REVISED WORK PLAN

PARTIAL CLOSURE OF GROUNDWATER COLLECTION SYSTEM

NYSDEC SITE NO. 9-15-066, OPERABLE UNIT 2
CHEEKTOWAGA, NEW YORK

PREPARED BY

CBS CORPORATION
PITTSBURGH, PENNSYLVANIA

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1.0 INTRODUCTION

This Revised Work Plan is for the partial closure of the groundwater collection system installed and operated as part of Operable Unit 2 of the Remedial Program at New York State Department of Environmental Conservation (NYSDEC) Site No. 9-15-066 in Cheektowaga, New York (the “Site”). The groundwater collection and treatment system addresses groundwater in the central and southern portion of the Site. Figure 1 is a Site plan showing the location of this system and Site groundwater monitoring wells.

CBS Corporation (CBS), with the assistance of Conestoga-Rovers & Associates, Inc. (CRA), has prepared this Revised Work Plan on behalf of the Respondents to the Order on Consent and Settlement Agreement, Index No. B9-0381-91-8 (the “Order”). Under an agreement among the Respondents, CBS is managing the Remedial Program under the Order.

Based on meeting discussions among NYSDEC, CBS, and the Niagara Frontier Transportation Authority (NFTA) on June 26, 2006, CBS submitted a comprehensive Work Plan to NYSDEC on August 3, 2006 that called for the phased shutdown of the groundwater collection and treatment system with post-shutdown monitoring to confirm that groundwater quality was not adversely affected. NYSDEC responded to CBS’ proposed plan via its letter of October 30, 2006 in which NYSDEC requested additional hydraulic evaluations of the impacts of system shutdown, particularly as related to potential surface water discharges, and the sequencing and timing of this work. In that letter, NYSDEC also indicated that the closure should be limited to those collection lines draining to Sumps 001 and 002 and that collection of water from the 003 segment of the system, along with treatment of the collected water, should continue. Over the past 18 months, CBS and CRA have observed the evolving conditions at the Site and have conducted various investigations and evaluations designed to resolve the issues raised by NYSDEC in response to the August 3, 2006 Work Plan.

The partial closure of the groundwater collection system follows completion of remedial construction for both Operable Units 1 and 2 and eight years of system operation and maintenance (O&M). The Respondents have concluded, and NYSDEC has concurred, that termination of the ongoing groundwater collection from the 001 and 002 portions of the system is warranted based on the data collected during the O&M completed to date that provide a clear understanding of Site hydrogeology, groundwater interaction with the former storm sewer system, potential contaminant migration pathways, and potential human health and environmental exposures.

This Revised Work Plan differs significantly from the August 3, 2006 Work Plan. Because of continuing problems with surface water inflows and influent chemistry, the treatment system can no longer keep pace, and the underground piping network has become inundated. The source of this inundation is primarily surface water from precipitation events that has managed to enter the subsurface pipe networks. Accordingly, this Revised Work Plan focuses on permanently closing the 001 and 002 segments of the collection system in a manner that minimizes potential impacts to groundwater and surface water and allows collection and treatment activities to focus on the 003 segment. This Revised Work Plan also provides monitoring and contingency plans designed to detect and react to any discharges of contaminated groundwater that become manifest as a result of the groundwater collection system closures.

1.1 BACKGROUND

NYSDEC defined the requirements for the Remedial Program at the Site in Records of Decision (RODs) issued in March 1995 and December 1995 for Operable Units 1 and 2, respectively. Operable Unit 1 addressed source control through excavation and on-site thermal treatment and the removal of impacted sediments from U-Crest Ditch. Operable Unit 2, which addressed groundwater remediation, called for active collection and treatment of groundwater in the central and southern portion of the Site and Site-wide groundwater monitoring. CBS completed the Operable Unit 1 remedial action and the remedial construction component of Operable Unit 2 in 2000. NYSDEC confirmed successful completion of remedial construction in accordance with the Order via letter dated June 27, 2002.

As source control actions were being completed, CBS began O&M of the installed remedial systems and Site-wide groundwater monitoring. Since initiating O&M, nearly 35 million gallons of water have been recovered from the former Site storm sewers that now function as a collection system, and the collected water has been treated through the on-site treatment system. Over this same time period, 19 synoptic groundwater monitoring events have been conducted.

1.2 ORGANIZATION OF REVISED WORK PLAN

Following this introductory section, Sections 2.0 and 3.0 describe the basis for the remedial systems that have been installed and are currently operating at the Site. Section 2.0 presents an overview of the Site hydrogeology, and Section 3.0 describes the remedial design. Section 4.0 summarizes what has been learned over the past eight years of system O&M and how these findings have changed the Site conceptual model upon which the remedial systems were originally designed. Recognizing these changes, Section 5.0 describes the components of and the step-by-step processes for closure of the groundwater collection networks that drain to Sumps 001 and 002, including monitoring and contingency plans. Section 6.0 presents the schedule for the described closure activities, and Section 7.0 lists cited references.

2.0 SITE HYDROGEOLOGY

This section briefly summarizes information and data developed in the Site Remedial Investigation (RI) regarding the hydrogeology of the central and southern portions of the Site. This information is then applied in estimating the flow of groundwater within the area of influence of the groundwater collection system installed as part of Operable Unit 2.

2.1 SITE GEOLOGY

As described in the RI report (Dunn Engineering Company, 1994), the Site is underlain with glacial till consisting predominantly of a clayey silt matrix with varying quantities of embedded fine to coarse sands, gravel, and rock fragments. The till ranges in thickness from about 30 to 50 feet and uniformly overlies bedrock at the Site. The RI also identified fill materials, typically 5 to 6 feet in thickness, overlying the till in portions of the Site. Since completion of the RI, NFTA has conducted significant Site redevelopment as part of airport expansion. These Site redevelopment activities have resulted in increased fill thicknesses of 20± feet in some areas of the Site. Even with this additional fill placement, however, the fill remains discontinuous and does not extend to off-site areas. The gradation of the fill is highly variable, ranging from clayey soils to crushed concrete rubble.

Bedrock underlies the glacial till. The uppermost bedrock is comprised of light gray cherty limestone that was identified in the RI as the Moorehouse Limestone member of the Onondaga Limestone formation. The RI reported encountering limestone in on-site borings at depths ranging from 29 to 57 feet below the ground surface (ft-bgs).

2.2 GROUNDWATER HYDROLOGY

Groundwater is found in the unconsolidated materials at the Site, with typical depths to groundwater ranging from 5 to 15 ft-bgs. The variability in depth relates primarily to the thickness of fill materials.

In the central and southern portion of the Site, the hydraulic gradient is from northeast to southwest and ranges from about 0.02 to 0.05 feet per foot (ft/ft). Figure 2 shows a generalized potentiometric surface map for groundwater in the unconsolidated materials.

Multiple rounds of groundwater elevation measurements over the O&M period have shown that, although shallow groundwater levels fluctuate within 2± feet in response to antecedent precipitation and snowmelt, the groundwater flow direction and hydraulic gradient are relatively consistent throughout the year.

The very low hydraulic conductivity of the glacial till and the discontinuity of the overlying fill greatly limit potential lateral groundwater flow within the unconsolidated materials at the Site. The RI reported an average (i.e., geometric mean) hydraulic conductivity of the till of 2.34 x 10^{-6} centimeter per second (cm/sec), which, in combination with the observed average hydraulic gradient of 0.035 ft/ft, would result in a calculated groundwater (Darcian) flow velocity less than 1 foot per year (ft/yr). This value is calculated as follows:

$$V = \frac{Ki}{\eta} \times \left(1.04 \times 10^{6}\right)$$

Where,

V = groundwater flow velocity, ft/yr;
K = hydraulic conductivity, cm/sec;
i = hydraulic gradient, ft/ft; and
η = effective porosity, dimensionless.

The factor of 1.04 x 10^6 is the units conversion between cm/sec and ft/yr. Using Site data, the groundwater velocity calculation is as follows.

$$V = \frac{\left(2.34 \times 10^{-6}\right) \times \left(0.035\right)}{\left(0.15\right)} \times \left(1.04 \times 10^{6}\right) = 0.57\,\mathrm{ft/yr}$$

An effective porosity of 0.15 is estimated based on the observed gradation of the till (McWorter and Sunada, 1977). The RI similarly reported a maximum groundwater flow velocity in the southern portion of the Site of 0.47 ft/yr.

At the calculated groundwater flow velocity of 0.57 ft/yr, the natural flux of groundwater across southern portion of Site is about 820 gallons per day (gpd), which is calculated as follows:

$$Q = V \times t \times W \times (0.0205)$$

Where,

Q	=	total flow (flux) of groundwater across the Site, gpd;
t	=	saturated thickness, feet; and
W	=	width of contributory flow area, feet.

The saturated thickness is conservatively estimated to be 35 feet, based on an average depth to bedrock of 40 ft-bgs and a typical depth to groundwater of 5 ft-bgs. The width of the contributory flow area, measured perpendicular to flow, is conservatively estimated to be on the order of 2,000 feet (see Figure 2). The factor of 0.0205 is the conversion from cubic feet per year to gpd.

$$Q = (0.57) \times (35) \times (2000) \times (0.0205) = 820\,\text{gpd}$$

This total flow across the Site of 820 gpd equates to an average groundwater flow of 0.57 gallons per minute (gpm). In applying this calculation to a potential groundwater recovery rate, no vertical infiltration of precipitation or surface water contribution is assumed over the collection area. This assumption is reasonable, provided that a low-permeable cover/cap is in place atop the collection area.

These calculations show that, from a practical perspective, there is essentially no lateral groundwater flow through the glacial till. This condition was plainly observed at the excavation of Area I during Operable Unit 1 Site remediation where the soil excavation extended more than 20 feet below the groundwater table and was open for several weeks, yet the groundwater inflow rate was so low that no construction dewatering was needed to operate within this large excavation.

Localized groundwater flow can occur in the discontinuous sand lenses within the clayey matrix of the till, but such sand lenses do not provide advective transport of Site-related contaminants over appreciable distances. The only operative flow paths for groundwater flow and contaminant transport are man-made preferential pathways along subsurface utility lines, such as the former plant storm sewers now being employed as the collection network.

3.0 REMEDIAL PROGRAM DESIGN

This section reviews the design of Operable Unit 2 and the Site conceptual model upon which the design was based. Comparing that design to the actual O&M experience, described in Section 4.0, forms an important basis for determining that closure of the 001 and 001 portions of the Operable Unit 2 groundwater collection system is appropriate.

3.1 CONCEPTUAL SITE MODEL

NYSDEC developed the remedial action plan for Operable Unit 2 based on the supposition that the plant storm sewer system acted as a drainage gallery for shallow groundwater. By this model, where the sewers were situated below the groundwater table, impacted groundwater at the Site drained to nearby storm sewers. As described in the *Proposed Remedial Action Plan* (NYSDEC, 1995a):

> "The primary reason for lack of off-site migration of contaminated groundwater in the southern portion of the site … is believed to be the influence of the storm sewer system. The sewer system is acting as a groundwater interceptor, receiving groundwater via infiltration due to its position relative to the water table. The sewer system is capturing and controlling the contaminated groundwater before it migrates off-site."

The inference was that operation of the sewer system as a groundwater collection network was needed for hydraulic control of groundwater and associated advective transport of contaminants.

3.2 REMEDIATION GOALS AND REMEDIAL ACTION OBJECTIVES

NYSDEC set forth its remediation goals in the December 1995 ROD for Operable Unit 2 (NYSDEC, 1995b). The remediation goals of the December 2005 ROD were used as the basis for defining the following Site-specific objectives for the remedial design of the groundwater recovery and treatment system:

- Minimize the off-site migration of Site-related constituents of concern (COCs) to off-site areas to the south and southwest along Genesee Street;
- Prevent human exposure to impacted on-site groundwater; and

- Protect surface water quality in U-Crest Ditch from Site-related COCs in the discharge from Site storm sewers.

To meet these Site-specific remediation objectives, NYSDEC established the numerical cleanup standards (i.e., Remedial Action Objectives (RAOs)) for Site groundwater listed in Table 1.

3.3 REMEDIAL COMPONENTS

3.3.1 GROUNDWATER MONITORING

In accordance with the approved *Final Remedial Action Plan* (IT Corporation, 1999), CBS installed six groundwater monitoring wells (i.e., MW-30, MW-31, MW-32, MW-33, MW-34, and MW-34D) to complement three pre-existing wells (i.e., MW-2, MW-5, MW-28) to monitor groundwater quality and to assess progress in achieving the specified RAOs. All of the monitoring wells except well MW-32 monitor groundwater in the central and southern portion of the Site, i.e., within that portion of the Site for which the groundwater collection and treatment system was designed and installed. Well MW-32 monitors groundwater at the extreme northern end of the Site, remote from the zone of influence of the groundwater collection and treatment system.

Six wells (i.e., MW-2, MW-5, MW-28, MW-30, MW-31, and MW-34) monitor shallow groundwater along the downgradient Site perimeter (Figure 2). The results from these monitoring wells are specifically determinant of whether the Site conditions meet the first of the NYSDEC-defined remediation goals for this Site (Section 3.2), i.e., minimize the off-site migration of Site-related COCs to off-site areas to the south and southwest along Genesee Street. Well MW-33 monitors groundwater upgradient of the area of the collection system, and MW-34D is a bedrock well that forms a couplet with shallow well MW-34 along the downgradient Site boundary.

3.3.2 COLLECTION AND TREATMENT SYSTEM

3.3.2.1 Original Design

Consistent with the conceptual Site model developed by NYSDEC, CBS modified the plant storm sewer system to provide for groundwater collection in the central and southern portion of the Site. Points of storm water inflow (e.g., downspouts, roof leaders, catch basins) were sealed in an effort to isolate the piping network from surface water. Most of the work associated with sealing points of potential surface water inflow was the responsibility of NFTA contractors conducting building demolition and, later, concrete floor slab removal. Sewer lines that resided above the water table were likewise plugged, and holes were drilled in the bottom of selected submerged manholes to enhance groundwater infiltration.

After these modifications, the terminal manhole on each of the three legs of the collection system was converted into a wet-well (sump) for pumping the collected water to the treatment system through newly installed conveyance (pressure) lines. These terminal manholes are referred to as Sumps 001, 002, and 003 respectively for the segments of the collection system from east to west at the Site (Figure 1). In some report documents and drawings, these pumping stations are referred to as CSMH-001, CSMH-002, and CSMH-003, respectively.

The groundwater treatment system was initially designed with the following unit processes:

- Flow equalization;
- Sanitization using an ultraviolet light;
- Suspended solids removal through the use of disposable bag filters; and
- Activated carbon adsorption for dissolved organics removal.

Discharge from the treatment system is to U-Crest Ditch.

3.3.2.2 Modifications

During and after construction, several modifications have been made to the treatment process and Site conditions that affect the collection and treatment systems. These modifications have primarily been brought about as a result of Site changes related to redevelopment for airport expansion.

pH Adjustment: When the treatment plant was initially started, it immediately became apparent that the concrete demolition debris used as backfill during NFTA's Site redevelopment activities was causing an elevated pH of the system influent. In response, a pH adjustment step (i.e., acidification) was added to the treatment system to control the influent pH.

Floor Slab Removal: The NYSDEC remedial plan and the system design both assumed that the 38± acres of concrete former building floor slab would remain in place following building demolition to serve as a low-permeability cap atop the area of groundwater recovery. In 1999, however, NYSDEC allowed NFTA to remove 985,000 square feet (i.e., 22.6 acres) of this floor slab to accommodate new parking areas and access roads being constructed by NFTA as part of airport expansion. In 2002, NYSDEC subsequently allowed NFTA to remove the remaining 658,000 square feet (i.e., 15.1 acres) of floor slab to accommodate NFTA's runway extension project. Because not all of the areas from which the slab was removed were re-capped with low-permeability materials, this change in Site conditions contributed additional flow to the groundwater collection system.

Tunnel Sump: While the groundwater recovery and treatment system was being installed, NFTA proposed piping and a lift station to dewater a tunnel constructed on a new airport access roadway. The NFTA design called for the tunnel to be lined with an impermeable membrane (i.e., 60-mil liner) and a separate tunnel sump constructed to collect potentially impacted groundwater from below the liner. The potentially impacted groundwater was to be pumped to Manhole MH-002-12 in the upper portion of the 002 groundwater collection system (Figure 1). Appendix A provides the NFTA design drawings for this tunnel dewatering system (i.e., Drawings GPS-1, GPS-2, and GPS-3). The "as built" version of NFTA Drawing GPS-2 does not show a pump installed, and inspection of the NFTA tunnel sump manhole in 2007 showed no evidence that NFTA had installed the planned pumping equipment or the piping to MH 002-12 at this location.[1]

Other Treatment System Changes: Since system startup in 2000, other system modifications have been made in an effort to improve operations. Such modifications include the addition of the following:

- Separate flow equalization tank to separate flow equalization from pH adjustment;

[1] A separate surface water collection and pumping system is associated with the tunnel sump. This system removes surface water that collects above the 60-mil liner and discharges it to a nearby NFTA storm sewer.

- Mixer on pH adjustment tank for improved control of acid addition;
- Supplemental process instrumentation; and
- Increased size of first carbon adsorber to improve system hydraulics.

Other trial modifications (e.g., polymer addition to improve solids removal in equalization tank, alternative particulate filter design) were attempted but found not to be workable.

4.0 O&M EXPERIENCE

Over the past eight years, CBS has operated and maintained the groundwater collection and treatment system and has routinely collected groundwater samples from the monitoring wells. The O&M experience and the data generated during the O&M period are the principal bases for this Revised Work Plan. Section 4.1 provides a brief narrative summary of operating experience; Sections 4.2 through 4.5 provide O&M monitoring data. Sections 4.6 and 4.7, respectively, present the revised conceptual Site model and conclusions regarding future O&M based on this revised Site conceptual model.

4.1 OVERVIEW OF OPERATING EXPERIENCE

Since the inception of operations in August 2000, the groundwater collection and treatment system has been beset by O&M difficulties. The root causes of the operational problems are twofold:

- Surface water continues to flow to the former storm sewer pipes used for groundwater collection as a result of improperly sealed downspouts, roof leaders, and catch basins. These inflows, in combination with the additional infiltration resulting from building floor slab removal, hydraulically overload the system.
- The collected groundwater exhibits a high hardness and pH that are apparently related to the use of crushed concrete as fill in Site redevelopment. The hardness precipitates as calcium and magnesium carbonate, and this fine precipitate rapidly plugs pumps, piping, filters, and activated carbon adsorbers.

When the groundwater treatment plant was started in August 2000, the influent pH was much higher than historically had been associated with Site groundwater or flows in storm sewers monitored under the Site surface water permit in effect prior to building demolition. In response, the treatment train was retrofitted with a pH adjustment system. Then, in the fall and winter of 2000, as the weather in the region turned wetter, suspended solids and very high inflows became major problems with system operation, plugging filters and the carbon adsorbers and overwhelming the collection sumps.

Despite these problems, the system was kept operating, but O&M costs were extraordinary and it was obvious that the system was receiving excess flows and solids that could not be efficiently handled. In late 2001, a video inspection was conducted for all accessible collection sewers. This survey found large quantities of sediment present in these lines; because downspouts, roof leaders, and catch basin that had connected to the old storm sewers had not been properly sealed, muddy water was washed into the "groundwater collection" sewers.

Based on the results of the video inspection, the groundwater collection sewers were cleaned and identified surface water inflows were sealed off in the spring of 2002. A temporary treatment system was operated at the Site between June and November 2001 to support the collection piping dewatering needed for this cleaning, inspection, and repair. The temporary system included unit processes of acidification, filtration, and activated carbon adsorption.

Suspended solids concentrations and system flow dropped off after the 2002 repairs, and process changes (e.g., adding a settling tank with polymer addition, improving process instrumentation) were made that were expected to bring the system O&M consistent with the original plans. Despite these efforts, solids continue to be a major operational problem. A fine floc forms when the groundwater from the various sumps is blended together, and this floc blinds off the filters and plugs the carbon. Downtime for sump pump maintenance due to clogging with precipitate exacerbates the hydraulic overloading caused by surface water inflows.

The observations and data collected over the past two years show that the exiting treatment system is now becoming less effective due to these operational problems. Pumping from the sumps to the groundwater treatment system cannot keep up with the rate of inflow so that, with time, water levels in these underground reservoirs have continued to rise to the point of overtopping. Sump 001 was the first to become surcharged, and an additional pump was added in an effort to maintain water levels below the ground surface. That effort has seen mixed results; during periods of high precipitation, the pumping still cannot keep up. More recently, Sump 002 likewise overtopped during period of high precipitation.

