Olin CHEMICALS
P.O. BOX 248, LOWER RIVER ROAD, CHARLESTON, TN 37310
Phone: (615) 336-4000

January 7, 1993

Phillip Masters
Hazardous Waste Facilities Branch
United States Environmental Protection Agency
Region II
26 Federal Plaza, Room 1037
New York, New York 10278

Re: Report of Man-made Passageways Evaluation
Olin Corporation
Niagara Falls, NY, Plantsite
EPA ID No. NYD002123461, Index No. RCRA-3013-0208
RCRA Facility Investigation

Dear Mr. Masters:

Section 2.7 of the Work Plan requires an evaluation of the potential for offsite migration via man-made passageways. Section 8 of the Interim Report submitted February 9, 1992, provided a preliminary report of our evaluation to that date. The draft report of the evaluation is enclosed.

The report states that the impact of man-made passageways appears to be limited to the overburden and that there does not appear to be a major potential for off-plant migration of groundwater contamination via these passageways.

Please call (615-336-4308) if you have any questions about this report or any of the work under the RFI.

Sincerely,

OLIN CORPORATION

J. C. Brown
Manager, Environmental Technology

\jcb\172
Enclosure

cc: P. Counterman (2)
W. G. McGlasson (w/o enclos.)
K. R. McIntosh (w/o enclos.)
G. C. Meyer (w/o enclos.)
J. P. Mitchell
S. F. Radon
A. D. Rheingold (w/o enclos.)
Permits Admin. Branch - EPA

SUPPLEMENTAL REPORT: MAN-MADE PASSAGEWAYS OLIN CHEMICALS RCRA FACILITY INVESTIGATION

Prepared for:
Olin Corporation
2400 Buffalo Avenue
Niagara Falls, New York 14302
November 1992

Woodward-Clyde

Woodward-Clyde Consultants
3571 Niagara Falls Boulevard
North Tonawanda, New York 14120
Project Number 92C2030-5

3571 Niagara Falls Boulevard
North Tonawanda
New York 14120
(716) 692-7172
Fax (716) 692-1512

Woodward-Clyde Consultants

November 9, 1992
90C2030-5

Mr. James C. Brown
Olin Chemicals
Lower River Road
Charleston, Tennessee 37310

Re: Supplemental Report: Man-Made Passageways
Olin Chemicals Buffalo Avenue Plant
RCRA Facility Investigation (RCRA-89-3013-0208)

Dear Mr. Brown:

Woodward-Clyde Consultants (WCC) is pleased to submit this supplemental report pursuant to the Olin Chemicals Buffalo Avenue Plant RCRA Facility Investigation (RFI). This report addresses the recommendations of the Interim Report (WCC, February 7, 1992) concerning potential subsurface contaminant migration in underground sewers adjacent to the Olin Plant.

If you have any questions or comments on this report, please contact the undersigned. We appreciate the opportunity to work with Olin on this project.

Sincerely,

Kelly R. McIntosh, P.E.
Project Manager

James F. Roetzer, Ph.D.
Senior Associate

cc: J. Humphries (Olin)

Olircra.rep

SUPPLEMENTAL REPORT: MAN-MADE PASSAGEWAYS OLIN CHEMICALS RCRA FACILITY INVESTIGATION

Prepared for:
Olin Chemicals
2400 Buffalo Avenue
Niagara Falls, New York 14302
November 9, 1992

Woodward-Clyde Consultants
3571 Niagara Falls Boulevard
North Tonawanda, New York 14120
Project Number 90C2030-5

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EXECUTIVE SUMMARY

This report was prepared as part of the RCRA Facility Investigation (RFI) being conducted by Woodward-Clyde Consultants (WCC) for the Olin Chemicals Buffalo Avenue Plant in Niagara Falls, New York. The purpose of this report is to assess the potential for underground conduits (man-made passageways) to cause preferential migration of groundwater contamination from the Olin Plant.

Based on groundwater monitoring data, sewer construction information, site hydrogeology, and results of off-site man-made passageways investigations, this report concludes the following:

1. Within the boundaries of the Olin Plant, the hydraulic impact of the identified man-made passageways appears to be limited to the overburden and top-of-bedrock interface (i.e., the A-zone). The impacts are not widespread, and since A-zone contaminant levels near these structures are generally very low, there does not appear to be a major potential for off-plant migration of groundwater contamination via these conduits.

2. The two off-site sewers evaluated do not likely act as conduits for preferential migration of groundwater contamination potentially associated with solid waste management units (SWMUs) at the Olin Plant.

1.0
INTRODUCTION

Olin Corporation (Olin) has entered into an Administrative Consent Order (Index No. RCRA-89-3013-0208) with the U.S. Environmental Protection Agency (EPA) which provides for performance of a RCRA Facility Investigation (RFI) at Olin's Buffalo Avenue Plant in Niagara Falls, New York (Figure 1-1). Olin has retained Woodward-Clyde Consultants (WCC) to conduct the RFI. The RFI included installation and sampling of groundwater monitoring wells. Locations of monitoring wells are shown on Figure 1-2.

