon Pad O&M	250.00	6	Month	1,500
H&S Disposables	1,000.00	6	Month	6,000
Mobilization/Demobilization				
Equipment	2,500.00	1	LS	2,500
Personnel	2,500.00	1	LS	2,500
Work Plans	2,500.00	1	LS	2,500
Bonds & Insurance	5,000.00	1	LS	5,000
Permits	500.00	1	LS	500
Erosion Control				
Silt Fence (along misc. areas)	3.00	500	LF	1,500
Miscellaneous Site Restoration				
6' Topsoil, Seeding, and Mulching	11,800.00	1	AC	11,800
				\$325,501

Notes:
Costs from contractor supplier estimates; Golder project related experience;
or from R.S Means Environmental Restoration Assemblies Cost Book, 1997.
** Disposal costs include 14% local disposal tax.

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2B
COLLECTION BY ENHANCED PERMEABILITY TRENCH
ONSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Trench		
Surface Clearing Bulldozer		7,853
Cat 235, 1.5 CY, Soil/Sand, Trenching		10,260
Clean Soil Backfill and Placement	17,450	
Spoils Placement	436	
Stone Backfill 1/2"-3/4"	40,568	
16 oz/yd Geotextile, Non-woven	3,145	
Soil Testing for disposal (3)	1,800 *	
Sub-Surface Piping		
HDPE, 2' dia., 15' deep sump	2,000	
HDPE, 2' dia., 20' deep sump	2,500	
Submersible Transfer Pump 4-13 gpm <180' h	2,400	
W.L. Sensor Float Switch	400	
Check valve	600	
Flow meter	4,000	
Electrical/Mechanical Controls	10,000	
2" HDPE Force Main Carrier Pipe	3,850	
4" HDPE Force Main Containment Pipe	5,600	
Building and Piping Insulation	7,000	
Existing Tank Retrofit Area E	25,000 *	

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2B
COLLECTION BY ENHANCED PERMEABILITY TRENCH
ONSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Contractor Field Office & Facilities		
Trailer	3,000 *	
Water & Electricity	3,000 *	
Portable Toilets (2)	2,400 *	
Telephones/Fax	3,000 *	
Health & Safety and Decontamination		
Decon Pad Installation	5,000 *	
Decon Pad O&M	1,500 *	
H&S Disposables	6,000 *	
Mobilization/Demobilization		
Equipment	2,500 *	
Personnel	2,500 *	
Work Plans	2,500 *	
Bonds & Insurance	5,000 *	
Permits	500 *	
Erosion Control		
Silt Fence (along misc. areas)	1,500 *	
Miscellaneous Site Restoration		
6' Topsoil, Seeding, and Mulching	11,800 *	
Total for All Sites	\$ 176,949	\$ 18,113
Design/CQA (20%)	35,390	3,623
Overhead and Profit (15%)	14,992	2,717
Contingencies	35,390	5,434
Disposal of soil (90% of excavated material) - hazardous	0 **	
Disposal of debris (10% of excavated material) - haz	32,239 **	
Transportation of excavated material	98,200 **	
Task Subtotals	\$ 393,160	\$ 29,887
Total		\$ 423,047

* Overhead and profit included in cost.

** Disposal costs include 14% local disposal tax.

CQA = Construction Quality Assurance.