4.2 WATER LEVELS

Table 2 presents water level data collected in the spring of 2008 to assess the effects of excess inflow on the collection system and evaluate if reasonable options were available to address the periodic overtopping at Sumps 001 and 002. These data show that the groundwater collection system is inundated, with water levels in manholes in the upper sections of these systems essentially identical to those at the respective collection sumps. Figure 3 shows profiles of the 001 and 002 portions of the system that illustrate water levels in comparison to the current ground surface and manhole and piping depths.

The data presented in Table 2 also show that the NFTA tunnel sump does not drain to MH-002-12 as originally designed. The observed water level in the NFTA tunnel sump is approximately two feet lower than the water level at MH-002-12.

Table 3 compares groundwater elevations measured in monitoring wells to the water levels observed in nearby sumps and manholes. The data presented in Table 3 show the significant differences between the water level in the collection system and groundwater elevations. In all cases, water levels are higher in the collection system, indicating that, at present, the collection system is not acting to drain groundwater but to recharge groundwater from the surface water inflows. The differences in water levels shown in Table 3 can be maintained because of the low hydraulic conductivity of the native soils at the Site.

4.3 SYSTEM INFLUENT MONITORING

4.3.1 FLOWS

Since system startup in August 2000 through the end of July 2008, 34.85 million gallons of water have been collected, treated, and discharged to U-Crest Ditch by the systems operating at the Site. Figure 4 presents a graph showing the cumulative volume of water removed from the subsurface over the operating period. This volume equates to an average flow rate of 12,000 gpd (8.3 gpm) over the 2,902 days of the operating period. The actual flow is more than 15 times the 820 gpd predicted as the Site-wide flux of groundwater through the glacial till (Section 2.2); or, from another perspective, the lateral groundwater flows across the Site in the uppermost water-bearing zone comprises about seven percent of the water collected and treated.

Figure 4 also shows the comparison between cumulative volume treated and the volume that corresponds to an average flow of 5 gpm. This 5 gpm average rate was estimated based on the lateral flux of groundwater plus an allowance for infiltration over the 50+ acre area potentially influenced by the collection system.

The actual sources of water being collected and treated include fugitive surface water sources and shallow, perched water found within the discontinuous pockets of more-permeable fill. Neither of these sources has the potential for advective transport of Site-related COCs to off-site areas, except to the extent that they contribute water to man-made preferential flow paths.

4.3.2 INFLUENT QUALITY

Table 4 summarizes data collected for the influent to the groundwater treatment system. These data include eight samples collected at system startup over the timeframe of August through October 2000 and quarterly sampling thereafter. Except for the samples collected in June 2001 and May 2006, influent samples have been collected as a composite of the water contributed by the three individual sumps.

4.3.2.1 Volatile Organic Compounds

In contrast to groundwater in the central and southern portion of the Site (Section 4.4.1), the influent to the treatment system contains elevated concentrations of trichloroethylene (TCE) and cis-1,2-dichloroethylene (cis-1,2-DCE). Volatile organic compound (VOC) concentrations are much higher in waters collected by the 003 segment of the groundwater collection system than those associated with the 001 or 002 segments.

The data presented in Table 4 show an initial 10-fold reduction in TCE concentrations in the system influent after completing startup in the fall of 2000, but, since that time, the downward trend is less pronounced (Figure 5). Comparison of the data from the June 2001 to the May 2006 sampling of individual sumps shows a significant decrease in the TCE concentration at Sump 002. The TCE concentration is lower, but relatively constant, in the water collected at Sump 001. At Sump 003, the TCE and other target VOC concentrations have remained elevated.

TCE Concentrations (micrograms per liter [(µg/L)])

Location	Date of Sampling	
	June 2001	**May 2006**
Sump 001	37	35
Sump 002	280	65
Sump 003	1,700	1,800

4.3.2.2 Metals

Cadmium and lead are also monitored in the groundwater treatment system influent. As shown in Table 4, the concentrations of these metals in the composite system influent are typically low (i.e., below groundwater RAOs), except that the cadmium concentration associated with the 001 system is at times elevated. As discussed in Section 4.5, the cadmium appears to originate from one location in the 001 segment (i.e., MH-001-14). Lead levels are generally quite low. The 30 influent samples for which lead was analyzed have shown lead concentrations ranging from "not detected" (reporting limits vary) to a maximum of 8.7 µg/L.

4.4 GROUNDWATER MONITORING

Table 5 summarizes the results of the 19 rounds of groundwater monitoring completed at the Site for the eight wells located in the central and southern portion of the Site, i.e., within the portion of the Site where the collection system is operative. The monitoring period began with the initial sampling conducted as remedial construction was being completed (May 2000) and has continued through June 2008. In accordance with the approved *Final Remedial Action Plan* (IT Corporation, 1999), groundwater monitoring has been conducted on a semi-annual basis, except in 2001 when, at the request of NYSDEC, quarterly monitoring was performed. The data from the 19 rounds of groundwater monitoring for these wells show that the groundwater quality in the central and southern portion of the Site generally meets the RAOs specified in the Operable Unit 2 ROD.

4.4.1 Volatile Organic Compounds

VOC concentrations in all seven wells near and along the boundary at the southern and southwestern limit of the Site (i.e., wells MW-2, MW-5, MW-28, MW-30, MW-31, MW-34, and MW-34D) have achieved the corresponding RAOs for VOCs in each of the past 16 rounds of groundwater sampling and, in total, 18 of the 19 rounds of groundwater monitoring. The only exception for these seven wells was the detection of 7.1 µg/L of TCE at well MW-5 in the March 29, 2001 sample, compared to the RAO for TCE of 5 µg/L.

A 1,1,1-trichloroethane (1,1,1-TCA) concentration of 35 µg/L was reported from the December 1, 2000 sample at well MW-33, which is located on the upgradient (northeastern) limit of the portion of the Site within the expected zone of influence of the collection system. No 1,1,1-TCA has been detected in any of the 17 rounds of groundwater sampling conducted at well MW-33 since December 2000, or in any other well in the central and southern portion of the Site at any other time. Also, in the December 2005 sampling, cis-1,2-DCE, TCE, and vinyl chloride concentrations of 23, 16, and 1.5 µg/L, respectively, were reported at well MW-33, but the later rounds of sampling showed no detectable concentrations of any of these VOCs. These later data support the hypothesis previously identified to NYSDEC that the December 2005 VOC concentrations at well MW-33 were the result of cross-contamination of sampling equipment. During the December 2005 monitoring event, well MW-33 was sampled immediately after well MW-32. The cis-1,2-DCE, TCE, and vinyl chloride concentrations subsequently reported in the December 2005 sampling at well MW-33, at which none of these VOCs had been detected in the past, were each found to equal 2 percent of the corresponding concentration at well MW-32. The conclusion is that groundwater at MW-33, located upgradient of the area of the collection system, has not been impacted by the target VOCs at the Site.

4.4.2 Metals

In addition to VOCs, the Operable Unit 2 ROD (NYSDEC, 1995b) established RAOs for two metals (i.e., cadmium and lead). In the 19 rounds of groundwater monitoring, only one exceedance of the RAO for cadmium (5 µg/L) has been observed. This excursion was a value of 6.2 µg/L in well MW-31 in December 2007. As discussed below, this specific sample also exhibited the highest lead concentration in any well sample collected since 2000. Based on the results of follow-up sampling, it is believed that the elevated metals in the December 2007 sample at MW-31 were the results of high suspended solids in the well sample. Cadmium was not detected above the RAO at any other time in any well.

Sporadic exceedances of the RAO for lead have been observed in samples in wells MW-5, MW-28, MW-30, and MW-31 beginning with the June 2004 monitoring event. In the June 2004 sampling, 44.5 and 35 µg/L of lead, respectively, were reported for wells MW-5 and MW-28. Since that time, reported lead levels have ranged to a maximum of 116 µg/L at well MW-31 in December 2007 (i.e., the same sample with sole cadmium exceedance), although lead levels at MW-5 have been below the RAO since the June 2005 sampling.

It is not uncommon, especially in fine-grained soil formations, for sediment to accumulate in the bottom of groundwater monitoring wells. This sediment can be re-suspended when a bailer is lowered into the well during purging and sampling, which results in a high suspended solids and corresponding elevated metals concentrations in samples. To assess whether suspended solids in the well samples were the cause of the observed metals levels, low-flow sampling techniques, which are designed to minimize the disturbance of the well (Puls and Barcelona, 1996), were used at wells MW-5, MW-28, and MW-31 in the June 2008 sampling. Comparisons of the December 2007 samples collected by conventional bailing and the June 2008 low-flow samples show the likely influence of suspended solids on metals levels at wells MW-28 and MW-31.

Comparison of Metals Levels for Differing Sampling Techniques
December 2007 (Conventional Bailing) vs. June 2008 (Low-Flow)

Well	Date of Sampling	Cadmium (µg/L)	Lead (µg/L)
MW-28	12/19/07	0.72	64.7
	06/26/08	ND*	8.2
MW-31	12/19/07	6.2	116
	06/27/08	ND*	ND**

* - Not detected at an analytical minimum detection limit of 0.29 µg/L.
** - Not detected at an analytical minimum detection limit of 1.4 µg/L.

Neither cadmium nor lead was detected in the December 2007 or the June 2008 samples at well MW-5.

Given the sporadic occurrence and lack of consistency across the Site, it is suspected that the lead detections are related to suspended solids entrainment in certain samples as a result of conventional sampling using a well bailer. It is also noted that Well MW-2 is located within 100 feet of well MW-28, screened at a similar elevation, but has shown no lead concentrations above 4.3 µg/L.

4.5 MANHOLE SAMPLING

On May 7 and 8, 2006, CBS collected samples from 22 manhole and sump locations throughout the groundwater collection network to assess whether water chemistry varied significantly and if such variations (or lack of variation) could provide further insight into subsurface flow and potential contaminant transport phenomena. Table 6 presents the concentration data from this sampling for general chemistry and metals, and Table 7 presents the concentration data for VOCs. The data are also summarized for each of the three sections of the recovery system in Figures 6 through 8.

A review of these manhole sampling results shows that VOC concentrations were present throughout the storm sewer collection system, with much higher concentrations associated with the western portion of the collection system that drains to Sump 003. The lowest concentrations were associated with the eastern portion of the collection system that drains to Sump 001. Elevated cadmium and lead concentrations were manifested at only a few locations, with most manhole samples showing no detectable concentrations of these metals.

There was no relationship between VOC and metals concentrations in manholes versus those in adjacent or nearby groundwater monitoring wells. Table 8 compares VOC and metals concentrations data from the water collected at manholes and sumps to those in groundwater at nearby monitoring wells. As shown in Table 8, VOC and metals concentrations observed in manholes or sumps do not correlate to those observed at nearby groundwater monitoring wells.

4.6 REVISED SITE CONCEPTUAL MODEL

The understanding of Site conditions has grown significantly based on the knowledge and data gleaned from system O&M over the past eight years. This expanded Site knowledge allows for a redefinition of the conceptual Site model as compared to that developed from the RI data and used as a basis for remedial design.

First, groundwater in the central and southern portion of the Site (i.e., the portion of the Site where the collection system is operative) is not impacted by Site-related VOCs or metals. This situation, which is evident from the 19 rounds of groundwater monitoring, results from the very low mobility of COCs in groundwater and the fact that the extensive Operable Unit 1 soil remediation efforts eliminated the sources of RAO COCs in groundwater. Because of the low potential for constituent transport in groundwater, the Operable Unit 1 source removal effectively "mined" out the impacted groundwater at the Site.

Second, under the hydrogeologic conditions at the Site, contaminant migration is limited to man-made preferential pathways, such as those associated with underground utility lines. The water that is being collected in the "groundwater" collection system is not groundwater associated with the uppermost continuous water-bearing zone. Instead, this water is comprised of fugitive surface water inflows and, where hydraulically connected to the collection systems via man-made pathways (e.g., along manhole risers), perched groundwater found in the discontinuous pockets of more-permeable fill placed at the Site.

Third, the VOCs detected in the system influent are not the result of impacted Site groundwater draining into these former sewer pipes; these VOCs are being leached from the bedding and fill materials immediately surrounding the underground pipes. The groundwater collection system does not collect contaminated groundwater; the groundwater is clean. The influent to the treatment system becomes impacted by flowing through storm sewer pipes that serve as the collection system.

Fourth, based on the recently observed water levels in manholes and those in groundwater monitoring wells, the groundwater collection system is not acting to drain groundwater. The hydraulic head levels suggest the opposite, i.e., that the hydraulic gradient is outward from the "collection system" to the local shallow groundwater. The very low hydraulic conductivity of the native soils, however, minimizes the actual advective flow.

Finally, as evidenced by the data from couplets of manholes/sumps and nearby monitoring wells, the COCs associated with bedding materials are not migrating outward into the groundwater flow regime.

4.7 CONCLUSIONS

Discontinuing operation of those portions of the groundwater collection system that drain to Sumps 001 and 002 is expected to have an overall positive effect on Site remediation. Closing the 001 and 002 systems, with effective follow-up monitoring and contingency plans, will eliminate the potential discharge of impacted groundwater to the surface. Moreover, eliminating these portions of the collection system will ease and improve the operation of the groundwater treatment system by substantially decreasing total flow and the potential for floc (i.e., calcium carbonate precipitate) formation, and pH variations. These improvements will translate to more aggressive and efficient treatment of the influent from the 003 system.

Based on the revised Site conceptual model presented in Section 4.6, the partial shutdown of the 001 and 002 collection system will not adversely affect groundwater quality. Because lateral groundwater flow is limited to preferential man-made pathways, discontinuing operation of the 001 and 002 collection system will actually decrease the potential for off-site migration of Site-related COCs through groundwater. Properly closing these portions of the system will permanently eliminate the pathways by which Site-related COCs could reach off-site groundwater or could impact surface water quality in U-Crest Ditch.

5.0 TERMINATION OF ACTIVE GROUNDWATER COLLECTION AT SUMPS 001 AND 002

This section describes the plan for discontinuing the collection of Site groundwater that drains to Sumps 001 and 002.

5.1 SYSTEM CLOSURE SEQUENCING

CBS proposes a step-by-step shutdown of the 001 and 002 portions of the groundwater collection and treatment system. These steps are described in the following sections.

5.1.1 PHASE 1 CLOSURE

Phase 1 in the closure sequence is designed to segregate the groundwater collection system into upper and lower portions to decrease the potential for overtopping at Sumps 001 and 002 and provide the opportunity to lower water levels in the lower portion before proceeding further. The Phase 1 activity also provides the opportunity to conduct inspections and Site reconnaissance before completing the final dismantling of the 001 and 002 collection systems.

In the Phase 1 work, manholes MH-001-02, MH-001-06, MH-002-09, and MH-002-10 (Figure 1) will be closed and sealed using the procedures described below. As shown in Figures 1 and 3, these manholes are located midway along their respective segment profiles and are the nearest upstream manholes above locations where water levels are near the ground surface (i.e., <5 ft-bgs). Sealing these manholes will split the collection systems, separating the upper portions, where water levels remain relatively deep below grade (i.e., >5 ft-bgs) from the lower portions where water levels are near or at the ground surface.

Figure 10 shows a detail for manhole closure. As shown in Figure 10, manhole closure involves filling the interior of the manhole to above the highest pipe crown with Portland cement concrete. This concrete fill will flow out a short distance into the pipes that connect to the manhole. In addition to filling the interior, grouting will be conducted around the outside of the manholes to ensure that the bedding material and other fill immediately surrounding the pipe and manhole are sealed. This grouting will be accomplished by drilling grout holes along the outside of the manhole and pumping a cement-bentonite grout into the bedding material and any other more-permeable fill materials around the piping that connects to the manhole.

After these Phase 1 manholes are sealed, groundwater pumping will continue at Sumps 001 and 002 for a period of up to four weeks (i.e., two weeks per section, conducted sequentially) in an effort to lower water levels in the lower portions of the collection piping and manholes. Lowering the water in these areas will reduce the potential for incidental discharges during subsequent manhole closure and provide improved access for such closures. Water levels will be monitored weekly at select manholes to assess the effects of sealing with continued pumping on water levels both upstream and downstream of the sealed manholes. Section 5.3.1 describes this monitoring.

5.1.2 PHASE 2 CLOSURE

Once the lower sections of the 001 and 002 systems are pumped down to the maximum extent practicable, Phase 2 closure will begin. In Phase 2, all of the manholes in the lower segments of the 001 and 002 system where water levels are near the surface (<5 ft-bgs) will be filled. The manholes to be closed are the following (Figure 1):

- CSMH-001 (Sump 001)
- MH-001-01
- MH-001-13
- MH-001-14
- CSMH-002 (Sump 002)
- MH-002-01
- MH-002-03
- MH-002-06
- MH-002-15

Despite multiple attempts, manhole MH-001-03 has not been located after NFTA's completion of runway extension work in this portion of the Site and is not addressed by this plan.

The sump pumps will be pulled from Sumps 001 and 002, and the electrical service to these locations will be disconnected and permanently locked out. The conveyance lines from the sumps will be capped both at the sump and at the treatment building. Manhole closure techniques for Phase 2 will then be the same as those used in the Phase 1 closures. The interior of these manholes will be filled with concrete to a level above the highest pipe crown, as described above, and the manholes will be externally grouted to seal off the pipe bedding and any other permeable fill materials around the pipes that enter these manholes.

After closing the Phase 2 manholes, water levels will be monitored weekly at select manholes for four weeks following closure to assess the effects of sealing on water levels upstream of the sealed manholes. Section 5.3.1 discusses this monitoring.

5.2 TREATMENT SYSTEM MODIFICATIONS

In conjunction with completing the Phase 2 closure, the equipment and piping in the treatment plant will be inspected, cleaned (as necessary), and reconfigured to receive influent solely from Sump 003. The system controls and Autodialer will also be modified as required. Unneeded piping will be disconnected and removed, and non-salvageable materials, including solids collected from the process vessels and piping, will be removed for off-site disposal at a properly permitted facility. The Site O&M Manual will be updated to address these changes and to bring the Manual up to date with all system modifications.

5.3 MONITORING PLAN

Monitoring and inspections will be conducted throughout and subsequent to the closure activity to accomplish the following:

- Evaluate the effects of closure activity on the remaining open portions of the groundwater collection system;
- Assess the effects of the closure on groundwater quality and surface water discharge quality; and
- Identify any newly manifested discharges to surface water.

5.3.1 WATER LEVEL MEASUREMENTS

Prior to, during, and after the Phase 1 and Phase 2 closure activities, water levels will be measured in selected manholes in the remaining open portions of the groundwater collection system. This monitoring is designed to assess the effectiveness of manhole sealing and evaluate the effects of manhole sealing on water levels in the remaining open manholes.

Table 9 summarizes the proposed water level monitoring program. As shown in this table, a baseline measurement event will be conducted prior to the start of closure activities. During closure, and up to four weeks thereafter, water levels will be monitored weekly. Afterward, for one year from the start of closure, water levels will be measured on a quarterly basis.

In conjunction with water level measurements at manholes, groundwater levels will be monitored ahead of starting the closure work to establish a baseline. Quarterly groundwater level measurements will then be collected for up to one year following the start of closure activities.

5.3.2 SURFACE WATER MONITORING

Three rounds of surface water monitoring are proposed for discharges from the NFTA storm sewer system that collects surface water from those portions of the airport property where the groundwater collection and treatment system has been operating. Figure 9 shows these storm sewers and the proposed discharge monitoring locations. These locations represent the furthest downstream points that are accessible for sampling and do not receive significant flows from other portions of the airport property or from Genesee Street.

Upon NYSDEC approval of these monitoring locations, three rounds of sampling will be conducted as follows:

- Immediately before starting the Phase 1 work;
- After completing Phase 1; and
- After completing Phase 2.

In all three monitoring events, surface water samples will be collected and analyzed for the following parameters, which are consistent with the discharge authorization for the groundwater treatment system:

pH	cis-1,2-dichloroethylene
Total suspended solids	Trichloroethylene
Toluene	Tetrachloroethylene
Methylene chloride	Cadmium
1,2-dichlorobenzene	Chromium

Lead will also be analyzed in these samples.

Flows will be estimated at the time of each sample collection, and other pertinent observations regarding the discharges (e.g., sheen, precipitate, other solids) will be recorded. The timing of the sampling will coincide with monitoring of the groundwater treatment system effluent.

Subsequent to the collection of the data generated from the three rounds of sampling events, NYSDEC will review and evaluate the data. Any additional or ongoing monitoring requirements will be identified at that time.

5.3.3 GROUNDWATER MONITORING

As part of the partial closure plan, a new shallow groundwater monitoring well (i.e., MW-35) will be installed between Sump 001 and Genesee Street to provide an additional monitoring point associated with the 001 system. This 2-inch diameter well will be installed using conventional rotary drilling techniques with hollow-stem augers. A 10-foot well screen will be set in the uppermost water-bearing zone. The location of this proposed well is shown in Figure 1.