As part of the RFI, major plant sewer systems were assessed with respect to their potential for acting as preferential pathways for off-site migration of contaminated groundwater. Most of this assessment was presented in the RFI Interim Report (WCC, February 7, 1992) submitted to EPA. The Interim Report recommended additional assessment of two sewer lines -- both of which are located off-plant. One, the Adams Avenue Sewer, runs from east to west south of Plants 1 and 2. The other, the Chemical Road Sewer, runs from south to north between Plants 1 and 2.

The current report summarizes the findings of the man-made passageways assessment presented in the Interim Report (Section 2.0) and presents the results of the supplemental assessment of the Adams Avenue and Chemical Road sewers (Section 3.0). The updated conclusions are presented in Section 4.0. Limitations of the report are identified in Section 5.0.

2.0
SUMMARY OF INTERIM REPORT MAN-MADE PASSAGEWAYS ASSESSMENT

In the Interim Report, major plant sewer systems were assessed with respect to their potential for acting as preferential pathways for off-site migration of contaminated groundwater. The primary characteristic used to determine if a sewer is a potentially significant preferential pathway for groundwater contaminant migration is its location relative to the top-of-bedrock. As described in the Interim Report, the first major water-bearing zone for groundwater flow beneath the Plant is the interval spanning the lower two feet of overburden and the weathered upper bedrock. Pipes and/or backfill above bedrock will not create a substantial hydraulic depression, even if susceptible to infiltration, because the saturated zone in the overburden is so thin. The thickness of the overburden saturated zone estimated in the Interim Report ranged from approximately zero to three feet. Therefore, for a permeable conduit to cause a substantial hydraulic depression it must be constructed several feet into the bedrock.

Other factors evaluated in assessing potential for preferential transport along storm sewers were the groundwater potentiometric surfaces and the distribution of contaminants. The potentiometric surface plots were examined for evidence of hydraulic depressions which could be related to infiltration to sewers (or backfill). The distribution of chemical contaminants was evaluated with respect to any linearity of concentrated zones which could be related to preferential contaminant migration.

There are seven sewer systems in the Plant 1 area and six sewer systems in the Plant 2 area. Appendix A presents a compilation of surface elevation, bottom elevation and pipe dimensions along each sewer system. These data were evaluated with respect to the top-of-bedrock surface, the groundwater potentiometric surfaces and the chemical contaminant distributions in groundwater.

Figures 2-1 and 2-2 show the locations of the sewer systems located within Plant 1 and Plant 2, respectively. Each sewer system is evaluated below.

2.1 PLANT 1 SEWER SYSTEMS

2.1.1 Clear Water Sewer Systems

In the Plant 1 area, there are two clear water sewer systems (designated 1CW and 2CW) which discharge to the Buffalo Avenue Diversion Sewer. The Buffalo Avenue Diversion Sewer carries stormwater and permitted discharges to the Niagara River. In the vicinity of the Plant 1 connections, the Buffalo Avenue Diversion Sewer is a 60-inch pipe excavated into the bedrock. The Interim Report conclusions regarding its potential impact on groundwater flow are summarized in Section 2.4.

The 1CW sewer system runs south to north in the western portion of Plant 1. The pipes are above bedrock except in the immediate vicinity of the connection with the Buffalo Avenue Diversion Sewer (manholes 94 and 96). Therefore, the 1CW system does not represent a substantial potential for causing preferential off-site groundwater flow and contaminant migration.

The 2CW system, portions of which have been abandoned and plugged, runs south to north in the eastern portion of Plant 1. The 2CW system is also above the bedrock at all locations except in the immediate vicinity of its connection with the Buffalo Avenue Diversion Sewer. Therefore the 2CW system does not represent a substantial potential for causing preferential off-site groundwater flow and contaminant migration.

2.1.2 Sanitary Sewer Systems

There are four sanitary systems which have been used in Plant 1. These are the 1S, 2S, 3S and 9S systems. Each of these connects to a city sanitary sewer which runs beneath Buffalo Avenue (Buffalo Avenue Sanitary Sewer) to the city wastewater treatment plant. Each of these sanitary sewer systems appears to be located above the bedrock except in the immediate vicinity of the connections with the Buffalo Avenue Sanitary Sewer, which is excavated into bedrock along the section of Buffalo Avenue north of Plant 1. These systems therefore do not appear to present a major potential for preferential off-site groundwater flow and contaminant migration. The Interim Report conclusions regarding the Buffalo Avenue Sanitary Sewer are summarized in Section 2.4.

2.2 PLANT 2 SEWER SYSTEMS

2.2.1 Clear Water Sewer Systems

There are two clear water sewer systems located at Plant 2. Both run south to north and connect to the Buffalo Avenue Diversion Sewer, which is a 48-inch pipe excavated into bedrock near Plant 2. Both these systems, 3CW and 4CW, are above bedrock on-site and do not present a substantial preferential pathway for off-site groundwater flow and contaminant migration.