AREA B, C, E
CONTAINMENT ALTERNATIVE 2C
COLLECTION BY EXTRACTION WELLS AND TRENCH COMBINATION
OFFSITE DISPOSAL OF SOILS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID:		Buffalo Color		
	Technology/Process:		Extraction Wells/Trench		
Assembly		Unit Cost	Quantity	Unit of Measure	Total Cost
Well Extraction System					
Rubber Tire Backhoe (header excavation)		6.00	129	CY	774
Clean Soil Backfill and Placement		10.00	129	CY	1,290
Air Regulators/Gauges (well head)		275.00	13	Each	3,575
Air Regulators/Gauges (compressor)		235.00	1	Each	235
Air Aftercooler		530.00	1	Each	530
Air Compressor (30 cfm)		5,000.00	1	Each	5,000
Dessicant Air Dryer		2,350.00	1	Each	2,350
Solenoid Pressure Dump Valve		135.00	1	Each	135
Pneumatic Pump		2,125.00	13	Each	27,625
Test borings, 4"		150.00	6	Each	900
36" Borehole		35.00	195	LF	6,825
4" PVC Riser Pipe		5.00	130	LF	650
4" PVC Well Screen		5.00	65	LF	325
Wellhead Vaults		475.00	13	Each	6,175
Gravel backfill 1/4"		22.00	51	CY	1,122
Air/Discharge Tubing (jacketed)		6.40	195	LF	1,248
Fittings		2,000.00	1	total	2,000
Extraction system performance monitoring piezometers		1,000.00	2	Each	2,000
Disposal of soil (90% of excavated material) - hazardous		79.80	248.0	Ton	19,790
Disposal of debris (10% of excavated material) - haz		79.80	22.0	CY	1,756
Transportation of excavated material		20.00	277	Ton	5,540
2" PVC Compressed Air Manifold		3.00	650	LF	1,950
Soil Testing for disposal (3)		600.00	3	Comp Sample	1,800
Well Transfer and Storage System					
HDPE, 2' dia., 10' deep sump		1,500.00	1	Each	1,500
Submersible Transfer Pump 4-13 gpm <180' h		1,200.00	1	Each	1,200
W.L. Sensor Float Switch		200.00	1	Each	200
Check valve		300.00	1	Each	300
Flow meter		2,000.00	1	Each	2,000
Electrical/Mechanical Controls		5,000.00	1	Each	5,000
3" HDPE Gravity Drain		5.00	500	LF	2,500
2" HDPE Force Main Carrier Pipe		5.50	150	LF	825
4" HDPE Force Main Containment Pipe		8.00	150	LF	1,200
Heat Tracing		7.00	25	LF	175
Concrete Pad for Compressor Building		2.10	300	SF	630
Compressor Building		10,000.00	1	Each	10,000
Building and Piping Insulation		7,000.00	1	Each	7,000

AREA B, C, E
CONTAINMENT ALTERNATIVE 2C
COLLECTION BY EXTRACTION WELLS AND TRENCH COMBINATION
OFFSITE DISPOSAL OF SOILS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID: Buffalo Color		Extraction Wells/Trench		
	Technology/Process:		Quantity	Unit of Measure	Total Cost
Assembly		Unit Cost			
Trench					
Surface Clearing Bulldozer		4.50	1,282	CY	5,769
Cat 235, 1.5 CY, Soil/Sand, Trenching		4.50	1,661	CY	7,475
Clean Soil Backfill and Placement		10.00	1,282	CY	12,820
Spoils Placement		1.00	321	CY	321
Stone Backfill 1/2"-3/4"		22.00	1,340	CY	29,480
16 oz/yd Geotextile, Non-woven		0.50	4,624	SY	2,312
Disposal of soil (90% of excavated material) - hazardous	**	79.80	3,632	Ton	289,834
Disposal of debris (10% of excavated material) - haz	**	79.80	314	CY	25,057
Transportation of excavated material	**	20.00	4,035	Ton	80,700
Soil Testing for disposal (3)		600.00	3	Comp Sample	1,800
Trench Sub-Surface Piping					
HDPE, 2' dia., 20' deep sump		2,500.00	1	Each	2,500
Submersible Transfer Pump 4-13 gpm <180' h		1,200.00	1	Each	1,200
W.L. Sensor Float Switch		200.00	1	Each	200
Check valve		300.00	1	Each	300
Flow meter		2,000.00	1	Each	2,000
Electrical/Mechanical Controls		5,000.00	1	Each	5,000
2" HDPE Force Main Carrier Pipe		5.50	600	LF	3,300
4" HDPE Force Main Containment Pipe		8.00	600	LF	4,800
Heat Tracing		7.00	25	LF	175
Building and Piping Insulation		7,000.00	1	Each	7,000
Existing Tank Retrofit Area E		25,000.00	1	Each	25,000
Contractor Field Office & Facilities					
Trailer		500.00	6	Month	3,000
Water & Electricity		500.00	6	Month	3,000
Portable Toilets (2)		400.00	6	Month	2,400
Telephones/Fax		500.00	6	Month	3,000
Health & Safety and Decontamination					
Decon Pad Installation		5,000.00	1	LS	5,000
Decon Pad O&M		250.00	6	Month	1,500
H&S Disposables		1,000.00	6	Month	6,000