Groundwater monitoring will be conducted quarterly at wells MW-30, MW-31, MW-34, and MW-35 for one year following the start of closure activities. Sampling will be conducted using low-flow techniques, and analytical parameters will be the same as currently employed in routine Site groundwater monitoring. Thereafter, groundwater monitoring at these wells will return to the current semi-annual frequency.

5.3.4 INSPECTIONS

In addition to the water level measurements and surface and groundwater monitoring, the ground surface in the area of the former 001 and 002 systems will be inspected for signs of surface seeps or overtopping of manholes. If any such surface discharges are encountered, the contingency measures described in Section 5.4 will be implemented.

5.4 CONTINGENCY PLAN

The planned partial closure is not expected to cause discharges of impacted groundwater or surface water. The closure program includes a contingency plan, however, in the unlikely event that unforeseen conditions arise. Three types of occurrences would trigger the need for contingency measures:

- Surface water monitoring shows an increase in concentrations in measured parameters over the three rounds of sampling;
- Surface water containing elevated COC concentrations (i.e., above RAOs) is found discharging to the surface in seeps; or
- A previously unclosed manhole is found to overtop.

The following paragraphs outline the contingency measures to be undertaken in the event of one of these circumstances.

5.4.1 SURFACE WATER DISCHARGES

If surface water monitoring shows an increase in concentrations in measured parameters over the three rounds of sampling (Section 5.3.2), additional inspection and sampling will be conducted in an effort to locate the source of the COCs. These measures will include reviewing the NFTA design drawings for the specific sewers associated with the affected storm sewers and collecting water quality samples at additional locations within the storm sewer system in an attempt to isolate the source of the inflow. Following this initial evaluation, a specific response plan will be submitted to NYSDEC and NFTA for review. Possible remedial measures will generally focus on eliminating sources of fugitive inflows at the source and include localized sewer relining, reconstruction, or abandonment. Follow-up monitoring will be conducted to confirm the effectiveness of the remedial measures employed.

5.4.2 SURFACE WATER SEEPS

Surface water may become manifest at locations where improperly sealed roof leaders or downspouts remain connected to the former storm sewers used for groundwater collection.

Any such locations should be identifiable shortly after completing closure of the groundwater collection system. Also, because the source of VOC and metals in the collected groundwater is associated with the bedding materials around these former storm sewers, such surface discharges are not likely to contain elevated concentrations of Site-related COCs.

If newly developed surface water discharges are identified following closure of the 001 and 002 groundwater collection systems (e.g., surface seeps, overtopping of NFTA storm sewer manholes, the first response will be to collect a water sample to determine if the water contains COCs associated with the former groundwater collection system. If it does not, NFTA will be notified to address the situation as part of its surface water management program for the airport property. If the water is found to be impacted, however, or if the overtopping is from a manhole associated with the closed groundwater collection system, further investigation will be conducted.

If impacted seepage is observed at the ground surface, sewer maps and drawings will first be reviewed to assess the seepage location with respect to the sewer lines formerly used for groundwater collection. This plan review will aid in the development of further response measures. A specific plan will then be developed and reviewed with NYSDEC and NFTA for implementation. If the seepage flow is very low or over a very small area, surface sealing with bentonite or compacted clay will be the preferred method to abate the discharge. For larger seeps, or for seeps where surface sealing was not effective, the affected area will either be excavated to expose the former collection pipe to seal the "leak" location or the area will be drilled for injection of cement-based grout to seal off the seepage below grade. The method employed will be selected to facilitate effective stoppage of the seep while minimizing disruption of Site surface structures and utilities.

5.4.3 OVERTOPPING MANHOLES

If, after implementing the closure measures described in Section 5.1 one or more of the remaining open manholes begins to overtop, that manhole will be sealed using the same procedures as described in Section 5.1 and shown in Figure 10. If a previously sealed manhole shows rising water or is overtopping, additional concrete will be place to fill the manhole riser to a level above the highest concrete joint in the manhole that is below water.

5.5 RESTRICTIVE COVENANTS

On February 4, 1999, the Respondents filed a "Declaration of Covenants and Restrictions" with the Clerk of Erie County, New York, to give notice to all parties who may acquire interest in the Site in the future of the actions specified in the Order. To supplement that deed notice, and as part of the closure process, NFTA will place covenants on the Site property and groundwater that impart the following environmental restrictions:

- The property shall remain in industrial or commercial use and shall not be used for residential development;
- No groundwater wells or other structures shall be installed on the property for the purpose of extracting groundwater for any potential consumptive use; and
- No surface water cisterns or other surface water collection devices or structures designed for the provision of water for consumptive use shall be installed at the Site.

The restrictive covenants will also include a requirement to perform vapor intrusion investigations for any building proposed for construction within the area from which groundwater is currently being recovered, and, if necessary, mitigation where sources of VOCs may adversely impact indoor air quality in any such buildings.

These institutional controls are specifically focused on ensuring that the second of the ROD-specified remediation goals (i.e., prevent human exposure to impacted on-site groundwater) (Section 3.2) continue to be achieved at the Site. As the property owner, it is the responsibility of NFTA to work with NYSDEC to develop and implement the necessary environmental restrictive covenants.

6.0 SCHEDULE

Figure 11 presents the schedule for implementing this Revised Work Plan for the partial termination of the groundwater collection system at the Site. The schedule fast-tracks contractor procurement to allow for completion of the two-phase closure program yet this construction season. The one year of water-level measurements and groundwater monitoring will commence immediately before Phase 1 of the closure program is initiated.

The schedule for the closure implementation tasks is weather-dependent, as the field work cannot be conducted during periods of severe cold or significant snow cover. Weather-related delays could extend the schedule shown in Figure 11 by several months. In addition, the project schedule makes certain assumptions regarding NYSDEC review and approval times and timing of access to secured areas of the airport property. Changes in these timeframes would also directly affect the schedule.

7.0 REFERENCES

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R.W. Puls and M.J. Barcelona, April 1996. "Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures," <u>EPA Groundwater Issue</u>, EPA/540/S-95/504. Office of Office of Solid Waste and Emergency Response, Washington, D.C.

TABLES

Table 1
Remedial Action Objectives for Site Groundwater
NYSDEC Site No. 9-15-066[1]

Constituent	Remedial Action Objective in Groundwater (µg/L)
1,2-dichloroethylene (total)	5
Toluene	5
1,1,1-Trichloroethane	5
Trichloroethylene	5
Vinyl chloride	2
Cadmium	5
Lead	25

[1] *NYSDEC, December 2005.*

Table 2
Summary of Water Level Measurement Data
NYSDEC Site No. 9-15-066, Cheektowaga, New York

Location/Descriptor		Elevation (ft-msl)		24-Apr-08		5-Jun-08		13-Jun-08	
		Rim	Ground Surface	Depth to Water (ft-bgs)	Water Elevation (ft-msl)	Depth to Water (ft-bgs)	Water Elevation (ft-msl)	Depth to Water (ft-bgs)	Water Elevation (ft-msl)
001 System Manholes	CSMH-001	701.34	701.2	0.4	700.9	NM	NM	NM	NM
	001-01	701.95	701.8	0.9	701.1	NM	NM	NM	NM
	001-06	708.20	708.2	7.3	700.9	NM	NM	NM	NM
	001-09	709.01	709.1	8.2	700.8	NM	NM	NM	NM
	001-10	708.51	708.5	7.6	700.9	NM	NM	NM	NM
	001-13	704.43	704.3	4.6	699.8	NM	NM	NM	NM
	001-14	704.36	704.3	3.2	701.2	NM	NM	NM	NM
002 System Manholes	CSMH-002	688.97	688.9	0.0	689.0	0.00	688.97	0.09	688.88
	002-02	690.84	690.8	NM	NM	1.78	689.06	1.88	688.96
	002-03	691.64	691.6	2.6	689.0	NM	NM	NM	NM
	002-06	691.91	691.9	3.0	688.9	2.97	688.94	3.05	688.86
	002-09	695.71	695.8	6.8	688.9	6.71	689.00	6.82	688.89
	002-10	698.71	698.8	9.7	689.0	9.72	688.99	9.80	688.91
	002-12	704.10	703.5	15.0	689.1	NM	NM	NM	NM
	002-13	704.88	704.9	16.0	688.9	NM	NM	NM	NM
	002-15	690.82	690.7	1.9	688.9	NM	NM	NM	NM

Table 2
Summary of Water Level Measurement Data
NYSDEC Site No. 9-15-066, Cheektowaga, New York

Location/Descriptor		Elevation (ft-msl)		24-Apr-08		5-Jun-08		13-Jun-08	
		Rim	Ground Surface	Depth to Water (ft-bgs)	Water Elevation (ft-msl)	Depth to Water (ft-bgs)	Water Elevation (ft-msl)	Depth to Water (ft-bgs)	Water Elevation (ft-msl)
003 System Manholes	CSMH-003	688.49	688.5	4.5	684.0	NM	NM	NM	NM
	003-01	688.88	688.9	4.9	684.0	NM	NM	NM	NM
	003-02	688.14	688.1	4.1	684.0	NM	NM	NM	NM
	003-03	689.62	689.7	5.6	684.0	NM	NM	NM	NM
	003-04	690.64	690.7	6.4	684.2	NM	NM	NM	NM
	003-07	694.59	691.7	10.6	684.0	NM	NM	NM	NM
	Access	688.80	689.0	4.9	683.9	NM	NM	NM	NM
NFTA Tunnel Manhole		702.49	701.9	15.6	686.9	NM	NM	NM	NM
Location/Descriptor		Elevation (ft-msl)		24-Apr-08		5-Jun-08		13-Jun-08	
		Top of Casing	Outer Casing	Depth to Water (ft-bgs)	Water Elevation (ft-msl)	Depth to Water (ft-bgs)	Water Elevation (ft-msl)	Depth to Water (ft-bgs)	Water Elevation (ft-msl)
Selected Groundwater Wells	MW-5	685.75	688.00	2.91	682.84	NM	NM	NM	NM
	MW-28	688.07	689.30	5.94	682.13	NM	NM	NM	NM
	MW-30	694.65	695.30	5.33	689.32	NM	NM	NM	NM
	MW-31	NA	688.25	3.18	685.07	2.85	685.40	2.74	685.51
	MW-34	702.81	703.80	3.51	699.30	NM	NM	NM	NM
	MW-34D	701.64	703.00	5.40	696.24	NM	NM	NM	NM

Notes:
1. *"NM" indicates not measured.*
2. *"NA" indicates top of casing elevation not available. Groundwater measurements made from top of outer casing.*

Table 3
Water Level Comparisons
Monitoring Wells Located Proximal to Sumps or Manholes
NYSDEC Site No. 9-15-066, Cheektowaga, New York

Sump or Manhole	Nearest Groundwater Monitoring Well	Distance Apart (feet)	Water Elevation Difference (feet)		
			24-Apr-08	5-Jun-08	13-Jun-08
CSMH-001	MW-30	280	11.62	NM	NM
	MW-34	250	1.64	NM	NM
	MW-34D	250	4.70	NM	NM
001-14	MW-34	43	1.86	NM	NM
	MW-34D	64	4.92	NM	NM
CSMH-002	MW-31	87	3.90	3.57	3.37
CSMH-003	MW-5	77	1.15	NM	NM
003-02	MW-28	320	1.91	NM	NM

Notes:
1. Water Elevation Difference = (Sump or Manhole Water Elevation) - (Nearest Monitoring Well Groundwater Elevation)
2. "NM" indicates not measured.

Table 4
Summary of Treatment System
Influent Monitoring Data

Date of Sampling	Outfall	Constituent Concentration (ug/L)						
		cis-1,2-dichloroethylene	Toluene	1,1,1-trichloroethane	Trichloroethylene	Vinyl Chloride	Cadmium	Lead
08/21/00	Composite	200 U	200 U	200 U	**3,100**	200 U	**1.5**	NA
08/29/00	Composite	200 U	200 U	200 U	**8,500**	200 U	**0.7**	NA
09/06/00	Composite	200 U	200 U	200 U	**4,100**	200 U	0.7 U	NA
09/13/00	Composite	400 U	400 U	400 U	**9,600**	400 U	**1.6**	NA
09/20/00	Composite	**54 J**	100 U	100 U	**2,500**	100 U	0.6 U	NA
09/27/00	Composite	100 U	100 U	100 U	**2,200**	100 U	**0.68 B**	NA
10/04/00	Composite	**60 J**	100 U	100 U	**2,500**	100 U	**0.69 B**	NA
10/10/00	Composite	**23 J**	25 U	25 U	**430**	25 U	0.5 U	NA
03/29/01	Composite	**9.1 J**	10 U	**1.4 J**	**16**	10 U	**1.5**	2.47 U
06/26/01	001	**25**	5 U	**0.9 J**	**37**	5 U	**448**	NA
06/26/01	002	**16**	5 U	**2.3 J**	**280**	5 U	3.0 U	NA
06/26/01	003	**510**	5 U	**4.5 J**	**1,700**	5 U	3.0 U	NA
09/29/01	Comp - Perm	**18**	25 U	**4 J**	**8.3 J**	10 U	0.25 U	**7.4**
09/29/01	Comp - Temp	**14 J**	25 U	25 U	**350**	25 U	0.25 U	**8.7**
12/21/01	Composite	**14**	10 U	10 U	**130**	10 U	**1.7**	4.1 U
03/14/02	Composite	**18**	10 U	10 U	**130**	10 U	**0.29**	**4.5**
10/15/02	Composite	**11.3**	**530**	**9.0**	**990**	**16**	5 U	NA
12/15/02	Composite	**7.3**	**19**	**0.16**	**46**	**1.3**	**8.4**	50 U
03/15/03	Composite	**7.8**	**14**	**1.0**	**29**	NA	**21**	3 U
06/11/03	Composite	**11.0**	**130**	**64**	**570**	25 U	**4.2**	**5.5**
09/09/03	Composite	**8.6**	**290**	25 U	**620**	**15**	**3.0**	**3.5**
12/10/03	Composite	**8.6**	**54**	25 U	**430**	25 U	**2.5**	**3.0**
03/12/04	Composite	**7.7**	**51**	2 U	**3.9**	2 U	**1.4**	**1.6**
06/09/04	Composite	**8.3**	**54**	40 U	**650**	40 U	**1.8**	**6.8**
09/13/04	Composite	**10.3**	**98**	10 U	**250**	10 U	**1.8**	**2.2**
12/13/04	Composite	**140**	**4.4 J**	20 U	**470**	20 U	**0.81 B**	**1.6 B**

Table 4
Summary of Treatment System
Influent Monitoring Data

Date of Sampling	Outfall	Constituent Concentration (ug/L)						
		cis-1,2-dichloroethylene	Toluene	1,1,1-trichloroethane	Trichloroethylene	Vinyl Chloride	Cadmium	Lead
03/23/05	Composite	**46**	15 U	15 U	**250**	15 U	**2.1 B**	1.5 U
06/09/05	Composite	**100**	15 U	15 U	**1,200**	**5.4 J**	**1.2 B**	3.0 U
10/03/05	Composite	**26**	1 U	**2.0**	**8.6**	**11**	5.0 U	3.0 U
12/16/05	Composite	**34**	5 U	5 U	**140**	**3.5 J**	**0.68 B**	3.0 U
03/13/06	Composite	**36**	10 U	10 U	**190**	**2.6 J**	**0.95 B**	**2.0 B**
05/09/06	Composite	**87**	10 U	10 U	**710**	**5.6 J**	**1.0 B**	3.0 U
06/12/06	Composite	**72**	3.3 U	3.3 U	**190**	**4.0 J**	**0.72 B**	3.0 U
09/11/06	Composite	**16**	5 U	5 U	**85**	5 U	**0.47 B**	**2.0 B**
12/11/06	Composite	**14**	5 U	5 U	**71**	**1.8 J**	5.0 U	3.0 U
03/22/07	Composite	**32**	5 U	**2.7 J**	**130**	**4.6 J**	**1.2 B**	3.0 U
06/20/07	Composite	**31**	**0.45 J**	**0.76 J**	**210**	**1.7 J**	**0.44 B**	3.0 U
09/17/07	Composite	**89**	20 U	20 U	**730**	**7.0 J**	5.0 U	3.0 U
12/18/07	Composite	**18**	2 U	2 U	**90**	**1.5 J**	5.0 U	3.0 U
03/19/08	Composite	**12**	**0.38 J**	**1.0 J**	**120**	**1.2 J**	5.0 U	3.0 U
06/17/08	Composite	**20**	4 U	4 U	**190**	**2.3 J**	5.0 U	3.0 U

Data Legend:
"NA" - indicates not analyzed
*Detections and estimated values are in **bold-face** type.*
Organic data qualifiers:
U - not detected at indicated detection limit
J - estimated concentration below reporting limit but above minimum detection limit.
Inorganic data qualifiers:
U - not detected at indicated detection limit
B - detected concentration below contract required detection limit but above instrument detection limit.

Table 5
Summary of Groundwater Monitoring Data
Wells in Central and Southern Portion of Site
NYSDEC Site No. 9-15-066

Well Number	Date of Sampling	Constituent Concentration (ug/L)						
		cis-1,2-dichloroethylene	Toluene	1,1,1-trichloroethane	Trichloroethylene	Vinyl Chloride	Cadmium	Lead
Remedial Action Objective		5	5	5	5	5	5	25
MW-2	05/04/00	5 U	5 U	5 U	5 U	**1.6 J**	**1.3**	**3.0 B**
	11/30/00	5 U	5 U	5 U	5 U	5 U	1.0 U	10 U
	03/29/01	10 U	10 U	10 U	10 U	10 U	0.41 U	2.47 U
	06/21/01	10 U	10 U	10 U	10 U	10 U	0.85 U	1.21 U
	09/13/01	10 U	10 U	10 U	10 U	10 U	0.25 U	0.79 U
	12/13/01	10 U	10 U	10 U	10 U	10 U	0.44 U	0.82 U
	03/14/02	10 U	10 U	10 U	10 U	10 U	0.17 U	2.03 U
	12/31/02	NA	10 U	10 U	10 U	10 U	0.29 U	**2.0 B**
	06/17/03	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/22/03	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	06/15/04	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/17/04	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	06/22/05	1 U	1 U	1 U	1 U	1 U	5.0 U	**4.1**
	12/15/05	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	06/13/06	1 U	1 U	1 U	1 U	1 U	5.0 U	**2.4 B**
	12/12/06	1 U	1 U	1 U	1 U	1 U	5.0 U	**4.3**
	06/26/07	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/19/07	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	06/26/08	1 U	1 U	1 U	1 U	1 U	5.0 U	**5.6**
MW-5	05/11/00	5 U	5 U	5 U	**5.0**	5 U	0.70 U	**18.0**
	11/30/00	NA	5 U	5 U	5 U	5 U	1.0 U	10 U
	03/29/01	10 U	10 U	10 U	**7.1 J**	10 U	**1.1**	**14.3**
	06/21/01	10 U	10 U	10 U	**4.1 J**	10 U	0.85 U	1.21 U
	09/13/01	10 U	10 U	10 U	**1.5 J**	10 U	**1.2**	**14.7**
	12/13/01	10 U	10 U	10 U	10 U	10 U	0.44 U	1.6 U
	03/14/02	10 U	10 U	10 U	10 U	10 U	**0.29 B**	3.20 U
	12/31/02	10 U	NA	10 U	10 U	10 U	**0.57 B**	**5.0**
	06/17/03	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/22/03	1 U	1 U	1 U	1 U	1 U	5.0 U	**6.1**
	06/30/04	1 U	1 U	1 U	1 U	1 U	**1.0 B**	**44.5**

Table 5
Summary of Groundwater Monitoring Data
Wells in Central and Southern Portion of Site
NYSDEC Site No. 9-15-066