2.2.2 Sanitary Sewer Systems

There are four sanitary sewer systems in the Plant 2 area: 5S, 6S, 7S and 8S. Each discharges directly or via the Chemical Road sewer to a sanitary sewer along Buffalo Avenue. The sanitary sewer beneath Buffalo Avenue adjacent to Plant 2 flows west to east from Chemical Road to 27th Street where it connects to a sewer running northward under 27th Street to the Southside Interceptor Tunnel. From the eastern boundary of Plant 2, the sanitary sewer runs east to west to the connection at 27th Street. These sanitary sewers are excavated into bedrock.

The 5S system is above grade until the vicinity of its connection to the Sanitary Sewer on Buffalo Avenue and as such does not represent a substantial potential for causing preferential groundwater flow.

The 6S and 8S sewer systems are located in the southwest portion of Plant 2 and connect to a sanitary sewer running south to north under Chemical Road (Du Pont property). These systems are above bedrock on Olin property, except possibly in the immediate vicinity of the Chemical Road connections. The invert elevations at manholes 108 (6S) and 88 (8S) are very close, but probably not below, the interpolated top-of-bedrock elevation. Therefore, these sewer systems do not appear to be potential conduits for preferential off-site groundwater flow and contaminant migration. Manhole 109 on the Chemical Road Sewer is below the interpolated top-of-bedrock elevation. The Interim Report conclusions regarding the Chemical Road Sewer are summarized further in Section 2.4.

The 7S sewer system is excavated into bedrock throughout most of the length of its main trunk which runs south to north under Alundum Road. As such, it represents a potential pathway for preferential off-site groundwater flow and contaminant migration.

2.3 OFF-SITE SEWERS

Three nearby off-site sewers were identified to be excavated into bedrock, and therefore represent a potential concern with respect to preferential groundwater migration. These include:

Chemical Road Sewer
Buffalo Avenue Diversion Sewer
Buffalo Avenue Sanitary Sewers

The Buffalo Avenue sewers are approximately 10 feet or less below the top-of-bedrock. The Interim Report recommended that invert elevations be obtained for the Chemical Road sewer. South of the Plant, along Adams Avenue, there is a sewer running east-west. Although there are no current connections with the Olin Plant systems, the Interim Report recommended that invert elevations be obtained along this sewer because of its proximity to the Plant.

2.4 SUMMARY OF INTERIM REPORT CONCLUSIONS

Four sewers on or near the Plant were found to represent a substantial potential for causing preferential flow. These were:

Plant 2 7S system (on-plant)
Chemical Road Sewer (off-plant)
Buffalo Avenue Diversion Sewer (off-plant)
Buffalo Avenue Sanitary Sewers (off-plant)

Each of these sewers/excavations was identified as having a potential for receiving groundwater discharge. In order for substantial groundwater infiltration to occur, the installation trench must either physically penetrate the water-bearing zone, or be in close

hydraulic connection via vertical fractures. If a fracture zone is not directly penetrated, or in close hydraulic connection, it would take a relatively high upward hydraulic gradient to induce water flow out of the water-bearing fractures, which are of very high hydraulic conductivity.

The main trunk of the 7S sewer system is excavated approximately 5 to 6 feet into bedrock along its traverse across Plant 2. This indicates that the bottom of the installation trench is about 4 to 5 feet above the B-zone bedding plane fractures. The hydraulic head at monitoring well OBA-6B (558 feet to 559 feet), located adjacent to the main trunk of the 7S system, is below the invert elevation of the sewer along that stretch (559 feet). Leakage upward from the B-zone into the 7S system is therefore not likely to occur in this vicinity. The inverts of the 7S system are below the measured water levels in the A-zone. The potentiometric surface maps do not show a depression in the A-zone hydraulic head near the sewers, indicating that if infiltration is occurring, it is not widespread. Therefore, the 7S system does not likely represent a substantial pathway for off-site migration of contaminants with sources on the Olin Plant. However, based on the high downward vertical gradient between the A- and B-zones, contaminants in the pipe or trench could leak downward to the B-zone.

The sewers along Buffalo Avenue are located in an installation trench excavated approximately 6 to 10 feet into the bedrock. Therefore the A-zone groundwater is directly intercepted. The projected B-zone elevations are generally a foot or more below the installation trench elevation. However, the B-zone is in closer proximity than for the other sewers and is likely closely connected hydraulically to the installation trench.

Hydraulic heads measured at well cluster OBA-2 indicate that the overburden and upper few feet of bedrock are dewatered in the vicinity of Buffalo Avenue. The Current Conditions Report (WCC, 1988) reports similar conditions occurring along the section of Buffalo Avenue between Gill Creek and Alundum Road (based on the Harza study in 1979). The potentiometric surface maps show a depression in the A-zone groundwater along Buffalo Avenue, although this may also be the natural direction of A-zone groundwater flow. The B-zone shows no discernable hydraulic impact of the Buffalo Avenue Sewers.

Vertical hydraulic gradients are strongly downward from the A- through CD-zones in the vicinity of the Buffalo Avenue Sewers. If the construction of the installation trench exposed or enhanced vertical fracturing, leakage out of the pipe and/or trench could impact on-site B- and C/CD-zone groundwater. Elevated levels of contamination measured in samples from wells OBA-2C and OBA-1C could be related to leakage of contaminated water out of the sewer line or its installation trench. As presented in the Interim Report, contamination in samples from these wells (including a non-aqueous phase liquid from OBA-2C) was composed primarily of chlorinated aliphatic volatile organic compounds. Since these chemicals were not used in substantial quantity at the Olin plant, it is possible that this contamination resulted from off-site (non-Olin) sources.