January 2000

993-9206

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2C
COLLECTION BY EXTRACTION WELLS AND TRENCH COMBINATION
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color		Extraction Wells/Trench		
	Technology/Process:		Quantity	Unit of Measure	Total Cost
Assembly		Unit Cost			
Mobilization/Demobilization					
Equipment		2,500.00	1	LS	2,500
Personnel		2,500.00	1	LS	2,500
Work Plans		2,500.00	1	LS	2,500
Bonds & Insurance		5,000.00	1	LS	5,000
Permits		500.00	1	LS	500
Erosion Control					
Silt Fence (along misc. areas)		3.00	500	LF	1,500
Miscellaneous Site Restoration					
6' Topsoil, Seeding, and Mulching		11,800.00	1	AC	11,800
TOTAL					\$683,368
Notes: Costs from contractor supplier estimates; Golder project related experience; or from R.S Means Environmental Restoration Assemblies Cost Book, 1997. ** Disposal costs include 14% local disposal tax.					

**CONTAINMENT ALTERNATIVE 2C
COLLECTION BY EXTRACTION WELLS AND TRENCH COMBINATION
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Well Extraction System		
Rubber Tire Backhoe (header excavation)	774	
Clean Soil Backfill and Placement	1,290	
Air Regulators/Gauges (well head)	3,575	
Air Regulators/Gauges (compressor)	235	
Air Aftercooler	530	
Air Compressor (30 cfm)	5,000	
Dessicant Air Dryer	2,350	
Solenoid Pressure Dump Valve	135	
Pneumatic Pump	27,625	
Test borings, 4"		900 *
36" Borehole		6,825 *
4" PVC Riser Pipe	650	
4" PVC Well Screen	325	
Wellhead Vaults	6,175	
Gravel backfill 1/4"	1,122	
Air/Discharge Tubing (jacketed)	1,248	
Fittings	2,000	
Extraction system performance monitoring piezometers		2,000 *
2" PVC Compressed Air Manifold	1,950	
Soil Testing for disposal (3)	1,800 *	
Well Transfer and Storage System		
HDPE, 2' dia., 10' deep sump	1,500	
Submersible Transfer Pump 4-13 gpm <180' h	1,200 *	
W.L. Sensor Float Switch	200	
Check valve	300	
Flow meter	2,000	
Electrical/Mechanical Controls	5,000	
3" HDPE Gravity Drain	2,500	
2" HDPE Force Main Carrier Pipe	825	
4" HDPE Force Main Containment Pipe	1,200	
Heat Tracing	175	
Concrete Pad for Compressor Building	630	
Compressor Building	10,000	
Building and Piping Insulation	7,000	

**CONTAINMENT ALTERNATIVE 2C
COLLECTION BY EXTRACTION WELLS AND TRENCH COMBINATION
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Trench		
Surface Clearing Bulldozer		5,769
Cat 235, 1.5 CY, Soil/Sand, Trenching		7,475
Clean Soil Backfill and Placement	12,820	
Spoils Placement	321	
Stone Backfill 1/2"-3/4"	29,480	
16 oz/yd Geotextile, Non-woven	2,312	
Soil Testing for disposal (3)	1,800 *	
Trench Sub-Surface Piping		
HDPE, 2' dia., 20' deep sump	2,500	
Submersible Transfer Pump 4-13 gpm <180' h	1,200	
W.L. Sensor Float Switch	200	
Check valve	300	
Flow meter	2,000	
Electrical/Mechanical Controls	5,000	
2" HDPE Force Main Carrier Pipe	3,300	
4" HDPE Force Main Containment Pipe	4,800	
Heat Tracing	175	
Building and Piping Insulation	7,000	
Existing Tank Retrofit Area E	25,000	
Contractor Field Office & Facilities		
Trailer	3,000 *	
Water & Electricity	3,000 *	
Portable Toilets (2)	2,400 *	
Telephones/Fax	3,000 *	
Health & Safety and Decontamination		
Decon Pad Installation	5,000 *	
Decon Pad O&M	1,500 *	
H&S Disposables	6,000 *	