Well Number	Date of Sampling	Constituent Concentration (ug/L)						
		cis-1,2-dichloroethylene	Toluene	1,1,1-trichloroethane	Trichloroethylene	Vinyl Chloride	Cadmium	Lead
Remedial Action Objective		5	5	5	5	5	5	25
MW-5 (cont'd)	12/17/04	1 U	1 U	1 U	1 U	1 U	**0.43 B**	**17.2**
	06/22/05	1 U	1 U	1 U	**1.1 J**	1 U	**0.23 B**	**35.1**
	12/14/05	1 U	1 U	1 U	1 U	1 U	5.0 U	**9.4**
	06/13/06	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/12/06	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	06/26/07	1 U	1 U	1 U	1 U	1 U	5.0 U	**1.8 B**
	12/19/07	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	06/26/08	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
MW-28	05/04/00	5 U	5 U	5 U	5 U	5 U	**1.5**	**3.1 B**
	03/29/01	10 U	10 U	10 U	10 U	10 U	0.41 U	2.47 U
	06/21/01	10 U	10 U	10 U	10 U	10 U	0.85 U	1.21 U
	09/13/01	10 U	10 U	10 U	10 U	10 U	0.25 U	**7.0**
	12/12/01	10 U	10 U	10 U	10 U	10 U	0.44 U	3 U
	03/14/02	10 U	10 U	10 U	10 U	10 U	0.17 U	**8.8**
	12/31/02	10 U	NA	10 U	10 U	10 U	0.29 U	**4.7 B**
	06/17/03	1 U	1 U	1 U	1 U	1 U	5.0 U	**1.4 B**
	12/22/03	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	06/15/04	1 U	1 U	1 U	1 U	1 U	5.0 U	**35.0**
	12/17/04	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	06/22/05	1 U	1 U	1 U	1 U	1 U	5.0 U	**36.8**
	12/15/05	1 U	1 U	1 U	1 U	1 U	5.0 U	**12.3**
	06/13/06	1 U	1 U	1 U	1 U	1 U	5.0 U	**36.5**
	12/12/06	1 U	1 U	1 U	1 U	1 U	5.0 U	**43.1**
	06/26/07	1 U	1 U	1 U	1 U	1 U	5.0 U	**58.6**
	12/19/07	1 U	1 U	1 U	1 U	1 U	**0.72 B**	**64.7**
	06/26/08	1 U	1 U	1 U	1 U	1 U	5.0 U	**8.2**
MW-30	05/04/00	5 U	5 U	5 U	5 U	5 U	**3.0**	**11.8**
	11/30/00	NA	5 U	5 U	5 U	5 U	1.0 U	10 U

Table 5
Summary of Groundwater Monitoring Data
Wells in Central and Southern Portion of Site
NYSDEC Site No. 9-15-066

Well Number	Date of Sampling	cis-1,2-dichloroethylene	Toluene	1,1,1-trichloroethane	Trichloroethylene	Vinyl Chloride	Cadmium	Lead
		Constituent Concentration (ug/L)						
Remedial Action Objective		5	5	5	5	5	5	25
MW-30 (cont'd)	03/29/01	10 U	10 U	10 U	10 U	10 U	0.41 U	2.47 U
	06/21/01	10 U	10 U	10 U	10 U	10 U	0.85 U	1.21 U
	09/13/01	10 U	10 U	10 U	10 U	10 U	**0.60 B**	**2.7 B**
	12/13/01	10 U	NA	10 U	10 U	10 U	0.44 U	1.5 U
	03/14/02	10 U	10 U	10 U	10 U	10 U	**0.59 B**	**3.7**
	12/31/02	10 U	10 U	10 U	10 U	10 U	**1.60 B**	**9.4**
	06/18/03	1 U	1 U	1 U	1 U	1 U	**0.47 B**	**4.3**
	12/22/03	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	06/15/04	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	01/05/05	1 U	1 U	1 U	1 U	1 U	5.0 U	**2.8 B**
	06/22/05	1 U	1 U	1 U	1 U	1 U	**2.4 B**	**27.5**
	12/14/05	1 U	1 U	1 U	1 U	1 U	**0.90 B**	**5.9**
	06/13/06	1 U	1 U	1 U	1 U	1 U	**1.9 B**	**14.7**
	12/12/06	1 U	1 U	1 U	1 U	1 U	**0.91 B**	**12.1**
	06/26/07	1 U	1 U	1 U	1 U	1 U	**1.7 B**	**17.8**
	12/19/07	1 U	1 U	1 U	1 U	1 U	**0.65 B**	**15.4**
	06/26/08	1 U	1 U	1 U	1 U	1 U	**1.4 B**	**15.4**
MW-31	05/09/00	5 U	5 U	5 U	5 U	5 U	0.70 U	3.0 U
	11/30/00	NA	5 U	5 U	5 U	5 U	1.0 U	10 U
	03/29/01	10 U	10 U	10 U	10 U	10 U	0.41 U	2.47 U
	06/21/01	10 U	10 U	10 U	10 U	10 U	0.85 U	1.21 U
	09/13/01	10 U	10 U	10 U	10 U	10 U	**0.27 B**	0.79 U
	12/13/01	10 U	10 U	10 U	10 U	10 U	0.44 U	2.2 U
	03/14/02	10 U	10 U	10 U	10 U	10 U	**0.55 B**	**3.4**
	12/31/02	10 U	NA	10 U	10 U	10 U	0.29 U	**2.9 B**
	06/17/03	1 U	1 U	1 U	1 U	1 U	5.0 U	**8.1**
	12/22/03	1 U	1 U	1 U	1 U	1 U	5.0 U	**13.2**
	06/30/04	1 U	1 U	1 U	1 U	1 U	**0.38 B**	**11.0**
	12/17/04	1 U	1 U	1 U	1 U	1 U	5.0 U	**2.0 B**

Table 5
Summary of Groundwater Monitoring Data
Wells in Central and Southern Portion of Site
NYSDEC Site No. 9-15-066

Well Number	Date of Sampling	Constituent Concentration (ug/L)						
		cis-1,2-dichloroethylene	Toluene	1,1,1-trichloroethane	Trichloroethylene	Vinyl Chloride	Cadmium	Lead
Remedial Action Objective		5	5	5	5	5	5	25
MW-31 (cont'd)	06/22/05	1 U	1 U	1 U	1 U	1 U	**1.1 B**	**38.2**
	12/15/05	1 U	1 U	1 U	1 U	1 U	**0.58 B**	**3.9**
	06/13/06	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/12/06	1 U	1 U	1 U	1 U	1 U	5.0 U	**2.4 B**
	06/26/07	1 U	1 U	1 U	1 U	1 U	**1.1 B**	**23.1**
	12/19/07	1 U	1 U	1 U	1 U	1 U	**6.2**	**116**
	06/27/08	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
MW-33	05/11/00	NA	5 U	**1.3 J**	5 U	5 U	**1.3**	3.0 U
	12/01/00	NA	5 U	**35**	5 U	5 U	1.0 U	10.0 U
	03/28/01	10 U	10 U	10 U	10 U	10 U	0.41 U	2.47 U
	06/21/01	10 U	10 U	10 U	10 U	10 U	0.85 U	1.21 U
	09/13/01	10 U	10 U	10 U	10 U	10 U	0.25 U	0.79 U
	12/13/01	10 U	10 U	10 U	10 U	10 U	0.44 U	0.82 U
	03/14/02	10 U	10 U	10 U	10 U	10 U	0.17 U	2.03 U
	12/31/02	10 U	NA	10 U	10 U	10 U	0.29 U	1.46 U
	06/18/03	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/22/03	1 U	1 U	1 U	1 U	1 U	**1.2 B**	**15.0**
	06/15/04	1 U	1 U	1 U	1 U	1 U	5.0 U	**7.4**
	12/17/04	1 U	1 U	1 U	1 U	1 U	5.0 U	**2.5 B**
	06/22/05	1 U	1 U	1 U	1 U	1 U	5.0 U	**1.9 B**
	12/14/05	**23**	1 U	1 U	**16**	**1.5 J**	5.0 U	3.0 U
	06/13/06	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/12/06	1 U	1 U	1 U	1 U	1 U	5.0 U	**2.7 B**
	06/26/07	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/19/07	1 U	1 U	1 U	1 U	1 U	5.0 U	**2.6 B**
	06/26/08	1 U	1 U	1 U	1 U	1 U	5.0 U	**2.3 B**
MW-34	05/06/00	5 U	5 U	10 U	5 U	5 U	**1.2**	**3.8 B**
	11/30/00	5 U	5 U	35 U	5 U	5 U	**2.1**	10.0 U

Table 5
Summary of Groundwater Monitoring Data
Wells in Central and Southern Portion of Site
NYSDEC Site No. 9-15-066

Well Number	Date of Sampling	Constituent Concentration (ug/L)						
		cis-1,2-dichloroethylene	Toluene	1,1,1-trichloroethane	Trichloroethylene	Vinyl Chloride	Cadmium	Lead
Remedial Action Objective		5	5	5	5	5	5	25
MW-34 (cont'd)	03/28/01	10 U	10 U	10 U	10 U	10 U	0.41 U	2.47 U
	06/21/01	10 U	10 U	10 U	10 U	10 U	0.85 U	1.21 U
	09/13/01	10 U	10 U	10 U	10 U	10 U	0.25 U	0.79 U
	12/13/01	10 U	10 U	10 U	10 U	10 U	0.44 U	0.82 U
	03/14/02	10 U	10 U	10 U	10 U	10 U	0.17 U	2.03 U
	12/31/02	10 U	NA	10 U	10 U	10 U	0.29 U	**2.8 B**
	06/18/03	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/22/03	1 U	1 U	1 U	1 U	1 U	5.0 U	**2.3 B**
	06/15/04	1 U	1 U	1 U	1 U	1 U	**0.29 B**	**4.1**
	01/05/05	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	06/22/05	1 U	1 U	1 U	1 U	1 U	5.0 U	**5.4**
	12/14/05	1 U	1 U	1 U	1 U	1 U	**0.41 B**	**6.5**
	06/13/06	1 U	1 U	1 U	1 U	1 U	5.0 U	**2.7 B**
	12/12/06	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	06/26/07	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/19/07	1 U	1 U	1 U	1 U	1 U	5.0 U	**4.3**
	06/26/08	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
MW-34D	05/06/00	5 U	5 U	5 U	5 U	5 U	**1.2**	**3.1 B**
	11/30/00	5 U	5 U	5 U	5 U	5 U	1.0 U	10.0 U
	03/28/01	10 U	10 U	10 U	10 U	10 U	0.41 U	2.47 U
	06/21/01	10 U	**2.2 J**	10 U	**1.1 J**	10 U	0.85 U	1.21 U
	09/13/01	10 U	10 U	10 U	10 U	10 U	0.25 U	0.79 U
	12/13/01	10 U	10 U	10 U	10 U	10 U	0.44 U	4.0 U
	03/14/02	10 U	10 U	10 U	10 U	10 U	0.17 U	2.03 U
	12/31/02	10 U	NA	10 U	10 U	10 U	0.29 U	**2.3 B**
	06/18/03	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/22/03	1 U	1 U	1 U	1 U	1 U	5.0 U	**12.8**
	06/15/04	1 U	1 U	1 U	1 U	1 U	5.0 U	**3.9**
	01/05/05	1 U	1 U	1 U	1 U	1 U	5.0 U	**1.7 B**

Table 5
Summary of Groundwater Monitoring Data
Wells in Central and Southern Portion of Site
NYSDEC Site No. 9-15-066

Well Number	Date of Sampling	Constituent Concentration (ug/L)						
		cis-1,2-dichloroethylene	Toluene	1,1,1-trichloroethane	Trichloroethylene	Vinyl Chloride	Cadmium	Lead
Remedial Action Objective		5	5	5	5	5	5	25
MW-34D (cont'd)	06/22/05	1 U	1 U	1 U	1 U	1 U	5.0 U	**9.8**
	12/14/05	1 U	1 U	1 U	1 U	1 U	5.0 U	**2.6 B**
	06/13/06	1 U	1 U	1 U	1 U	1 U	**1.7 B**	3.0 U
	12/12/06	1 U	1 U	1 U	1 U	1 U	5.0 U	**7.0**
	06/26/07	1 U	1 U	1 U	1 U	1 U	**0.47 B**	3.0 U
	06/26/07	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U
	12/19/07	1 U	1 U	1 U	1 U	1 U	**0.31 B**	**2.4 B**
	06/26/08	1 U	1 U	1 U	1 U	1 U	5.0 U	3.0 U

Data Legend:
"NA" - indicates not analyzed
Detections and estimated values are in ***bold-face*** *type.*
Concentrations above Remedial Action Objectives are highlighted in yellow.
Organic data qualifiers:
U - not detected at indicated minimum detection limit (MDL)
J - estimated concentration above MDL, but below reporting limit (RL)
Inorganic data qualifiers:
U - not detected at indicated RL
B - detected concentration above MDL, but below RL.

Table 6
Summary of Manhole Sampling Data - May 2006
General Chemistry and Metals

Manhole or Sump Number	Concentration									
	pH (s.u.)	Total Suspended Solids (mg/L)	Total Alkalinity (mg/L)	Cadmium (ug/L)	Calcium (mg/L)	Chromium (ug/L)	Iron (ug/L)	Lead (ug/L)	Magnesium (mg/L)	Manganese (ug/L)
001-02	**8.30**	**4.8**	**141**	**2.0 B**	**150**	5 U	**124**	3 U	**28.8**	**409**
001-06	**8.00**	4 U	**120**	**0.55 B**	**101**	5 U	**198**	3 U	**22.9**	**273**
001-09	**7.90**	4 U	**151**	**1.0 B**	**172**	5 U	**208**	3 U	**35.0**	**368**
001-10	**10.80**	4 U	**74.3**	5 U	**119**	**1.6 B**	**38.9 B**	3 U	**1.34 B**	**11.2 B**
001-13	**8.30**	4 U	**139**	5 U	**113**	5 U	**286**	3 U	**24.9**	**534**
001-14	**8.90**	**1,030**	**54.3**	**28.8**	**390**	**3.1 B**	**1,680**	**7.9**	**22.3**	**1,150**
002-02	**9.90**	**12,000**	**104**	**11.9**	**914 J**	**27.1**	**5,310 J**	**58.0**	**120**	**742 J**
002-03	**8.70**	**5,190**	**71.0**	**3.4 B**	**504**	**7.0**	**4,080**	**15.1**	**27.6**	**555**
002-06	**9.20**	4 U	**49.5**	5 U	**59.5 J**	**0.86 B**	100 U	3 U	**13.3**	**4.5 B J**
002-07	**10.40**	**3.6 B**	**29.1**	5 U	**45.1 J**	**1.0 B**	**524 J**	3 U	**4.22 B**	**5.2 B J**
002-09	**9.50**	4 U	**35.3**	5 U	**69.2 J**	5 U	**54.9 B J**	3 U	**12.5**	**6.4 B J**
002-09 (dup)	NA	4 U	NA	NA	NA	NA	NA	NA	NA	NA
002-10	**10.10**	**1,320**	**16.0**	5 U	**85.6**	**0.96 B**	**69.5 B**	3 U	**12.3**	**8.3 B**
002-10 (dup)	NA	NA	**17.6**	NA	NA	NA	NA	NA	NA	NA
002-12	**9.10**	**4.4**	**34.6**	5 U	**66.4**	**1.1 B**	**50.8 B**	3 U	**13.2**	**2.3 B**
002-12 (dup)	**9.20**	**4.4**	**34.9**	NA	NA	NA	NA	NA	NA	NA
002-13	**7.90**	**1,950**	**172**	**2.2 B**	**466**	**25.6**	**21,100**	**59.4**	**69.0**	**1,550**
002-15	**11.50**	**3.6 B**	**122**	5 U	**41.6 J**	**2.0 B**	**84.4 B J**	3 U	**3.48 B**	**0.88 B J**
002-15 (dup)	NA	NA	**126**	NA	NA	NA	NA	NA	NA	NA
003-02	**11.00**	4 U	**79.7**	5 U	**219**	**14.2**	**33.4 B**	3 U	**5.06**	**0.94 B**
003-03	**11.60**	**20.4**	**280**	**1.4 B**	**164**	**12.6**	**521**	**4.4**	**1.01 B**	**16.2**
003-04	**11.20**	4 U	**120**	5 U	**233**	**24.0**	**89.6 B**	3 U	**6.91**	**2.0 B**
003-07	**11.20**	**5.2**	**132**	5 U	**237**	**19.5**	**198**	**2.9 B**	**8.46**	**8.9 B**
Sump 001	**8.30**	4 U	**164**	**1.2 B**	**216 J**	5 U	**198 J**	3 U	**39.8**	**763 J**
Sump 002	**7.90**	**26.4**	**126**	**1.3 B**	**219 J**	**1.2 B**	**427 J**	3 U	**40.8**	**399 J**
Sump 003	**11.40**	**4.0**	**145**	5 U	**235 J**	**16.4**	100 U	3 U	**2.51 B**	**0.49 B J**

Data Legend:
"NA" - indicates not analyzed
Detections and estimated values are in ***bold-face*** *type.*
Inorganic Data Qualifiers:
U - not detected at indicated reporting limit (RL).
B - estimated concentration above minimum detection limit (MDL), but below reporting limit (RL).
J - analyte detected in method blank.

Table 7
Summary of Manhole Sampling Data - May 2006
Volatile Organic Compounds

Manhole or Sump Number	Concentration (ug/L)							
	cis-1,2-Dichloroethylene	1,2-Dichlorobenzene	Methylene chloride	Toluene	1,1,1-Trichloroethane	Trichloroethylene	Tetrachloroethylene	Vinyl Chloride
001-02	**7.0**	1 U	2 U	1 U	1 U	**14**	1 U	**1.3**
001-06	**12**	1 U	2 U	1 U	1 U	**17**	1 U	**3.4**
001-09	**26**	1 U	2 U	1 U	1 U	**45**	1 U	**5.1**
001-10	**6.3**	1 U	2 U	1 U	**5.6**	**2.2**	**4.0**	**1.8**
001-13	**89**	2 U	4 U	2 U	2 U	**2.7**	**2.7**	**130**
001-14	**1.2**	1 U	2 U	1 U	1 U	**2.4**	1 U	1 U
002-02	**68**	4 U	8 U	4 U	4 U	**220**	4 U	**5.7**
002-03	**100**	1.7 U	3 U	1.7 U	1.7 U	**65**	1.7 U	**21**
002-06	**42**	1.7 U	3 U	1.7 U	1.7 U	**83**	**1.9**	**6.3**
002-07	**14**	1 U	2 U	1 U	1 U	**23**	**2.7**	**1.3**
002-09	**27**	2 U	4 U	2 U	2 U	**120**	**4.8**	**1.5 J**
002-10	**17**	1 U	2 U	1 U	1 U	**38**	**1.3**	**1.6**
002-12	**15**	1 U	2 U	1 U	1 U	**34**	**1.0**	**1.6**
002-13	**12**	1.7 U	3 U	1.7 U	**76**	**11**	1.7 U	**3.3**
002-15	**37**	1 U	2 U	1 U	1 U	**31**	**5.7**	**1.8**
003-02	**130**	25 U	50 U	25 U	25 U	**1,800**	25 U	25 U
003-03	**19**	2 U	4 U	2 U	2 U	**120**	2 U	**15**
003-04	**240**	33 U	67 U	33 U	33 U	**2,200**	33 U	33 U
003-07	**190**	25 U	50 U	25 U	25 U	**1,600**	25 U	25 U
Sump 001	**21**	1 U	2 U	1 U	1 U	**35**	1 U	**3.2**
Sump 002	**24**	2.5 U	5 U	2.5 U	2.5 U	**140**	2.5 U	2.5 U
Sump 003	**200**	25 U	50 U	25 U	25 U	**1,800**	25 U	25 U

<u>*Data Legend*</u>:
Detections and estimated values are in ***bold-face*** *type.*
Organic Data Qualifiers:
U - not detected at indicated reporting limit (RL).
J - estimated concentration above minimum detection limit (MDL), but below reporting limit (RL).

Table 8
Comparison of Groundwater Versus Manhole and Sump Water Chemistry
NYSDEC Site No. 9-15-066

Date	Couplet	Constituent Concentration (ug/L)				
		Cis-1,2-DCE	TCE	Vinyl Chloride	Cadmium	Lead
June 2001	Sump 002	**16**	**280**	5 U	3 U	NA
	MW-31	10 U	10 U	10 U	0.85 U	1.21 U
	Sump 003	**510**	**1,700**	5 U	3 U	NA
	MW-5	10 U	**4.1 J**	10 U	0.85 U	1.21 U
May 2006	Sump 002	**24**	**140**	2.5 U	**1.3 B**	3 U
	MW-31	1 U	1 U	1 U	5.0 U	3.0 U
	Sump 003	**200**	**1,800**	25 U	5 U	3 U
	MW-5	1 U	1 U	1 U	5 U	3 U
	MH-001-14	**1.2**	**2.4**	1 U	**28.8**	**7.9**
	MW-34	1 U	1 U	1 U	5.0 U	**2.7 B**
	MH-001-14	**1.2**	**2.4**	1 U	**28.8**	**7.9**
	MW-34A	1 U	1 U	1 U	**1.7 B**	3.0 U

<u>*Data Legend*</u>:

"NA" - indicates not analyzed

Detections and estimated values are in ***bold-face*** *type.*

Organic data qualifiers:

U - not detected at indicated minimum detection limit (MDL)

J - estimated concentration above MDL, but below reporting limit (RL)

Inorganic data qualifiers:

U - not detected at indicated RL

B - detected concentration above MDL, but below RL.