In summary, the on-Plant hydraulic impact of the identified sewers appears to be limited to the A-zone. However, the impacts are not widespread and since A-zone contaminant levels near these structures are generally very low, there does not appear to be a major potential for off-plant migration of groundwater contamination via these conduits. The Interim Report recommended that invert elevations be obtained for the Chemical Road Sewer and Adams Avenue Sewer to complete the man-made passageways assessment. These data are presented and evaluated in the following section.

3.0 POTENTIAL FOR MIGRATION IN ADAMS AVENUE AND CHEMICAL ROAD SEWERS

Information concerning the Adams Avenue and Chemical Road sewers was found in the following Du Pont reports:

1. Man-Made Passageways Investigations - Niagara Plant
   Prepared by Woodward-Clyde Consultants
   February 17, 1984

2. Supplemental Man-Made Passageways Investigations - Niagara Plant
   Prepared by Woodward-Clyde Consultants
   October 24, 1984

3. Effectiveness Evaluation: Adams Avenue Slurry Wall
   Prepared by Woodward-Clyde Consultants
   August 11, 1988

3.1 ADAMS AVENUE SEWER

According to the Du Pont man-made passageways investigations, the Adams Avenue Sewer is channeled into bedrock. Table 3-1 lists the sewer invert elevation, bedrock elevation and groundwater elevation in the vicinity of Plant 1 (400 feet west of Chemical Road). The sewer is blocked approximately 70 feet west of Chemical Road and is consequently inactive east of this point. West of this plug, the sewer and bedding was identified as a potential conduit for contaminant migration.

In 1986, Du Pont constructed a slurry wall across the sewer bedding approximately 300 feet west of Chemical Road to prevent potential preferential migration (see Figure 2-1). The sewer pipe was plugged on both sides of the slurry wall. According to WCC's effectiveness evaluation report, the slurry wall is acting as a barrier to any preferential groundwater flow. The slurry wall, therefore, acts as a barrier to preferential

groundwater flow from the area south of Plant 2.

West of the slurry wall, south of Plant 1, there is still a potential of preferential migration. The sewer trench is excavated approximately 6 feet into bedrock. Based on the nearest Olin monitoring well (OBA-8B), the elevation of the B-zone in this vicinity appears to be 5 or more feet below the invert. Therefore, B-zone groundwater is not directly intercepted. Furthermore, the sewer is located upgradient with respect to B-zone groundwater flow at the Olin Plant, indicating little, if any, potential for preferential contaminant migration in this zone.

A-zone groundwater could seep into the sewer or backfill west of the slurry wall. The A-zone groundwater potentiometric surface maps show that groundwater flow is toward the west. Thus the Adams Avenue sewer is not directly downgradient of any SWMUs. In the western portion of Plant 1, the Adams Avenue Sewer is located 200-600 feet from the plant boundary. In the eastern portion of Plant 1, the sewer ranges from approximately 50 feet to 200 feet off-site. Relatively low contaminant levels in the nearest monitoring well (OBA-8A) provide further indication that the Adams Avenue Sewer is not a substantial preferential pathway for off-site transport of contamination from the Olin Plant 1 Area.

3.2 CHEMICAL ROAD SEWER

As part of the Du Pont man-made passageways investigations, a test pit was excavated along the Chemical Road Sewer, just south of the Buffalo Avenue junction. The sewer pipe was exposed and a well screen and casing was installed next to the pipe. The pipe was channeled approximately 6 feet into bedrock at this location, which was at the deepest portion of the sewer. Table 3-1 lists the sewer invert elevation and bedrock elevation at this location.

The excavation was dry. Furthermore, the well installed by Du Pont in the excavation did not contain water and was dry during several subsequent measurement attempts. This indicates that groundwater levels at this location were below the sewer excavation and, therefore, preferential migration of groundwater along the sewer was not occurring. This is consistent with the findings presented in the Interim Report that the overburden

and upper bedrock are dewatered in the vicinity of Buffalo Avenue.

3.3 SUMMARY

In summary, this section presents an assessment of the potential for subsurface preferential contaminant migration along the Chemical Road and Adams Avenue Sewers, located on Du Pont property near the Olin Buffalo Avenue Plant. The results of man-made passageways investigations by Du Pont were used in the assessment. These results indicate that the two sewers are not likely to act as conduits for preferential migration of groundwater contamination potentially associated with solid waste management units (SWMUs) or other sources (if any) at the Olin Plant.

4.0
CONCLUSIONS

Based on groundwater monitoring data, sewer construction information, site hydrogeology, and results of off-site man-made passageways investigations, this report concludes that, within the boundaries of the Olin Plant, the hydraulic impact of the identified man-made passageways appears to be limited to the overburden. Since A-zone contaminant levels near these structures are generally very low, there does not appear to be a major potential for off-plant migration of groundwater contamination via these conduits.