AREA B, C, E
CONTAINMENT ALTERNATIVE 2C
COLLECTION BY EXTRACTION WELLS AND TRENCH COMBINATION
ONSITE DISPOSAL OF SOILS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID:		Buffalo Color		
	Technology/Process:		Extraction Wells/Trench		
Assembly		Unit Cost	Quantity	Unit of Measure	Total Cost
Well Extraction System					
Rubber Tire Backhoe (header excavation)		6.00	129	CY	774
Clean Soil Backfill and Placement		10.00	129	CY	1,290
Air Regulators/Gauges (well head)		275.00	13	Each	3,575
Air Regulators/Gauges (compressor)		235.00	1	Each	235
Air Aftercooler		530.00	1	Each	530
Air Compressor (30 cfm)		5,000.00	1	Each	5,000
Dessicant Air Dryer		2,350.00	1	Each	2,350
Solenoid Pressure Dump Valve		135.00	1	Each	135
Pneumatic Pump		2,125.00	13	Each	27,625
Test borings, 4"		150.00	6	Each	900
36" Borehole		35.00	195	LF	6,825
1" PVC Riser Pipe		5.00	130	LF	650
4" PVC Well Screen		5.00	65	LF	325
Wellhead Vaults		475.00	13	Each	6,175
Gravel backfill 1/4"		22.00	51	CY	1,122
Air/Discharge Tubing (jacketed)		6.40	195	LF	1,248
Fittings		2,000.00	1	total	2,000
Extraction system performance monitoring piezometers		1,000.00	2	Each	2,000
Disposal of soil (90% of excavated material) - hazardous	**	0.00	248.0	Ton	0
Disposal of debris (10% of excavated material) - haz	**	79.80	22.0	CY	1,756
Transportation of excavated material	**	20.00	277	Ton	5,540
2" PVC Compressed Air Manifold		3.00	650	LF	1,950
Soil Testing for disposal (3)		600.00	3	Comp Sample	1,800
Well Transfer and Storage System					
HDPE, 2' dia., 10' deep sump		1,500.00	1	Each	1,500
Submersible Transfer Pump 4-13 gpm <180' h		1,200.00	1	Each	1,200
W.L. Sensor Float Switch		200.00	1	Each	200
Check valve		300.00	1	Each	300
Flow meter		2,000.00	1	Each	2,000
Electrical/Mechanical Controls		5,000.00	1	Each	5,000
3" HDPE Gravity Drain		5.00	500	LF	2,500
2" HDPE Force Main Carrier Pipe		5.50	150	LF	825
4" HDPE Force Main Containment Pipe		8.00	150	LF	1,200
Heat Tracing		7.00	25	LF	175
Concrete Pad for Compressor Building		2.10	300	SF	630
Compressor Building		10,000.00	1	Each	10,000
Building and Piping Insulation		7,000.00	1	Each	7,000