Table 9
Summary of Water Level Monitoring Program

<table>
<tr><th rowspan="2">Phase</th><th colspan="2">System Water Levels</th><th colspan="2">Groundwater Levels</th></tr>
<tr><th>Frequency</th><th>Locations</th><th>Frequency</th><th>Locations</th></tr>
<tr><td>Pre-Closure</td><td>1 Event</td><td>All accessible sumps manholes on 001 and 002 segments</td><td>1 Event</td><td rowspan="7">MW-30, MW-31, MW-34 & MW-35</td></tr>
<tr><td rowspan="2">Phase 1 Closure</td><td rowspan="2">Weekly while pumping at Sumps 001 and 002 (up to two weeks sequentially for each of the two segments)</td><td>001 System: Sump 001, MH-001-01, MH-001-14, MH-001-09 & MH-001-13</td><td rowspan="6">Quarterly for one year</td></tr>
<tr><td>002 System: Sump 002, MH-002-06, MH-002-12 & MH-002-15</td></tr>
<tr><td rowspan="2">Phase 2 Closure</td><td rowspan="2">Weekly for four weeks following completion</td><td>001 System: MH-001-09 & MH-001-10</td></tr>
<tr><td>002 System: MH-002-07, MH-002-12 & MH-002-13</td></tr>
<tr><td rowspan="2">Post-Closure</td><td rowspan="2">Quarterly for one year following Phase 2 monitoring</td><td>001 System: MH-001-09 & MH-001-10</td></tr>
<tr><td>002 System: MH-002-07, MH-002-12 & MH-002-13</td></tr>
</table>

FIGURES

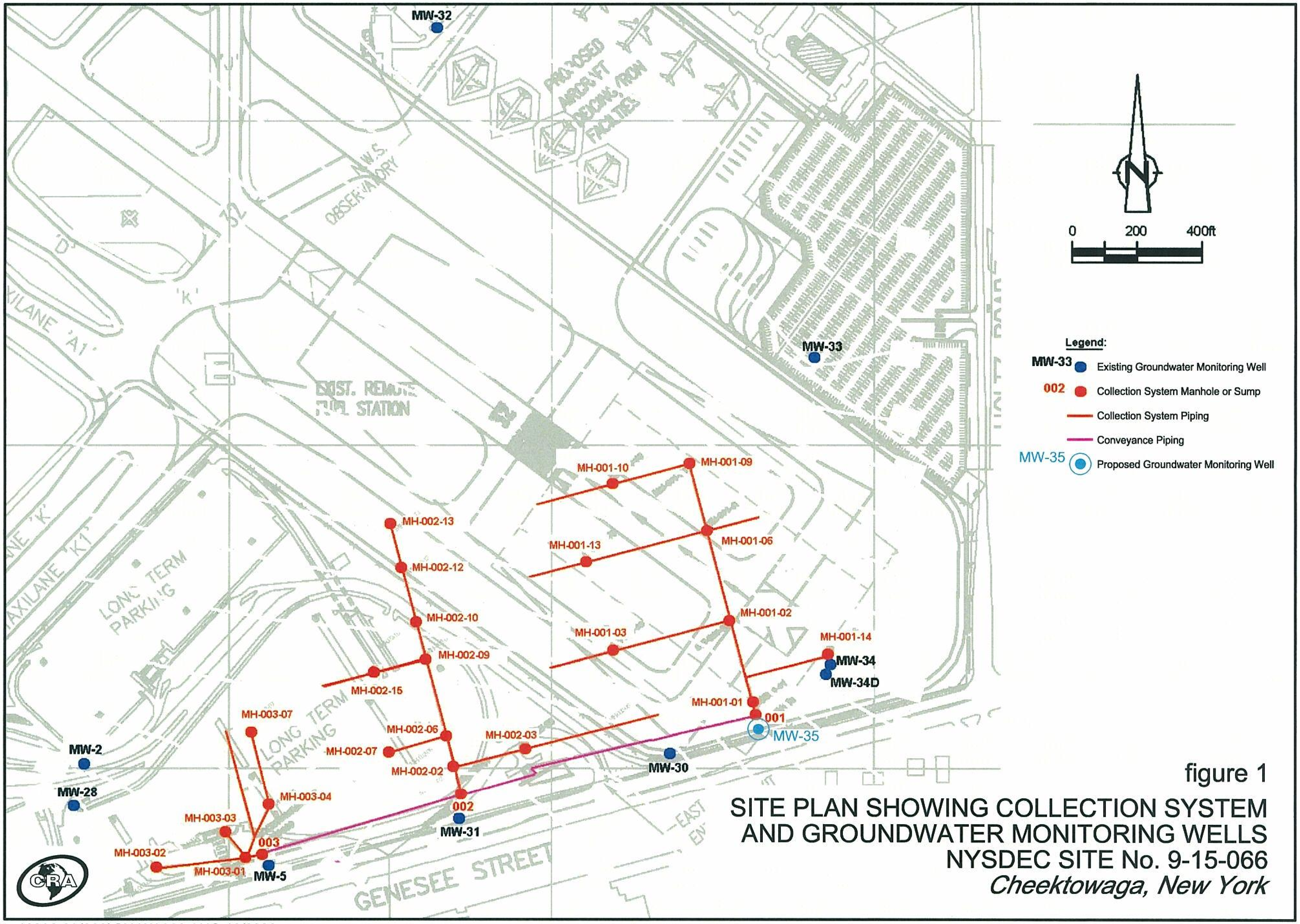


figure 1

SITE PLAN SHOWING COLLECTION SYSTEM AND GROUNDWATER MONITORING WELLS
NYSDEC SITE No. 9-15-066
Cheektowaga, New York

18036-00(003)GN-WA003 AUG 18/2008

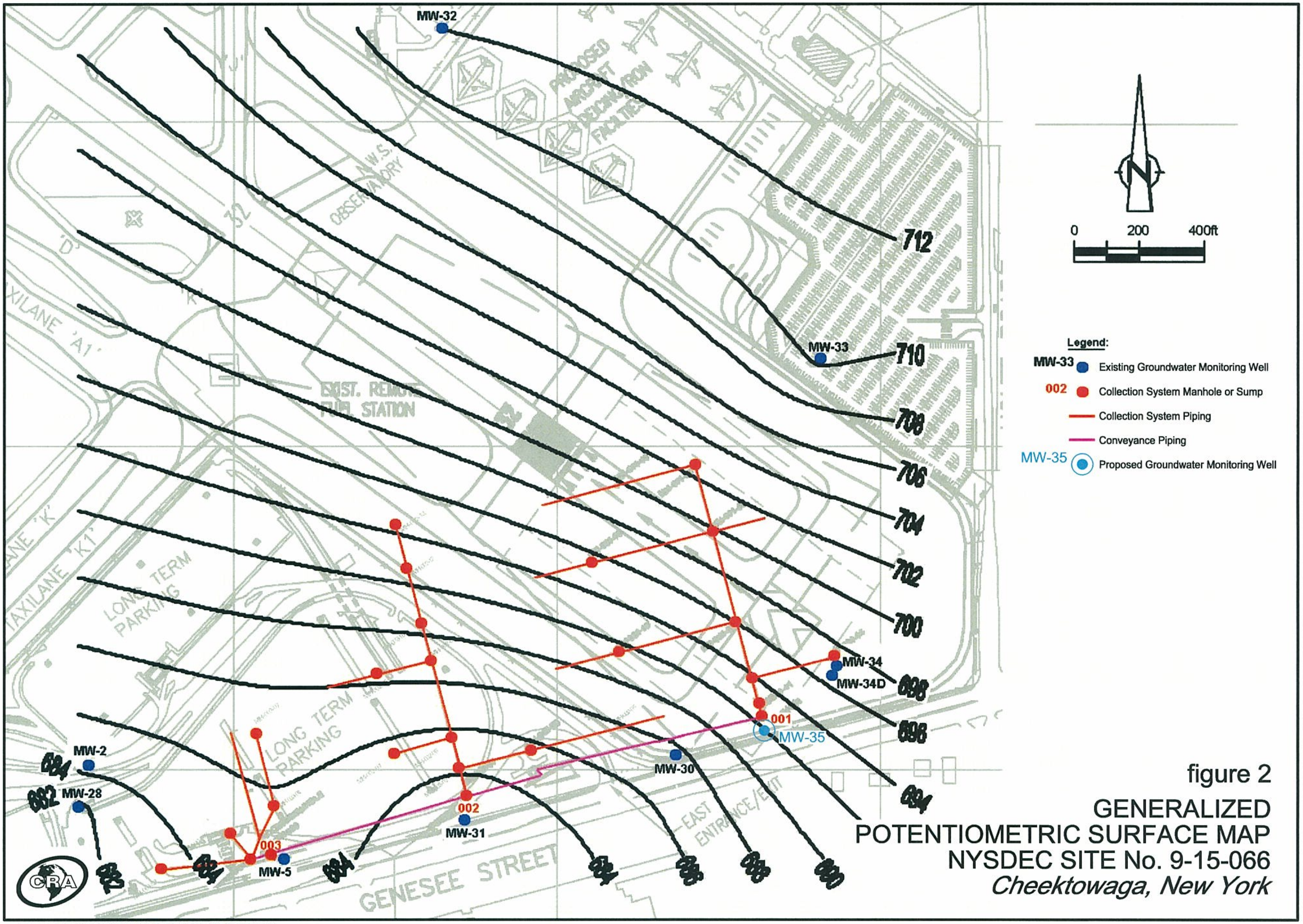


figure 2

GENERALIZED
POTENTIOMETRIC SURFACE MAP
NYSDEC SITE No. 9-15-066
Cheektowaga, New York

18036-00(003)GN-WA003 AUG 18/2008

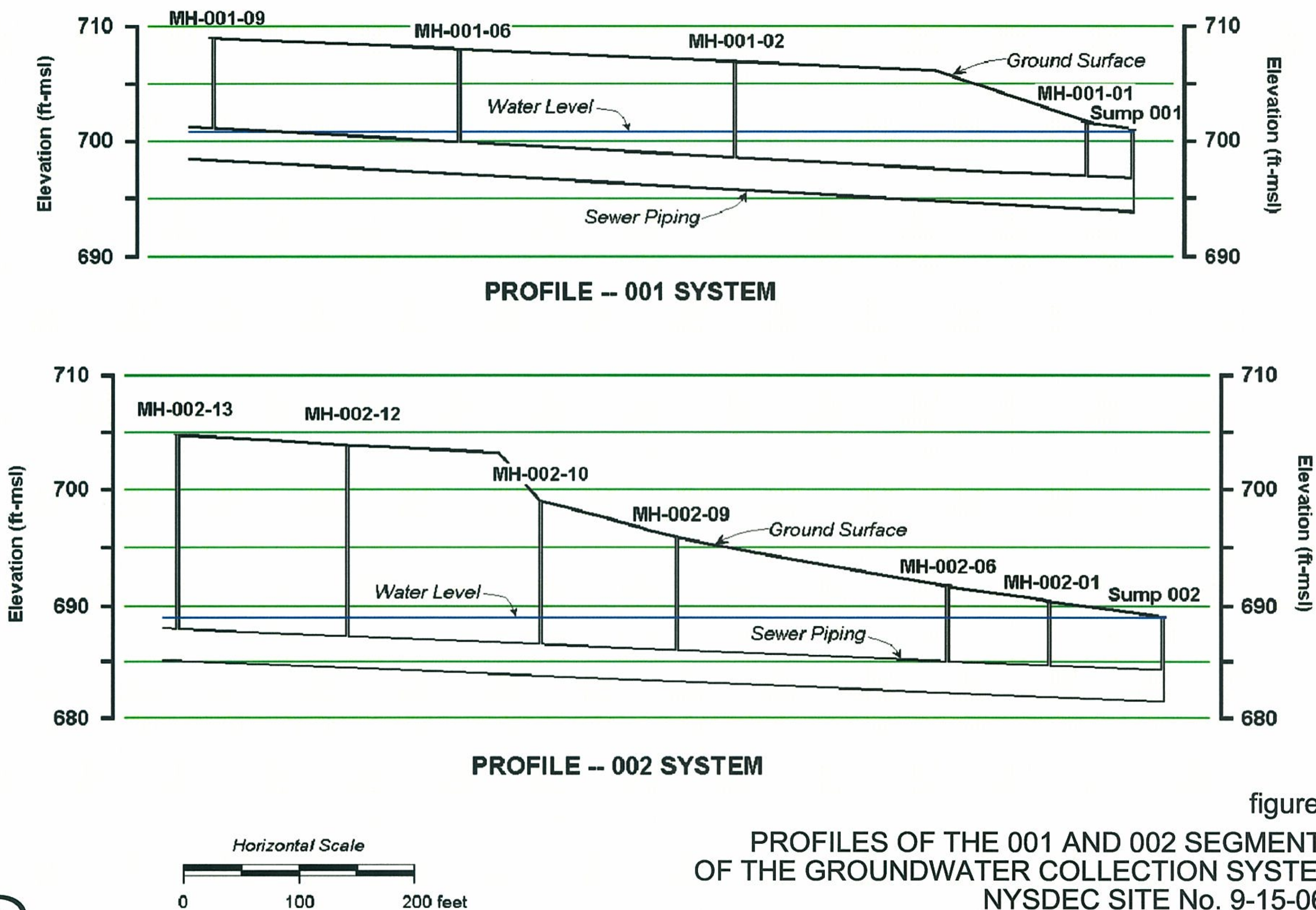


figure 3

PROFILES OF THE 001 AND 002 SEGMENTS
OF THE GROUNDWATER COLLECTION SYSTEM
NYSDEC SITE No. 9-15-066
Cheektowaga, New York

18036-00(003)GN-WA004 AUG 18/2008

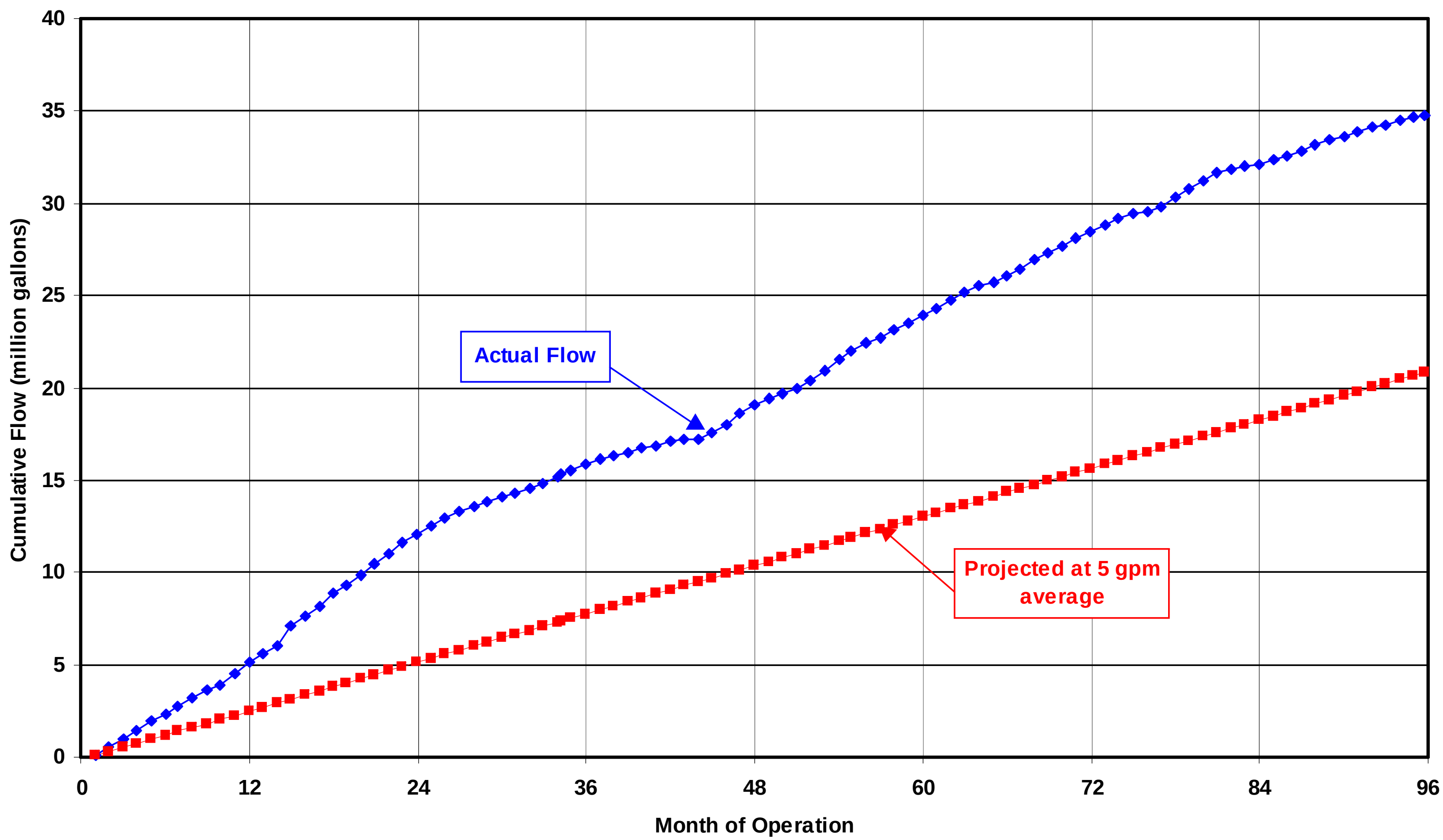


figure 4

CUMULATIVE VOLUME
OF TREATED WATER
NYSDEC SITE No. 9-15-066
Cheektowaga, New York