The two off-site sewers evaluated do not likely act as conduits for preferential migration of groundwater contamination potentially associated with solid waste management units (SWMUs) at the Olin Plant.

5.0
LIMITATIONS

This report is based primarily on sewer construction details (provided by Olin), groundwater monitoring data, site hydrogeological data and the results of man-made passageways investigations conducted off-site. WCC's work is in accordance with our understanding of professional practice and environmental standards existing at the time the work was performed. Professional judgements presented are based on our evaluation of technical information gathered and on our understanding of site conditions and site history. Our analyses, interpretations, and judgements rendered are consistent with professional standards of care and skill ordinarily exercised by the consulting community and reflect the degree of conservatism WCC deems proper for this project at this time. Methods are constantly changing and it is recognized that standards may subsequently change because of improvements in the state of the practice.

The information used for this investigation includes the boring logs, water level elevations, and water quality analyses presented in the Interim Report. Boring logs reflect subsurface conditions at the indicated locations. WCC has endeavored to collect soil and water samples which are representative of site conditions. Soil and water quality samples, however, can only represent a small portion of the subsurface conditions in the area, both in volume and through time. The interpretations made in this report are based on the assumption that subsurface conditions do not deviate appreciably from those found during our field investigations.

Tables

TABLE 3-1

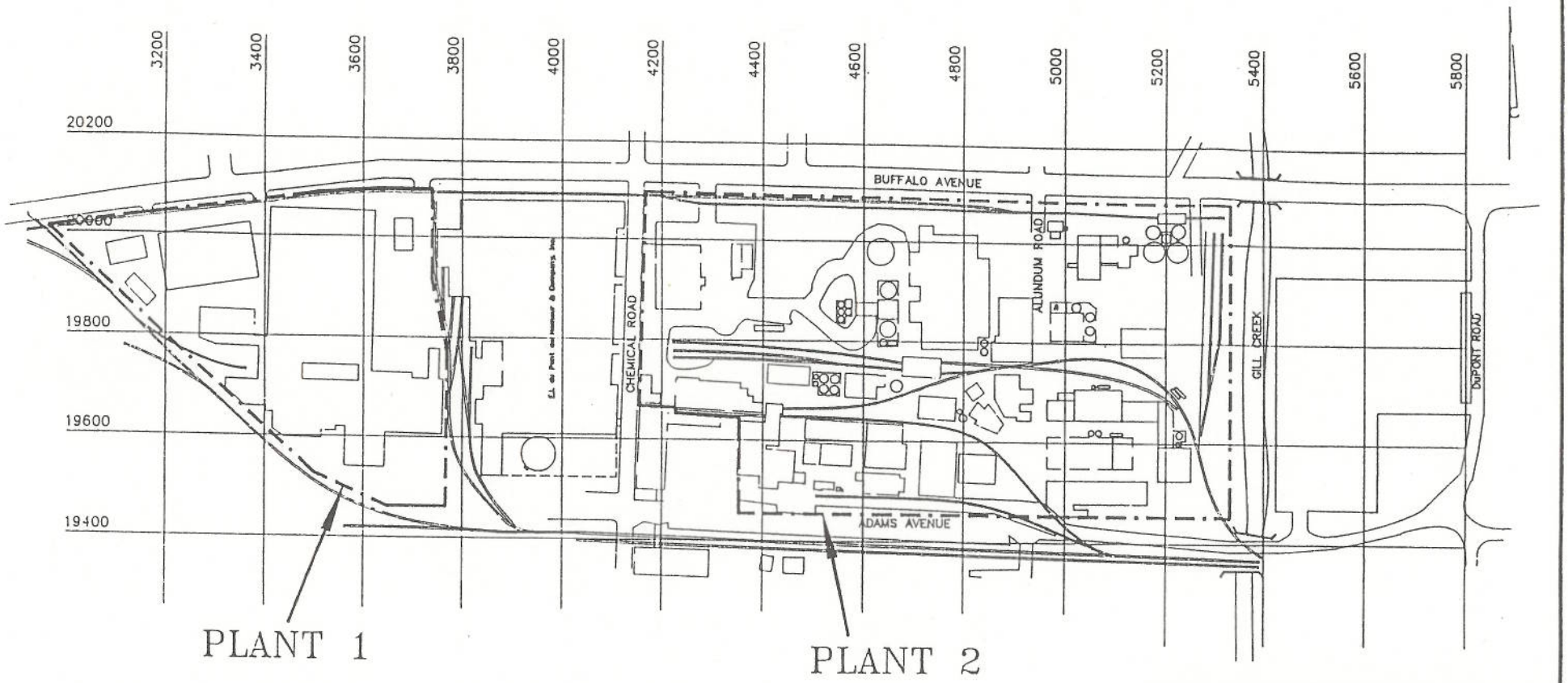
COMPARISON OF ADAMS AVENUE AND CHEMICAL ROAD
SEWER INVERT ELEVATIONS WITH GROUNDWATER
AND BEDROCK ELEVATIONS