AREA B, C, E
CONTAINMENT ALTERNATIVE 2C
COLLECTION BY EXTRACTION WELLS AND TRENCH COMBINATION
ONSITE DISPOSAL OF SOILS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID: Buffalo Color		Technology/Process: Extraction Wells/Trench		
	Assembly	Unit Cost	Quantity	Unit of Measure	Total Cost
Trench					
	Surface Clearing Bulldozer	4.50	1,282	CY	5,769
	Cat 235, 1.5 CY, Soil/Sand, Trenching	4.50	1,661	CY	7,475
	Clean Soil Backfill and Placement	10.00	1,282	CY	12,820
	Spoils Placement	1.00	321	CY	321
	Stone Backfill 1/2"-3/4"	22.00	1,340	CY	29,480
	16 oz/yd Geotextile, Non-woven	0.50	4,624	SY	2,312
	Disposal of soil (90% of excavated material) - hazardous **	0.00	3,632	Ton	0
	Disposal of debris (10% of excavated material) - haz **	79.80	314	CY	25,057
	Transportation of excavated material **	20.00	4,035	Ton	80,700
	Soil Testing for disposal (3)	600.00	3	Comp Sample	1,800
Trench Sub-Surface Piping					
	HDPE, 2' dia., 20' deep sump	2,500.00	1	Each	2,500
	Submersible Transfer Pump 4-13 gpm <180' h	1,200.00	1	Each	1,200
	W.L. Sensor Float Switch	200.00	1	Each	200
	Check valve	300.00	1	Each	300
	Flow meter	2,000.00	1	Each	2,000
	Electrical/Mechanical Controls	5,000.00	1	Each	5,000
	2" HDPE Force Main Carrier Pipe	5.50	600	LF	3,300
	4" HDPE Force Main Containment Pipe	8.00	600	LF	4,800
	Heat Tracing	7.00	25	LF	175
	Building and Piping Insulation	7,000.00	1	Each	7,000
	Existing Tank Retrofit Area E	25,000.00	1	Each	25,000
Contractor Field Office & Facilities					
	Trailer	500.00	6	Month	3,000
	Water & Electricity	500.00	6	Month	3,000
	Portable Toilets (2)	400.00	6	Month	2,400
	Telephones/Fax	500.00	6	Month	3,000
Health & Safety and Decontamination					
	Decon Pad Installation	5,000.00	1	LS	5,000
	Decon Pad O&M	250.00	6	Month	1,500
	H&S Disposables	1,000.00	6	Month	6,000

**CONTAINMENT ALTERNATIVE 2C
COLLECTION BY EXTRACTION WELLS AND TRENCH COMBINATION
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Mobilization/Demobilization		
Equipment	2,500 *	
Personnel	2,500 *	
Work Plans	2,500 *	
Bonds & Insurance	5,000 *	
Permits	500 *	
Erosion Control		
Silt Fence (along misc. areas)	1,500 *	
Miscellaneous Site Restoration		
6' Topsoil, Seeding, and Mulching	11,800 *	
Total for All Sites	\$ 237,722	\$ 22,969
Design/CQA (20%)	47,544	4,594
Overhead and Profit (15%)	27,408	1,987
Contingencies	47,544	6,891
Disposal of well soil (90% of excavated material) - haz	19,790 **	
Disposal of well debris (10% of excavated material) - haz	1,756 **	
Transportation of excavated material from wells	5,540 **	
Disposal of trench soil (90% of excavated material) - haz	289,834 **	
Disposal of trench debris (10% of excavated material) - haz	25,057 **	
Transportation of excavated material from trench	80,700 **	
Task Subtotals	\$ 782,895	\$ 36,441
Task Total		\$ 819,336

* Overhead and profit included in cost.

** Disposal costs include 14% local disposal tax.

CQA = Construction Quality Assurance.

January 2000

993-9206

AREA B, C, E
CONTAINMENT ALTERNATIVE 2C
COLLECTION BY EXTRACTION WELLS AND TRENCH COMBINATION
ONSITE DISPOSAL OF SOILS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID: Buffalo Color		Extraction Wells/Trench		
	Technology/Process:		Quantity	Unit of Measure	Total Cost
Assembly		Unit Cost			
Mobilization/Demobilization					
Equipment		2,500.00	1	LS	2,500
Personnel		2,500.00	1	LS	2,500
Work Plans		2,500.00	1	LS	2,500
Bonds & Insurance		5,000.00	1	LS	5,000
Permits		500.00	1	LS	500
Erosion Control					
Silt Fence (along misc. areas)		3.00	500	LF	1,500
Miscellaneous Site Restoration					
6' Topsoil, Seeding, and Mulching		11,800.00	1	AC	11,800
TOTAL					\$373,744

Notes:

Costs from contractor supplier estimates; Golder project related experience;
or from R.S Means Environmental Restoration Assemblies Cost Book, 1997.