18036-00(LETT)GN-NI003 NOV 7/2008

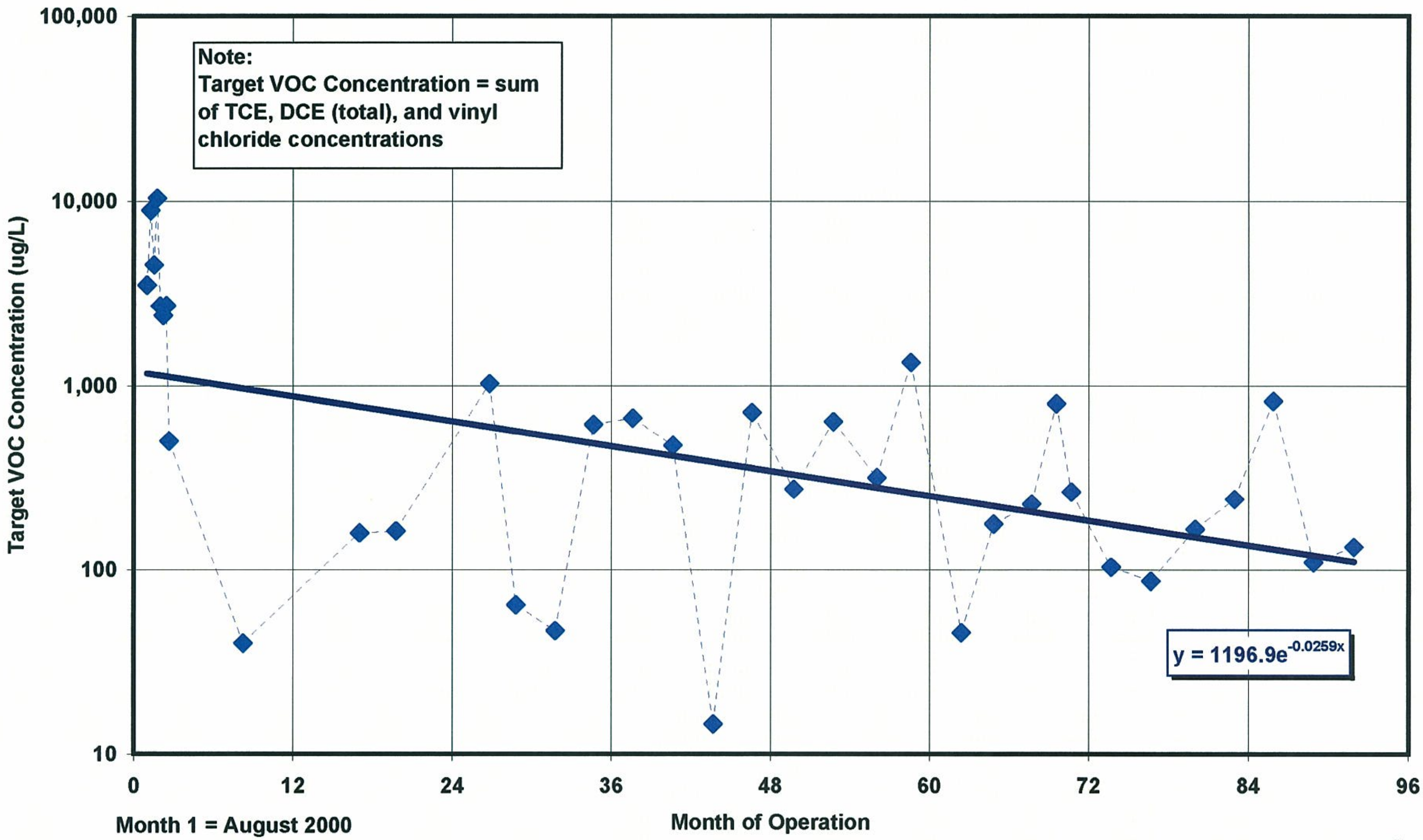
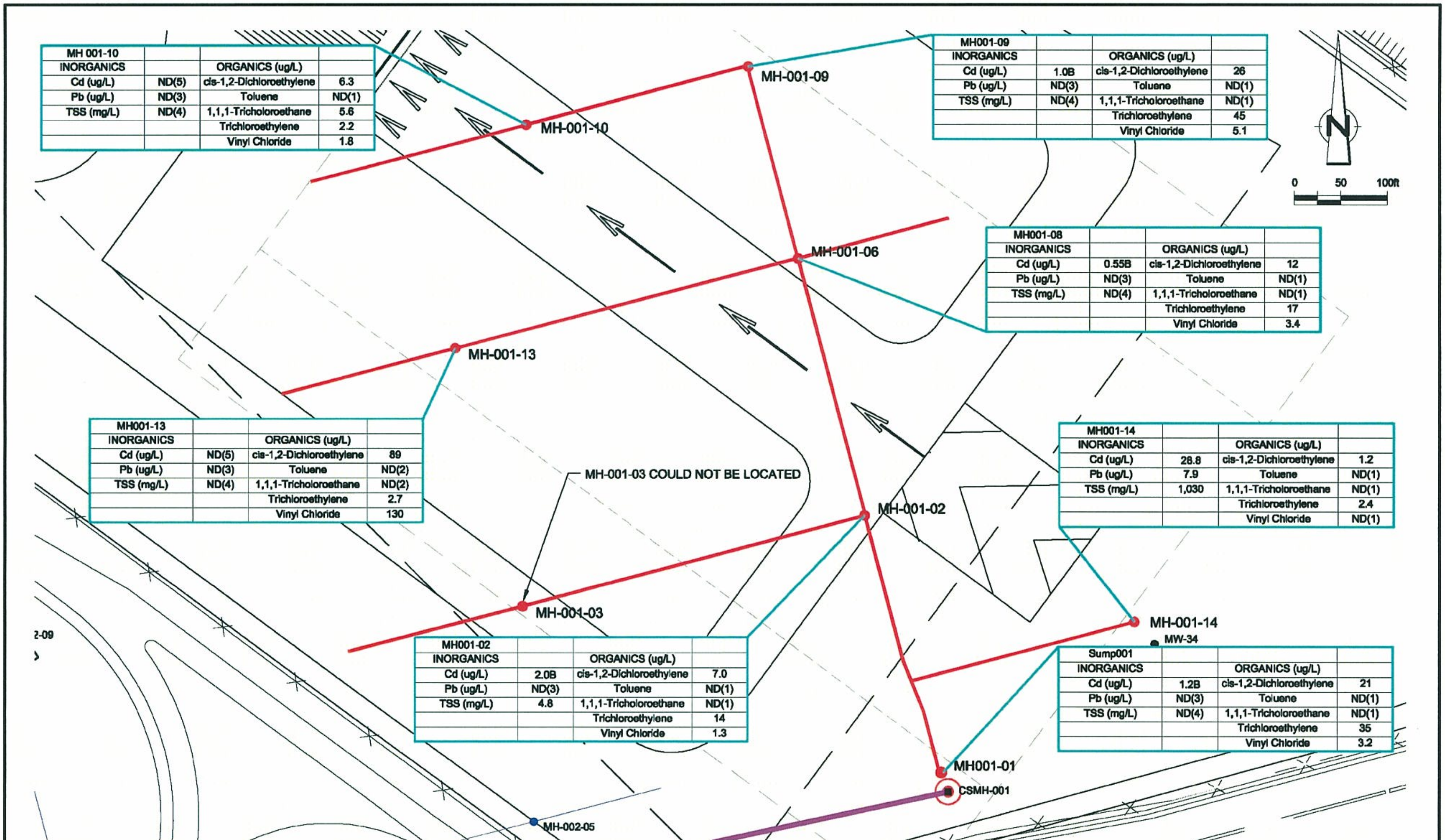


figure 5

TARGET VOC CONCENTRATIONS IN TREATMENT SYSTEM INFLUENT
NYSDEC SITE No. 9-15-066
Cheektowaga, New York

18036-00(003)GN-WA004 AUG 18/2008



MH 001-10			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	ND(5)	cis-1,2-Dichloroethylene	6.3
Pb (ug/L)	ND(3)	Toluene	ND(1)
TSS (mg/L)	ND(4)	1,1,1-Tricholoroethane	5.6
		Trichloroethylene	2.2
		Vinyl Chloride	1.8

MH001-09			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	1.0B	cis-1,2-Dichloroethylene	26
Pb (ug/L)	ND(3)	Toluene	ND(1)
TSS (mg/L)	ND(4)	1,1,1-Tricholoroethane	ND(1)
		Trichloroethylene	45
		Vinyl Chloride	5.1

MH001-06			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	0.55B	cis-1,2-Dichloroethylene	12
Pb (ug/L)	ND(3)	Toluene	ND(1)
TSS (mg/L)	ND(4)	1,1,1-Tricholoroethane	ND(1)
		Trichloroethylene	17
		Vinyl Chloride	3.4

MH001-13			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	ND(5)	cis-1,2-Dichloroethylene	89
Pb (ug/L)	ND(3)	Toluene	ND(2)
TSS (mg/L)	ND(4)	1,1,1-Tricholoroethane	ND(2)
		Trichloroethylene	2.7
		Vinyl Chloride	130

MH001-14			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	28.8	cis-1,2-Dichloroethylene	1.2
Pb (ug/L)	7.9	Toluene	ND(1)
TSS (mg/L)	1,030	1,1,1-Tricholoroethane	ND(1)
		Trichloroethylene	2.4
		Vinyl Chloride	ND(1)

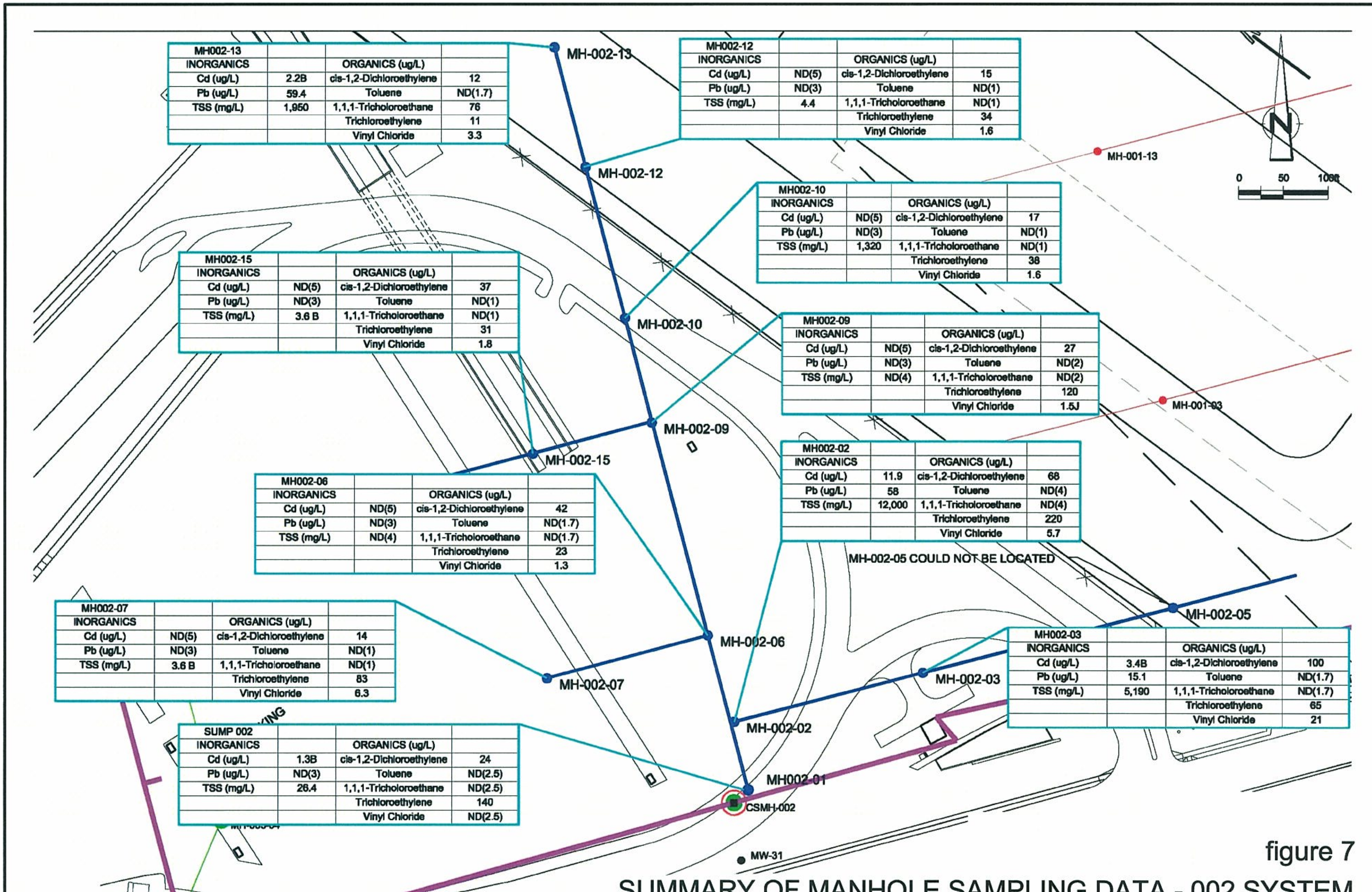
MH001-02			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	2.0B	cis-1,2-Dichloroethylene	7.0
Pb (ug/L)	ND(3)	Toluene	ND(1)
TSS (mg/L)	4.8	1,1,1-Tricholoroethane	ND(1)
		Trichloroethylene	14
		Vinyl Chloride	1.3

Sump001			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	1.2B	cis-1,2-Dichloroethylene	21
Pb (ug/L)	ND(3)	Toluene	ND(1)
TSS (mg/L)	ND(4)	1,1,1-Tricholoroethane	ND(1)
		Trichloroethylene	35
		Vinyl Chloride	3.2

figure 6

SUMMARY OF MANHOLE SAMPLING DATA - 001 SYSTEM
NYSDEC SITE No. 9-15-066
Cheektowaga, New York

CRA



MH002-13			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	2.2B	cis-1,2-Dichloroethylene	12
Pb (ug/L)	59.4	Toluene	ND(1.7)
TSS (mg/L)	1,950	1,1,1-Tricholoroethane	76
		Trichloroethylene	11
		Vinyl Chloride	3.3

MH002-12			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	ND(5)	cis-1,2-Dichloroethylene	15
Pb (ug/L)	ND(3)	Toluene	ND(1)
TSS (mg/L)	4.4	1,1,1-Tricholoroethane	ND(1)
		Trichloroethylene	34
		Vinyl Chloride	1.6

MH002-10			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	ND(5)	cis-1,2-Dichloroethylene	17
Pb (ug/L)	ND(3)	Toluene	ND(1)
TSS (mg/L)	1,320	1,1,1-Tricholoroethane	ND(1)
		Trichloroethylene	38
		Vinyl Chloride	1.6

MH002-15			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	ND(5)	cis-1,2-Dichloroethylene	37
Pb (ug/L)	ND(3)	Toluene	ND(1)
TSS (mg/L)	3.6 B	1,1,1-Tricholoroethane	ND(1)
		Trichloroethylene	31
		Vinyl Chloride	1.8

MH002-09			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	ND(5)	cis-1,2-Dichloroethylene	27
Pb (ug/L)	ND(3)	Toluene	ND(2)
TSS (mg/L)	ND(4)	1,1,1-Tricholoroethane	ND(2)
		Trichloroethylene	120
		Vinyl Chloride	1.5J

MH002-02			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	11.9	cis-1,2-Dichloroethylene	68
Pb (ug/L)	58	Toluene	ND(4)
TSS (mg/L)	12,000	1,1,1-Tricholoroethane	ND(4)
		Trichloroethylene	220
		Vinyl Chloride	5.7

MH002-06			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	ND(5)	cis-1,2-Dichloroethylene	42
Pb (ug/L)	ND(3)	Toluene	ND(1.7)
TSS (mg/L)	ND(4)	1,1,1-Tricholoroethane	ND(1.7)
		Trichloroethylene	23
		Vinyl Chloride	1.3

MH002-07			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	ND(5)	cis-1,2-Dichloroethylene	14
Pb (ug/L)	ND(3)	Toluene	ND(1)
TSS (mg/L)	3.6 B	1,1,1-Tricholoroethane	ND(1)
		Trichloroethylene	83
		Vinyl Chloride	6.3

MH002-03			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	3.4B	cis-1,2-Dichloroethylene	100
Pb (ug/L)	15.1	Toluene	ND(1.7)
TSS (mg/L)	5,190	1,1,1-Tricholoroethane	ND(1.7)
		Trichloroethylene	65
		Vinyl Chloride	21

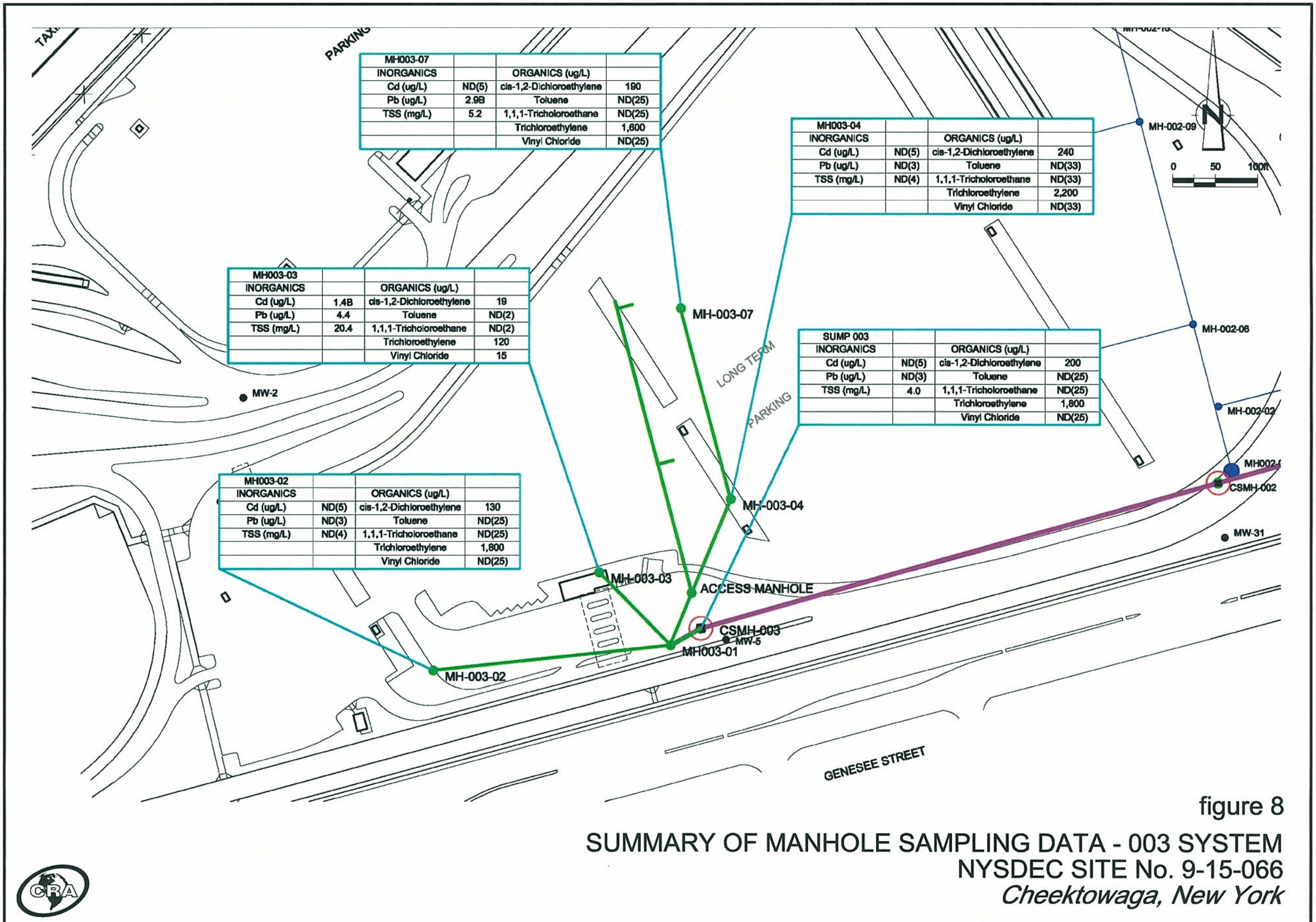
SUMP 002			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	1.3B	cis-1,2-Dichloroethylene	24
Pb (ug/L)	ND(3)	Toluene	ND(2.5)
TSS (mg/L)	26.4	1,1,1-Tricholoroethane	ND(2.5)
		Trichloroethylene	140
		Vinyl Chloride	ND(2.5)

figure 7

SUMMARY OF MANHOLE SAMPLING DATA - 002 SYSTEM
NYSDEC SITE No. 9-15-066
Cheektowaga, New York

CRA

18036-00(003)GN-WA003 AUG 18/2008



MH003-07			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	ND(5)	cis-1,2-Dichloroethylene	190
Pb (ug/L)	2.9B	Toluene	ND(25)
TSS (mg/L)	5.2	1,1,1-Tricholoroethane	ND(25)
		Trichloroethylene	1,600
		Vinyl Chloride	ND(25)

MH003-04			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	ND(5)	cis-1,2-Dichloroethylene	240
Pb (ug/L)	ND(3)	Toluene	ND(33)
TSS (mg/L)	ND(4)	1,1,1-Tricholoroethane	ND(33)
		Trichloroethylene	2,200
		Vinyl Chloride	ND(33)

MH003-03			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	1.4B	cis-1,2-Dichloroethylene	19
Pb (ug/L)	4.4	Toluene	ND(2)
TSS (mg/L)	20.4	1,1,1-Tricholoroethane	ND(2)
		Trichloroethylene	120
		Vinyl Chloride	15

SUMP 003			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	ND(5)	cis-1,2-Dichloroethylene	200
Pb (ug/L)	ND(3)	Toluene	ND(25)
TSS (mg/L)	4.0	1,1,1-Tricholoroethane	ND(25)
		Trichloroethylene	1,800
		Vinyl Chloride	ND(25)

MH003-02			
INORGANICS		ORGANICS (ug/L)	
Cd (ug/L)	ND(5)	cis-1,2-Dichloroethylene	130
Pb (ug/L)	ND(3)	Toluene	ND(25)
TSS (mg/L)	ND(4)	1,1,1-Tricholoroethane	ND(25)
		Trichloroethylene	1,800
		Vinyl Chloride	ND(25)

figure 8

SUMMARY OF MANHOLE SAMPLING DATA - 003 SYSTEM
NYSDEC SITE No. 9-15-066
Cheektowaga, New York