OLIN BUFFALO AVENUE PLANT RFI

Sewer	Location	Invert Elevation[1]	Top of Bedrock Elevation[2]	Estimated[3] Groundwater Elevation
Adams Avenue	400 feet west of Chemical Road	553.83	562	561.63
Chemical Road	Intersection at Buffalo Avenue	559.68	565.5	Dry

(1) Elevations based on U.S. Coast and Geodetic Survey datum
(2) Estimated based on the top-of-bedrock surface contour map presented in the Interim Report (WCC, 1992)
(3) Measured water level in Du Pont utility well

Figures

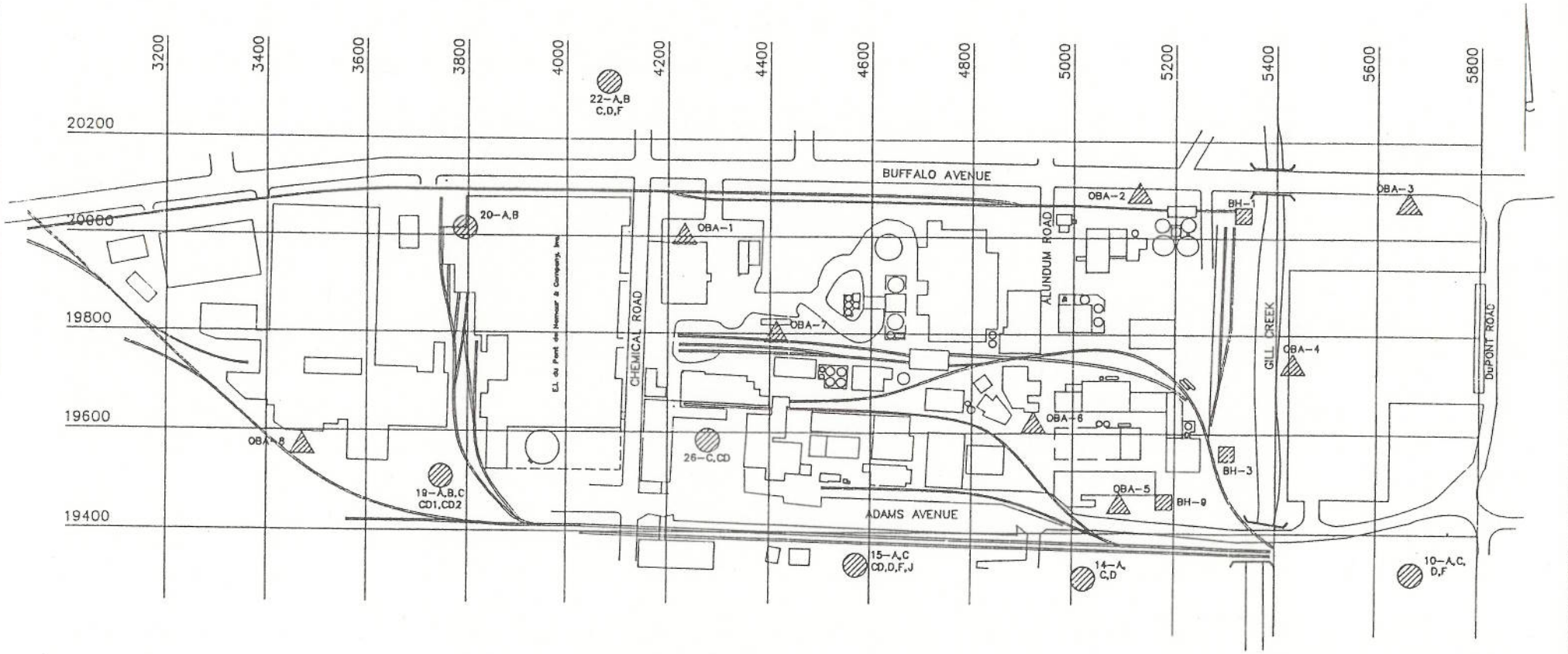


OLIN CHEMICALS NIAGARA PLANT
RCRA FACILITY INVESTIGATION

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

SITE LOCATION PLAN

Job No.: 88C2346-12	Drawing No.	Date:
Checked by: KRM	Rev. No.:	Figure 1-1
Scale: 0 200 Feet		



LEGEND:

HBH-1 — EXISTING HARZA MONITORING WELLS

OBA-1 — OLIN MONITORING WELL LOCATIONS

20-A,B — DuPONT MONITORING WELLS

OLIN CHEMICALS NIAGARA PLANT
RCRA FACILITY INVESTIGATION

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

MONITORING WELL LOCATION PLAN

Job No.: 88C2346-12	Drawing No.	Date:
Checked by: KRM	Rev. No.:	
Scale: 0 — 200 Feet		Figure 1-2