** Disposal costs include 14% local disposal tax.

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2C
COLLECTION BY EXTRACTION WELLS AND TRENCH COMBINATION
ONSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Well Extraction System		
Rubber Tire Backhoe (header excavation)	774	
Clean Soil Backfill and Placement	1,290	
Air Regulators/Gauges (well head)	3,575	
Air Regulators/Gauges (compressor)	235	
Air Aftercooler	530	
Air Compressor (30 cfm)	5,000	
Dessicant Air Dryer	2,350	
Solenoid Pressure Dump Valve	135	
Pneumatic Pump	27,625	
Test borings, 4"		900 *
36" Borehole		6,825 *
4" PVC Riser Pipe	650	
4" PVC Well Screen	325	
Wellhead Vaults	6,175	
Gravel backfill 1/4"	1,122	
Air/Discharge Tubing (jacketed)	1,248	
Fittings	2,000	
Extraction system performance monitoring piezometers		2,000 *
2" PVC Compressed Air Manifold	1,950	
Soil Testing for disposal (3)	1,800 *	
Well Transfer and Storage System		
HDPE, 2' dia., 10' deep sump	1,500	
Submersible Transfer Pump 4-13 gpm <180' h	1,200 *	
W.L. Sensor Float Switch	200	
Check valve	300	
Flow meter	2,000	
Electrical/Mechanical Controls	5,000	
3" HDPE Gravity Drain	2,500	
2" HDPE Force Main Carrier Pipe	825	
4" HDPE Force Main Containment Pipe	1,200	
Heat Tracing	175	
Concrete Pad for Compressor Building	630	
Compressor Building	10,000	
Building and Piping Insulation	7,000	

AREA B, C, E
CONTAINMENT ALTERNATIVE 2C
COLLECTION BY EXTRACTION WELLS AND TRENCH COMBINATION
ONSITE DISPOSAL OF SOILS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Task Summary		
	20% Contingency	30% Contingency
Trench		
Surface Clearing Bulldozer		5,769
Cat 235, 1.5 CY, Soil/Sand, Trenching		7,475
Clean Soil Backfill and Placement	12,820	
Spoils Placement	321	
Stone Backfill 1/2"-3/4"	29,480	
16 oz/yd Geotextile, Non-woven	2,312	
Soil Testing for disposal (3)	1,800 *	
Trench Sub-Surface Piping		
HDPE, 2' dia., 20' deep sump	2,500	
Submersible Transfer Pump 4-13 gpm <180' h	1,200	
W.L. Sensor Float Switch	200	
Check valve	300	
Flow meter	2,000	
Electrical/Mechanical Controls	5,000	
2" HDPE Force Main Carrier Pipe	3,300	
4" HDPE Force Main Containment Pipe	4,800	
Heat Tracing	175	
Building and Piping Insulation	7,000	
Existing Tank Retrofit Area E	25,000	
Contractor Field Office & Facilities		
Trailer	3,000 *	
Water & Electricity	3,000 *	
Portable Toilets (2)	2,400 *	
Telephones/Fax	3,000 *	
Health & Safety and Decontamination		
Decon Pad Installation	5,000 *	
Decon Pad O&M	1,500 *	
H&S Disposables	6,000 *	

**AREA B, C, E
CONTAINMENT ALTERNATIVE 2C
COLLECTION BY EXTRACTION WELLS AND TRENCH COMBINATION
ONSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary		
	20% Contingency	30% Contingency
Mobilization/Demobilization		
Equipment	2,500 *	
Personnel	2,500 *	
Work Plans	2,500 *	
Bonds & Insurance	5,000 *	
Permits	500 *	
Erosion Control		
Silt Fence (along misc. areas)	1,500 *	
Miscellaneous Site Restoration		
6' Topsoil, Seeding, and Mulching	11,800 *	
Total for All Sites	\$ 237,722	\$ 22,969
Design/CQA (20%)	47,544	4,594
Overhead and Profit (15%)	27,408	1,987
Contingencies	47,544	6,891
Disposal of well soil (90% of excavated material) - haz	0 *	
Disposal of well debris (10% of excavated material) - haz	1,756 *	
Transportation of excavated material from wells	5,540 *	
Disposal of trench soil (90% of excavated material) - haz	0 *	
Disposal of trench debris (10% of excavated material) - haz	25,057 *	
Transportation of excavated material from trench	80,700 *	
Task Subtotals	\$ 473,271	\$ 36,441
Task Total	\$ 509,712	

* Overhead and profit included in cost.

** Disposal costs include 14% local disposal tax.

CQA = Construction Quality Assurance.