CRA

18036-00(003)GN-WA003 AUG 18/2008

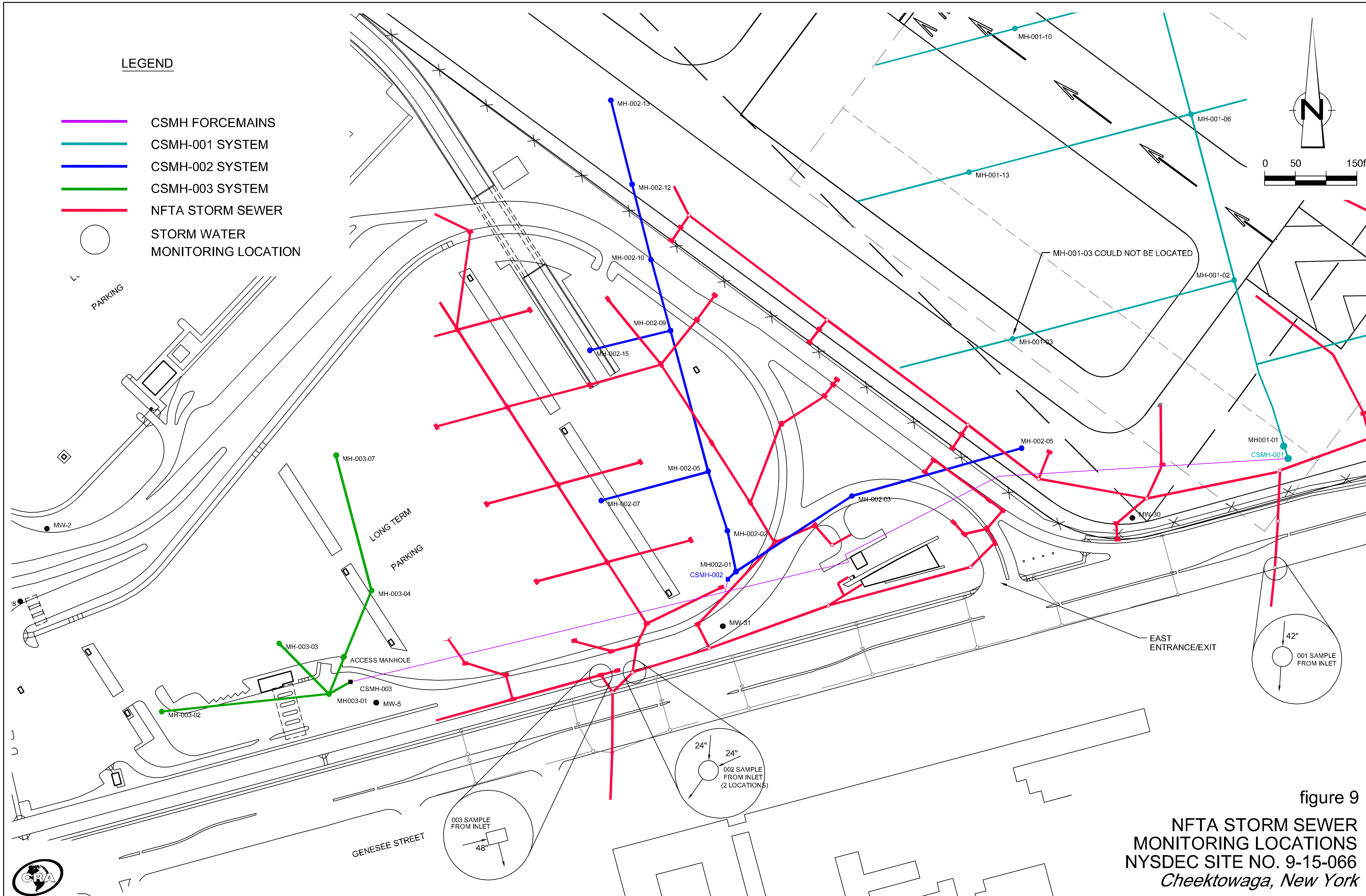


figure 9

NFTA STORM SEWER MONITORING LOCATIONS
NYSDEC SITE NO. 9-15-066
Cheektowaga, New York

18036-00(LETT)GN-NI001 NOV 7, 2008

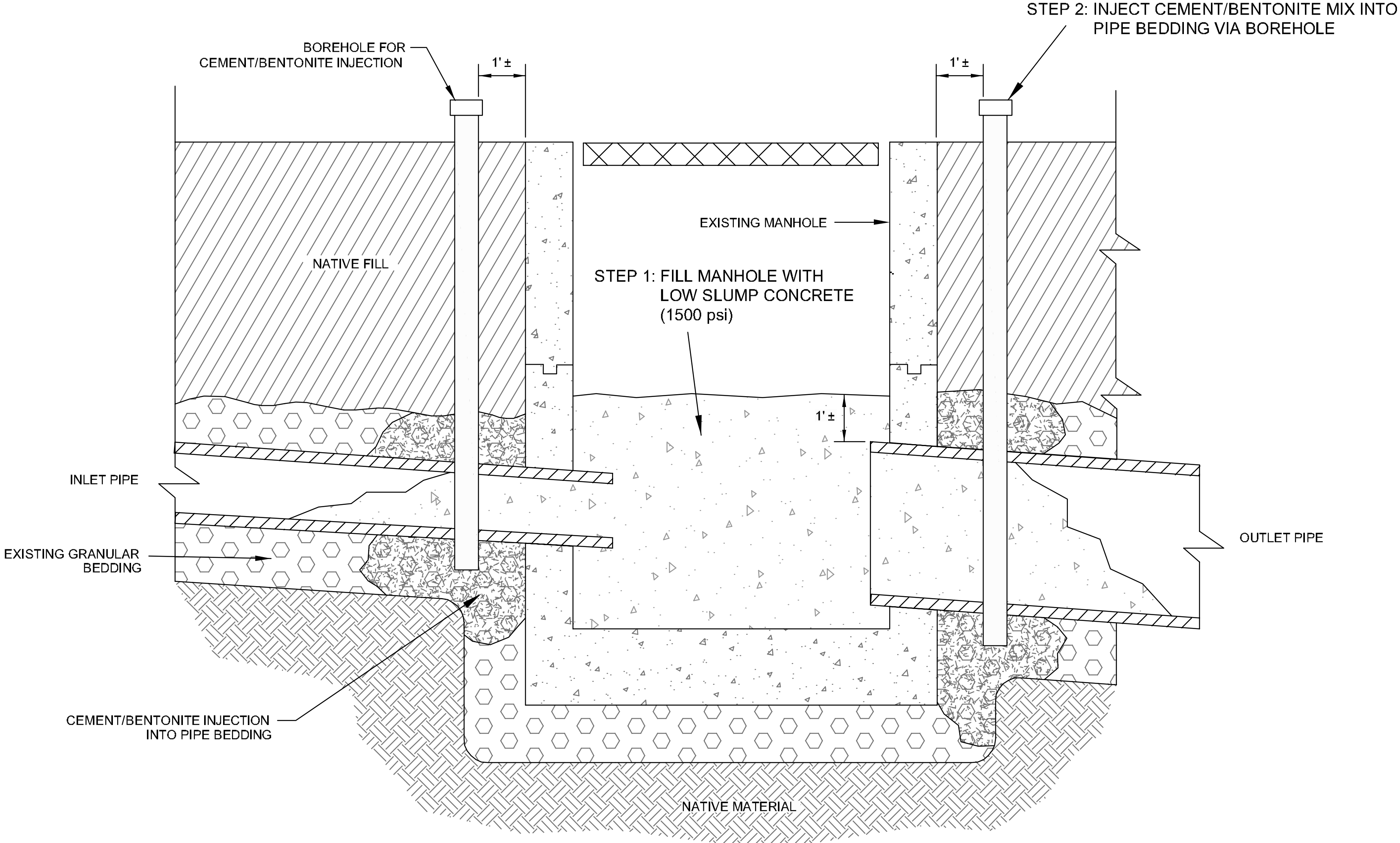


figure 10

STORM SEWER PLUGGING DETAIL
NYSDEC SITE No. 9-15-066
Cheektowaga, New York

18036-00(LETT)GN-NI005 NOV 7/2008

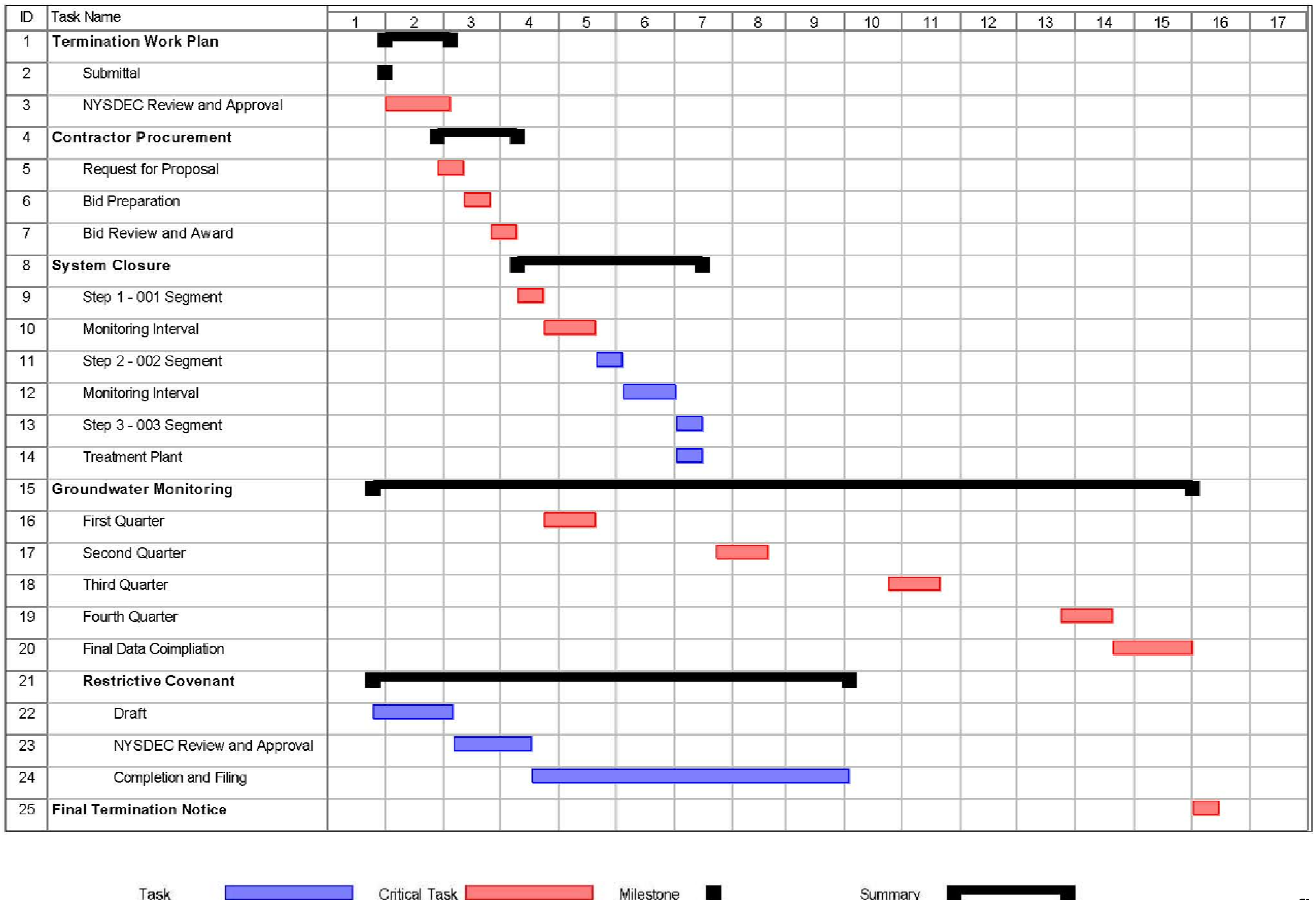


figure 11

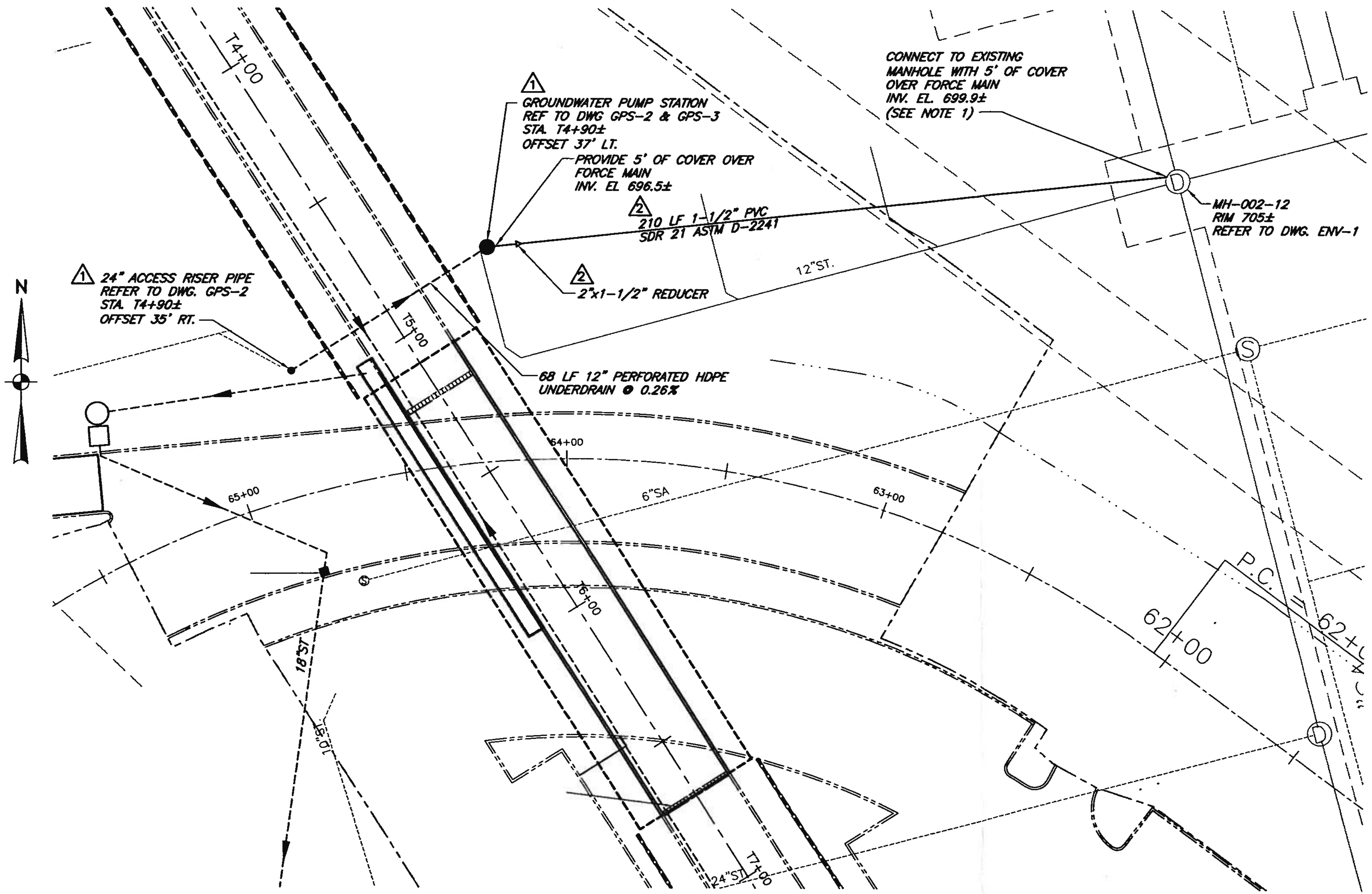
COLLECTION SYSTEM CLOSURE SCHEDULE
NYSDEC SITE No. 9-15-066
Cheektowaga, New York

CRA

18036-00(LETT)GN-NI006 NOV 7/2008

APPENDIX A

NFTA TUNNEL SUMP MANHOLE DRAWINGS



GROUNDWATER PUMP STATION SITE PLAN

SCALE A

20 0 20 40

SCALE A 1"=20'

GENERAL NOTES:

1. DO NOT DISTURB EXISTING GROUNDWATER COLLECTION PIPING.
2. PAYMENT FOR ALL WORK ASSOCIATED WITH THE GROUNDWATER PUMP STATION SHALL BE PAID UNDER FORCE ACCOUNT. THE CONTRACTOR SHALL FURNISH, DELIVER, INSTALL, TEST AND PLACE IN SATISFACTORY OPERATING CONDITION PUMPING SYSTEMS COMPLETE WITH CONTROLS, WET WELLS, VALVE CHAMBERS, VALVES, CONNECTING PIPING, FITTINGS, ALL ELECTRIC POWER AND SERVICE CONNECTIONS INCLUDING POLES, MAIN DISCONNECTS, EXCAVATION, CONCRETE, CAISSON INSTALLATION, CONCRETE STRUCTURES, AND SELECT MATERIAL, AS SHOWN ON THE PLANS AND SPECIFIED IN THE CONTRACT DOCUMENTS. INCLUDED IN THIS SYSTEM SHALL BE ALL SHEETING, SHORING, DEWATERING, CONTINUANCE OF UTILITIES, FORCE MAIN AND/OR GRAVITY PIPING NECESSARY TO PROVIDE A COMPLETE INSTALLATION. PAYMENT WILL BE MADE ON A TIME AND MATERIALS BASIS AS COMPLETED AND APPROVED BY THE ENGINEER.
3. SUBMITTALS

A. SHOP DRAWINGS
PRIOR TO OBTAINING AND PRODUCTS SHOWN ON THESE DRAWINGS THE CONTRACTOR SHALL SUBMIT DETAILED SHOP DRAWINGS AND DATA FOR REVIEW AS PER SPECIFICATION SECTION 01300.

B. MATERIALS LIST
THE CONTRACTOR SHALL SUBMIT, ALONG WITH SHOP DRAWINGS, A MATERIAL LIST WHICH SHALL INCLUDE FULL INFORMATION REGARDING ALL COMPONENTS OF THE MATERIAL OR EQUIPMENT.

C. OTHER SUBMITTALS
THE CONTRACTOR SHALL SUBMIT CERTIFICATES OF COMPLIANCE WITH APPLICABLE REFERENCED STANDARDS.

D. MAINTENANCE DATA
FOR EACH TYPE AND SIZE OF MATERIAL SPECIFIED TO INCLUDE IN MAINTENANCE MANUALS SPECIFIED IN DIVISION 1.

4. RELATED DOCUMENTS
DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AN SUPPLEMENTARY CONDITIONS AND DIVISION 1 SPECIFICATION SECTIONS APPLY TO THIS WORK. ALL PROVISIONS OF SPECIFICATION SECTION 15445 STORM WATER PUMPS SHALL APPLY TO THIS WORK, EXCEPT THAT THE PUMPING UNITS SHALL BE AS SPECIFIED ON DRAWINGS GPS-1 THROUGH GPS-3.

CONSULTANT STAMP:

STATE OF NEW YORK · MICHAEL FREDRICK LEYDECKER · 082140-1 · PROFESSIONAL ENGINEER

MICHAEL F. LEYDECKER DATE 11/7/00
TVGA ENGINEERING, SURVEYING P.C.