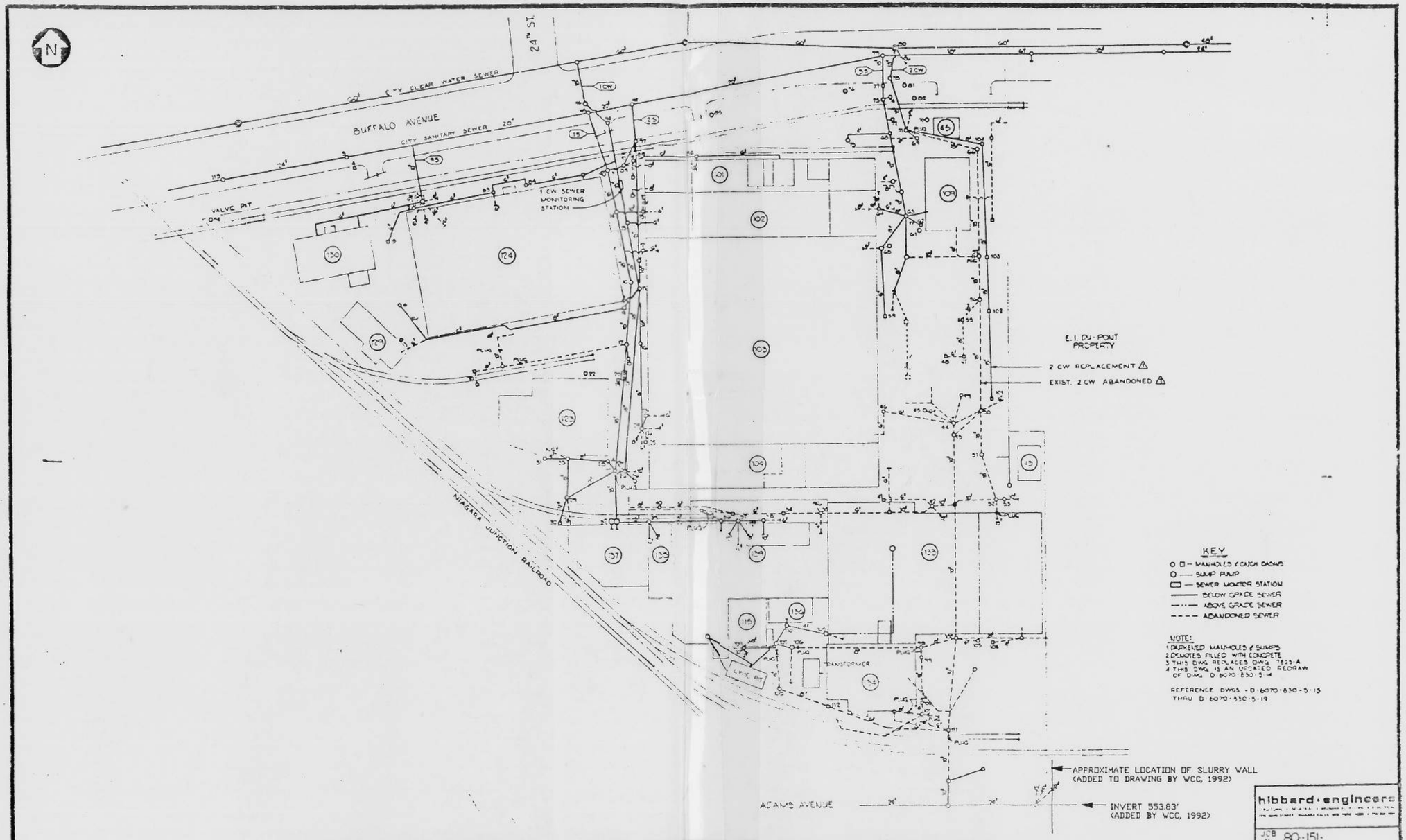

N
24TH ST.
BUFFALO AVENUE
8"ø CLEAR WATER SEWER
CITY SANITARY SEWER 20"
VALVE PIT
1 CW SEWER MONITORING STATION
NIAGARA JUNCTION RAILROAD
TRANSFORMER
ADAMS AVENUE
E. I. DU-PONT PROPERTY
2 CW REPLACEMENT
EXIST. 2 CW ABANDONED
APPROXIMATE LOCATION OF SLURRY WALL (ADDED TO DRAWING BY WCC, 1992)
INVERT 553.83' (ADDED BY WCC, 1992)
KEY
MANHOLES & CATCH BASINS
SUMP PUMP
SEWER MONITOR STATION
BELOW GRADE SEWER
ABOVE GRADE SEWER
ABANDONED SEWER
NOTE:
1 DENOTES MANHOLES & SUMPS
2 DENOTES FILLED WITH CONCRETE
3 THIS DWG REPLACES DWG. 7833-A
4 THIS DWG IS AN UPDATED REDRAWN OF DWG. D-6070-830-5-14
REFERENCE DWGS. - D-6070-830-5-15 THRU D-6070-830-5-19
hibbard·engineers
JOB No. 80-151-
Olin
NIAGARA PLANT
PLANT No. 1
ALL EXISTING & ABANDONED SEWER LINES
Modified by WCC (1992) as shown
PROJECT NO. 1592
DRAWING NUMBER D-1592-830-5-14
REV. 2
7825-A