**AREA BCE
CONTAINMENT ALTERNATIVE 2
COLLECTION BY EXTRACTION WELLS AND/OR TRENCH
OPERATION AND MAINTENANCE COSTS
30-YEAR COSTS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color		Technology/Process: Area BCE Extraction System		
	Assembly	Unit Cost	Quantity	Unit of Measure	Total Cost
Extraction System					
Well /trench maintenance*		63,327	1	EACH	63,327
Electricity		876	30	Ea. yr.	26,280
Systems Inspections/Reporting		5,000	30	Ea. yr.	150,000
Subtotal					239,607
Contingencies (20%)					47,921
Task Total (30 YEAR)					287,528
Annual Costs					9,584

Notes:

*Assumes 25% replacement of total cost of well/trench system (minus waste disposal and soil testing) over 30-year period.
Assumes sumps/compressor consume 20 kilowatt hours per day; 12 cents kilowatt hour rate.

AREAS A, C, E
ASPHALT CAPPING OF SOILS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID: Buffalo Color		Technology/Process: Soil Capping		
	Assembly	Unit Cost	Quantity	Unit of Measure	Total Cost
Cover System Components					
3-inch thick stone base (1)	*	1.00	25,700	SY	25,700
Asphalt binder (2 inches thick)	*	5.00	47,400	SY	237,000
Asphalt wearing surface (1 inch thick)	*	5.00	47,400	SY	237,000
TOTAL					\$499,700
Notes: * Costs from local contractor estimate					

**AREAS A, C, E
ASPHALT CAPPING OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

BUFFALO, NEW YORK

Task Summary	
Cover System Components	
3-inch thick stone base*	25,700
Asphalt binder (2 inches thick)*	237,000
Asphalt wearing surface (1 inch thick)*	237,000
Subtotal	\$ 499,700
Design/CQA (1%)	4,997
Overhead and Profit (15%)	0
Contingencies (20%)	99,940
Total	\$ 604,637

* Cost from local contractor initial estimates; overhead and profit included in cost.
CQA = Construction Quality Assurance.

AREA ACE
CONTAINMENT ALTERNATIVE 2
ASPHALT CAPPING OF SOILS
OPERATION AND MAINTENANCE COSTS
30 YEAR COSTS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID: Buffalo Color		Technology/Process: Soil Capping		
		Unit Cost	Quantity	Unit of Measure	Total Cost
Assembly					
Asphalt Cap					
Annual asphalt integrity assessment		2,000	30	EACH	60,000
25% replacement of wearing surface every 5 years		59,250	6	EACH	355,500
Subtotal					415,500
Contingencies (5%)					20,775
Task Total (30 year)					436,275
Annual costs					14,543
Notes:					

**ALTERNATIVE 1A
AREA A GROUT BARRIER
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color		Technology/Process: Area A Grout Barrier		
	Assembly	Unit Cost	Quantity	Unit of Measure	Total Cost
Grout barrier	*	729	1550	Lin.Ft.	1,129,950
Disposal of soil (90% of excavated material) - hazardous	**	79.80	1,426.0	Ton	113,795
Disposal of debris (10% of excavated material) - haz	**	79.80	159.0	CY	12,688
Transportation of excavated material	**	20	1585	Ton	31,700
Notes:					TOTAL
*Cost from Hayward Baker initial estimates; overhead and profit included in cost.					\$1,288,133
** Includes 14% local disposal tax.					
Assume: 1 Ton = 1 cy.					

**ALTERNATIVE 1A
AREA A GROUT BARRIER
OFFSITE DISPOSAL OF SOILS**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary	
Grout Barrier*	1,129,950
Subtotal	\$ 1,129,950
Design/CQA (05%)	+ 56,498
Contingencies (25%)	+ 282,488
Soil Disposal	113,795
Debris Disposal	12,688
Transportation of excavated material	31,700
Task Total	\$ 1,627,119

* Cost from Hayward Baker initial estimates
Overhead and profit included in costs.
CQA = Construction Quality Assurance.