FIGURE 2-1

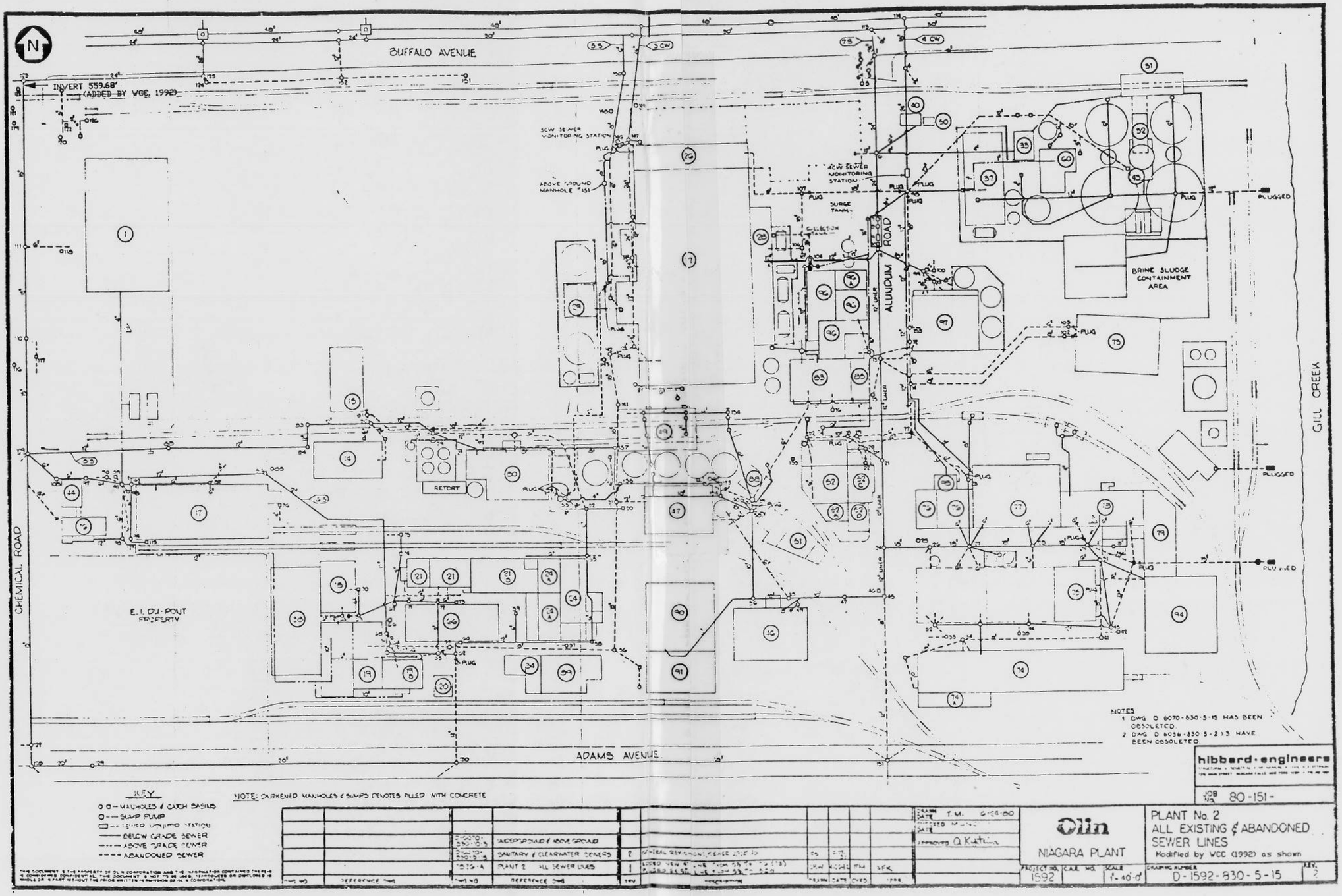

BUFFALO AVENUE
INVERT 559.68'
(ADDED BY WCC, 1992)
3 CW
4 CW
SCW SEWER MONITORING STATION
ABOVE GROUND MANHOLE "1ST"
SURGE TANK
COLLECTION TANK
ALUMINUM ROAD
BRINE SLUDGE CONTAINMENT AREA
PLUGGED
GILL CREEK
RETORT
CHEMICAL ROAD
E. I. DU-PONT PROPERTY
ADAMS AVENUE
KEY
MANHOLES / CATCH BASINS
SUMP PUMP
BELOW GRADE SEWER
ABOVE GRADE SEWER
ABANDONED SEWER
NOTE: DARKENED MANHOLES & SUMPS DENOTES FILLED WITH CONCRETE
NOTES
1 DWG D 6070-830-5-15 HAS BEEN OBSOLETED
2 DWG D 6036-830-5-2 & 3 HAVE BEEN OBSOLETED
hibbard-engineers
JOB No. 80-151-
DRAWN T.M. 6-24-80
CHECKED
DATE
APPROVED Q. Kutlin
Olin
NIAGARA PLANT
PLANT No. 2
ALL EXISTING & ABANDONED SEWER LINES
Modified by WCC (1992) as shown
PROJECT NO. 1592
CAD. NO.
SCALE 1" = 40'-0"
DRAWING NUMBER D-1592-830-5-15
REV. 2

FIGURE 2-2