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID:		Buffalo Color		
	Technology/Process:		Area A Bank Stabilization		
Assembly		Unit Cost	Quantity	Unit of Measure	Total Cost
Rip Rap		8	15000	SF	120,000
Brush clearing*		0.10	15000	SF	1,500
Slope grading		10	555	CY	5,550
Notes:					TOTAL
*Costs from R.S. Means Environmental Restoration Assemblies Cost Book, 1997.					\$127,050

**ALTERNATIVE 1
AREA A BANK EROSION CONTROL**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary	
Rip Rap	120,000
Brush clearing	1,500
Slope grading	5,550
Subtotal	\$ 127,050
Design/CQA (15%)	+ 19,058
Contingencies (20%)	+ 31,763
Task Total	\$ 177,871

Costs from R.S. Means Environmental Restoration
Assemblies Cost Book, 1997.

CQA = Construction Quality Assurance.

**AREA E
SHEET PILE REPAIR**

**BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Cost Estimate	Site ID: Buffalo Color				
	Technology/Process: Sheetpile Repair				
Assembly		Unit Cost	Quantity	Unit of Measure	Total Cost
Sheet Pile Repair					
Excavate and repair sheet pile		10,000.00	1	Each	10,000
TOTAL					\$10,000
Notes: Costs from local contractor initial estimates; includes repairing both sheet pile sections.					

**AREA E
SHEETPILE REPAIR****BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK**

Task Summary	
Sheetpile Repair	
Excavate and repair sheet pile	10,000
Subtotal	\$ 10,000
Design/CQA (15%)	1,500
Contingencies (30%)	3,000
Total	\$ 14,500

Cost from local contractor initial estimates; overhead and profit included in cost.
CQA = Construction Quality Assurance.

AREA E
CORRECTIVE ACTION MANAGEMENT UNIT (CAMU)
FOR ONSITE SOIL DISPOSAL OF EXTRACTION SYSTEM SPOILS

BUFFALO COLOR CORPORATION
BUFFALO , NEW YORK

Cost Estimate	Site ID: Buffalo Color				
	Technology/Process: CAMU				
Assembly		Unit Cost	Quantity	Unit of Measure	Total Cost
CAMU installation					
Grading/spoil placement		4	3,828	CY	15,312
Underdrain piping		10	350	LF	3,500
Transfer piping		10	130	LF	1,300
Drainage aggregate inc. placement		20	26	CY	520
Drainage geonet with double-sided filter fabric		5	2,500	SY	12,500
Structural geotextile		3	2,500	SY	7,500
Asphalt binder - 2" thick		5	2,500	SY	12,500
Asphalt wearing surface - 1" thick		5	2,500	SY	12,500
Notes:					
Price from local contractor for similar projects.					
TOTAL					\$65,632

AREA E
CORRECTIVE ACTION MANAGEMENT UNIT (CAMU)
FOR ONSITE SOIL DISPOSAL OF EXTRACTION SYSTEM SPOILS

BUFFALO COLOR CORPORATION
BUFFALO , NEW YORK

Task Summary	
CAMU installation	
Grading	15,312
Underdrain piping	3,500
Transfer piping	1,300
Drainage aggregate	520
Drainage geonet with double-sided filter fabric	12,500
Structural geotextile	7,500
Asphalt binder - 2" thick	12,500
Asphalt wearing surface - 1" thick	12,500
Subtotal	\$ 65,632
Design/CQA (20%)	13,126
Overhead and Profit (15%)	9,845
Contingencies (30%)	19,690
Task Total	\$ 108,293

Cost from local contractor estimates
Overhead and profit included in costs.
CQA = Construction Quality Assurance.

AREA ACE
CAMU ALTERNATIVE 2
CORRECTIVE ACTION MANAGEMENT UNIT (CAMU)
FOR ONSITE SOIL DISPOSAL OF EXTRACTION SYSTEM SPOILS
30 YEAR COSTS

BUFFALO COLOR CORPORATION
BUFFALO, NEW YORK

Cost Estimate	Site ID: Buffalo Color				
	Technology/Process: CAMU				
Assembly		Unit Cost	Quantity	Unit of Measure	Total Cost
Asphalt Cap					
Annual asphalt integrity assessment		500	30	EACH	15,000
25% replacement of wearing surface every 5 years		3,125	6	EACH	18,750
Subtotal					33,750
Contingencies (5%)					1,688
Task Total (30 year)					35,438
Annual costs					1,181
Notes:					