CONSULTANT LOGO:

TVGA
TVGA ENGINEERING, SURVEYING, P.C.
ENGINEERS • SURVEYORS • PHOTOGRAMMETRISTS
One Thousand Maple Road, P.O. Box H, Elma, NY 14059-0264 (716) 655-8842 Fax: (716) 655-0937

SUBCONSULTANT LOGO:

NFTA NIAGARA FRONTIER TRANSPORTATION AUTHORITY

NO.	REVISION	BY	DATE
1	DWG. REF. NOTES	PB	7/28/00
2	PIPE SIZES, SPEC.	PB	11/1/00

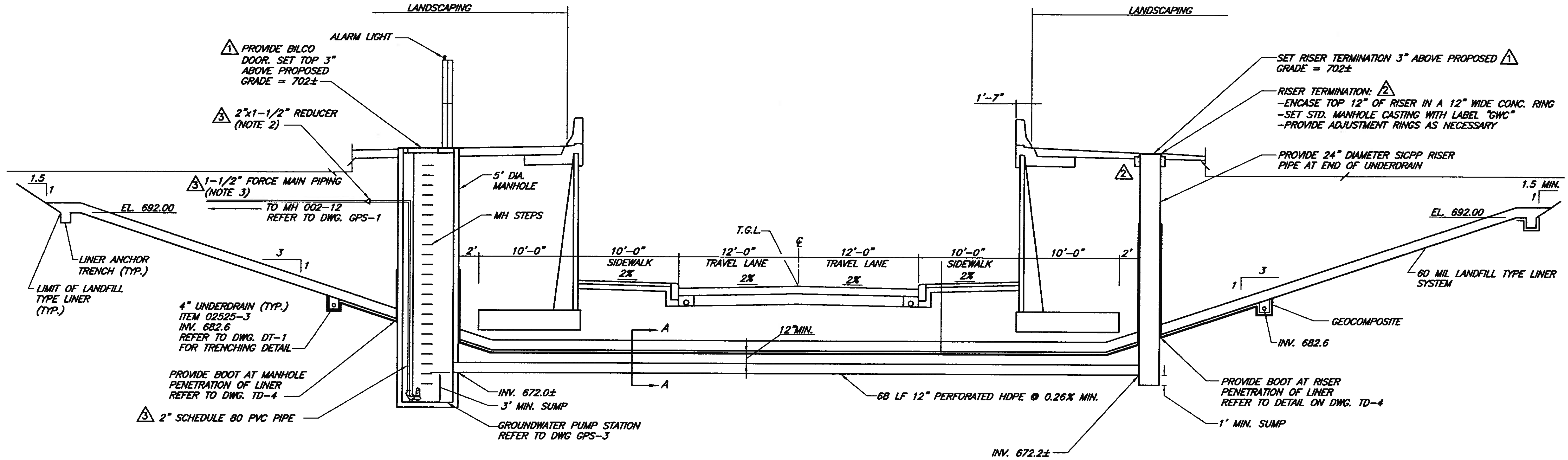
F.A.A. AIP NO. – PENDING
NYSDOT PIN NO. – PENDING

BUFFALO NIAGARA INTERNATIONAL AIRPORT
EAST ACCESS IMPROVEMENTS
AND PARKING EXPANSION – PHASE 3

GROUNDWATER PUMPSTATION SITE PLAN

SCALE – AS NOTED		DATE
DESIGNED BY	PB	07-26-00
DRAWN BY	TAP	07-27-00
CHECKED BY	KJS	07-27-00
APPROVED BY	MFL	07-27-00

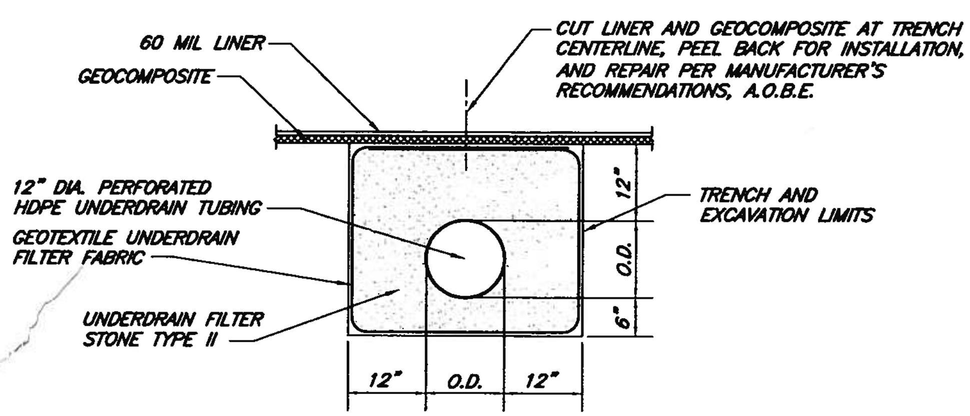
NFTA PROJ. No. – 12BL9931
CONSULTANT PROJ. No. – 990055
DRAWING FILE NAME: GPS-1.DWG
DRAWING GPS-1 SHEET XX/XX



SCHEMATIC SECTION OF TUNNEL APPROACH AT GROUNDWATER PUMP STATION

(STA. T4+90±)

NTS



SECTION A-A

NTS

PUMP STATION SPECIFICATIONS

- DUPLEX SUBMERSIBLE
- FLYGT MODEL 3045 WITH 236 IMPELLER
- 1.2 HP, 460V, THREE PHASE
- ALL ELECTRICAL CONTROLS SHALL BE FLYGT
- PROVIDE CONTROLS AS FOLLOWS
  - PUMPS OFF 683.00
  - PUMP 1 ON 684.00
  - PUMP 2 ON 685.00
  - ALARM ON 686.00
- PROVIDE FLYGT CHECK VALVES
- PROVIDE FLYGT 4901 FLUSH VALVE
- PROVIDE LIFTING RAILS
- PROVIDE ELECTRICAL SERVICE TO GROUNDWATER PUMP STATION PER THE ELECTRICAL DRAWINGS.

NOTES:

1. NOT USED
2. ALL JOINTS WITHIN 20 L.F. OF THE PUMP STATION SHALL BE RESTRAINED, INCLUDING THE JOINTS AT EACH SIDE OF THE 2" X 1-1/2" REDUCER.
3. THE FORCE MAIN SHALL BE 1-1/2" PVC SDR21 ASTM D-2241. INSTALLATION AND BACKFILLING SHALL BE IN ACCORDANCE WITH THE WATER MAIN TRENCH DETAIL ON DWG. UD-1.

CONSULTANT STAMP:

STATE OF NEW YORK
MICHAEL FREDRICK LEYDECKER
No. 062140-1
LICENSED PROFESSIONAL ENGINEER

MICHAEL F. LEYDECKER DATE 11/3/00
TVGA ENGINEERING, SURVEYING P.C.

CONSULTANT LOGO:

TVGA
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ENGINEERS • SURVEYORS • PHOTOGRAMMETRISTS
One Thousand Maple Road, P.O. Box H
Elma, NY 14059-0264
(716) 655-8842
Fax: (716) 655-0937

SUBCONSULTANT LOGO:

NFTA NIAGARA FRONTIER TRANSPORTATION AUTHORITY

NO.	REVISION	BY	DATE
1	NOTE REVISED	PB	7/28/00
2	RISER TERMINATION	PB	7/28/00
3	PUMP AND PIPING	PB	11/1/00

F.A.A. AIP NO. - PENDING
NYSDOT PIN NO. - PENDING

BUFFALO NIAGARA INTERNATIONAL AIRPORT
EAST ACCESS IMPROVEMENTS
AND PARKING EXPANSION - PHASE 3

GROUNDWATER
PUMP STATION
SCHEMATIC SECTION

SCALE - AS SHOWN		DATE
DESIGNED BY	PB	07-26-00
DRAWN BY	TAP	7/27/00
CHECKED BY	KJS	7/27/00
APPROVED BY	MFL	7/27/00
NFTA PROJ. No. - 12BL9931		
CONSULTANT PROJ. No. - 990055		
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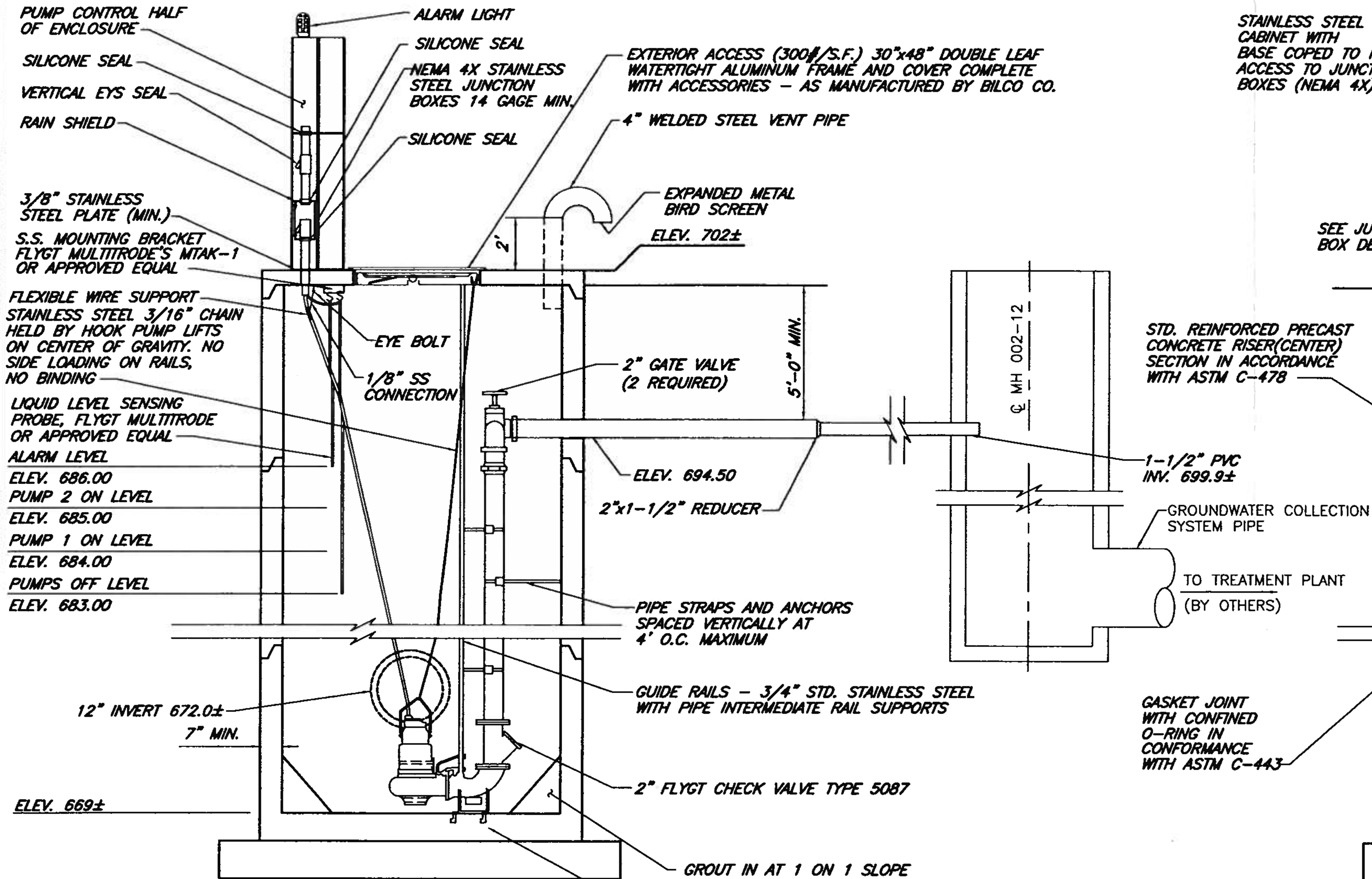
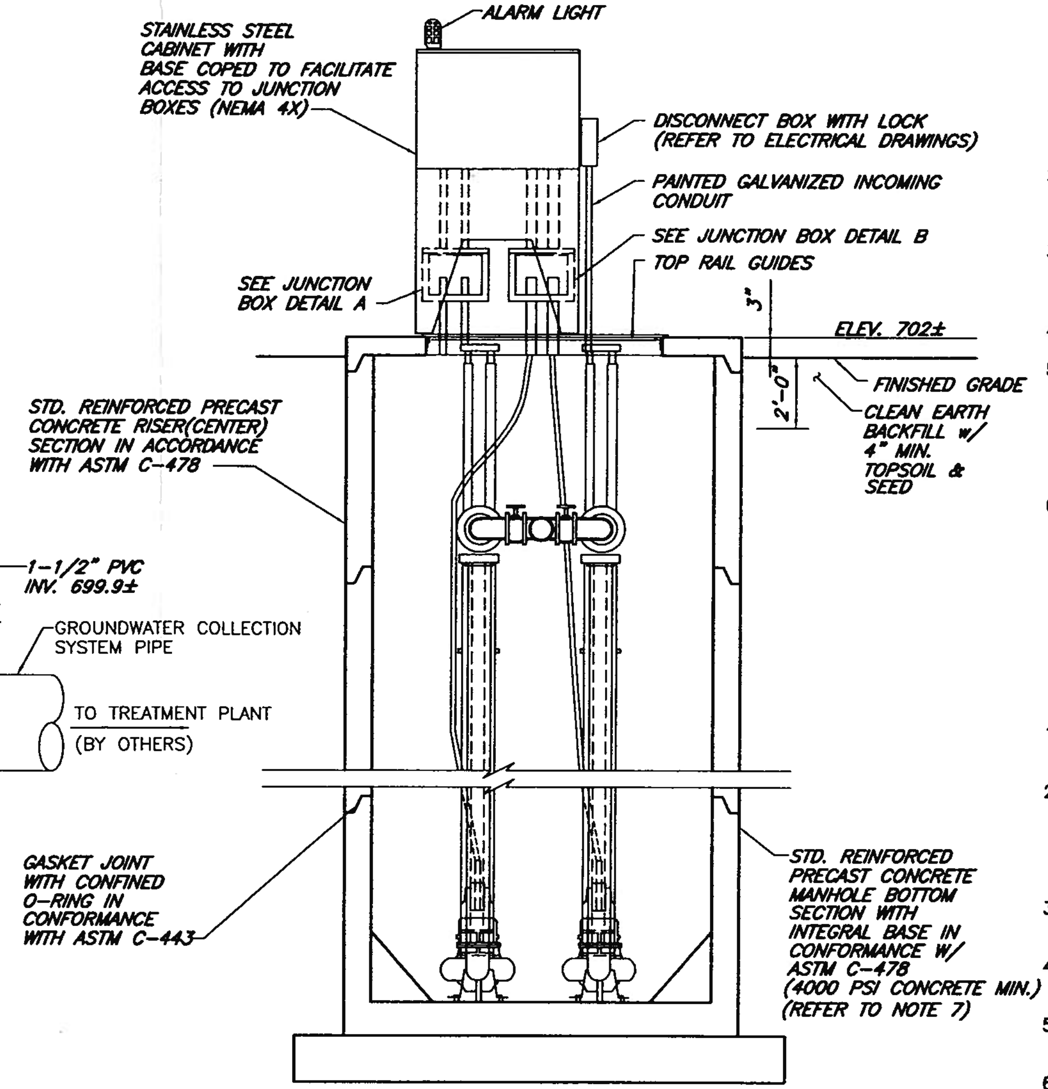


SIDE SECTION
N.T.S.



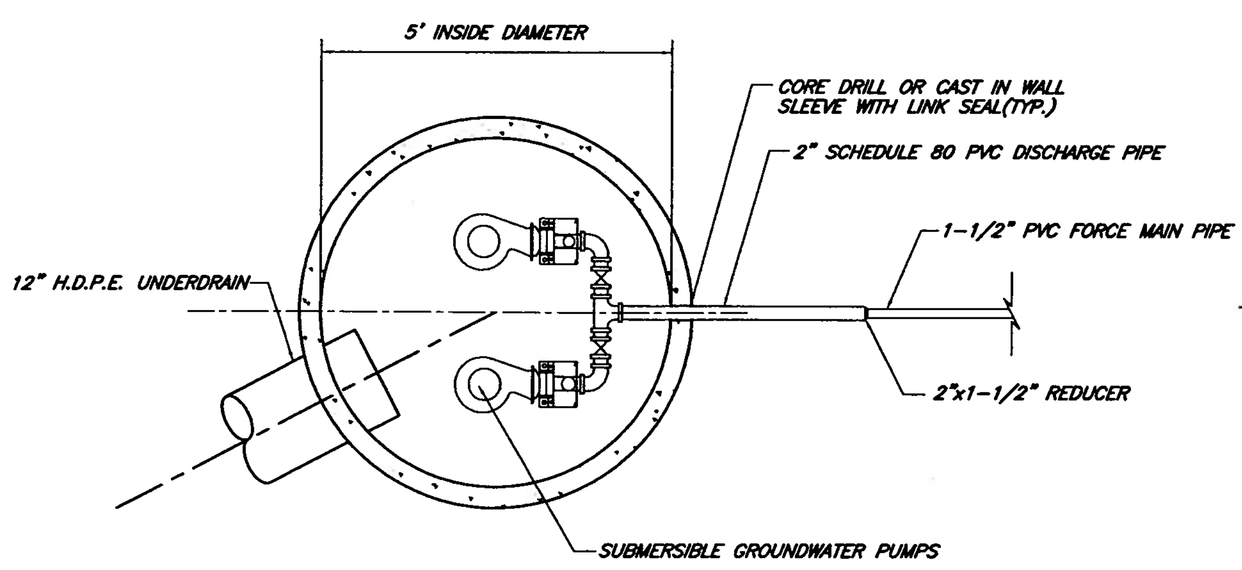
END SECTION
N.T.S.

CONCRETE PUMP CHAMBER NOTES:

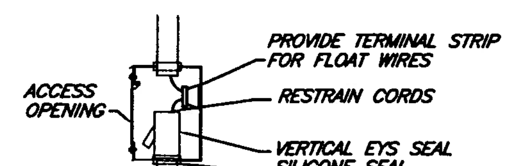
1. CONTRACTOR SHALL SUBMIT TO THE ENGINEER SHOP DRAWINGS OF THE SLAB TOP, RISER AND BASE SECTION HE PROPOSES TO USE, FOR APPROVAL BEFORE ORDERING, SHOP DRAWINGS SHALL SHOW LOCATIONS OF ALL PROPOSED OPENINGS.
2. ALL JOINTS BETWEEN SECTIONS SHALL BE WITH A CONFINED "O"-RING NEOPRENE GASKET AS PER LATEST ASTM SPECIFICATION C-443.
3. EACH JOINT SHALL INCLUDE THE INSTALLATION OF AN "E-2" STICK BITUMASTIC SEALANT. THE EXTERIOR SHALL BE WRAPPED WITH A BAND OF KRAFT PAPER.
4. NO LIFTING HOLES WILL BE ALLOWED.
5. ALL POINTS WHERE PIPES ENTER OR LEAVE THE CHAMBERS SHALL BE SEALED WITH ASSEMBLIES CONSISTING OF RUBBER GASKETS OR LINKS MECHANICALLY COMPRESSED TO FORM A WATERTIGHT SEAL, SUCH AS LINK-SEAL OR APPROVED EQUAL. TWO SEALING MECHANISMS SHALL BE USED AT EACH OPENING AT BOTH INSIDE AND OUTSIDE AREAS.
6. PROVIDE MANHOLE STEPS MEETING THE REQUIREMENTS OF SPECIFICATION SECTION 02595 FOR THE FULL DEPTH OF THE PUMP STATION.

GENERAL NOTES:

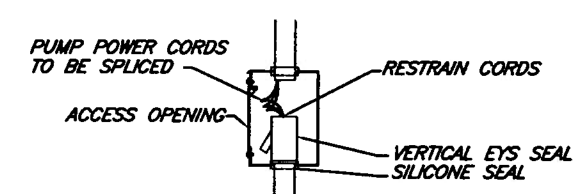
1. PUMP SHALL BE READILY DISCONNECTED FROM DISCHARGE PIPING BY VERTICAL LIFTING.
2. SLIDING GUIDE RAILS AND BRACKETS SHALL BE PROVIDED FOR POSITIVE CONNECT AND DISCONNECT TO DISCHARGE FLANGE. ACCESS COVERS SHALL BE SOLID AND HINGED WITH SAFETY CATCH FOR FULL OPEN POSITION AND SIZED TO MANUFACTURER'S REQUIREMENTS FOR PUMP MAINTENANCE.
3. ALL ELECTRICAL WIRING SWITCHES, BOXES, ETC. SHALL BE NEMA 4 OUTSIDE AND NEMA 7 INSIDE OF CHAMBER.
4. PIPE AND FITTINGS IN PUMP STATION SHALL BE FLANGED 2" SCHEDULE 80 PVC.
5. PUMP SUPPORTS AND DISCHARGE FITTINGS TO BE ANCHORED AS PER MANUFACTURER'S RECOMMENDATIONS.
6. PRIME ALL STEEL SURFACES AND PAINT WITH TWO COATS LIGHT GREEN EPOXY PAINT WITH A MINIMUM OF 10 MIL COVERAGE.
7. REINFORCING STEEL SHALL CONFORM TO ASTM A185 AND SHALL HAVE A MINIMUM 0.24 SQUARE IN/LF (BOTH WAYS).



PLAN VIEW
N.T.S.



JUNCTION BOX DETAIL A
N.T.S.



JUNCTION BOX DETAIL B
N.T.S.

PUMP EQUIPMENT LIST

1. TYPE	SUBMERSIBLE
2. MANUFACTURER	FLYGT
3. FLOW RATE/TDH	19.7 GPM AT 23.3' TDH
4. MODEL	DP-3045
5. HORSEPOWER	1.2 HP
6. MOTOR VOLTAGE/PHASE	460 VOLT, 3 PHASE
7. RPM	3480 RPM
8. DISCHARGE SIZE	2"
9. IMPELLER	236
10. FLUSH VALVE	FLYGT MODEL 4901

STATE OF NEW YORK
MICHAEL FREDRICK LEYDECKER
062140-1
LICENSED PROFESSIONAL ENGINEER

MICHAEL F. LEYDECKER DATE 4/7/00
TVGA ENGINEERING, SURVEYING P.C.
N.Y.S.P.E. LICENSE NO. 062140

CONSULTANT LOGO:

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Fax: (716) 655-0937

SUBCONSULTANT LOGO:

NFTA NIAGARA FRONTIER TRANSPORTATION AUTHORITY

NO.	REVISION	BY	DATE
1	DUPLEX 1.2 HP	PB	11/1/00

F.A.A. AIP NO. – PENDING
NYSDOT PIN NO. – PENDING

BUFFALO NIAGARA INTERNATIONAL AIRPORT
EAST ACCESS IMPROVEMENTS
AND PARKING EXPANSION – PHASE 3

GROUNDWATER PUMP STATION PLAN AND DETAILS

SCALE – NONE		DATE
DESIGNED BY	PB	07-27-00
DRAWN BY	PB	07-27-00
CHECKED BY	KJS	07-27-00
APPROVED BY	MFL	07-27-00
NFTA PROJ. No. – 12BL9931		
CONSULTANT PROJ. No. – 990055		
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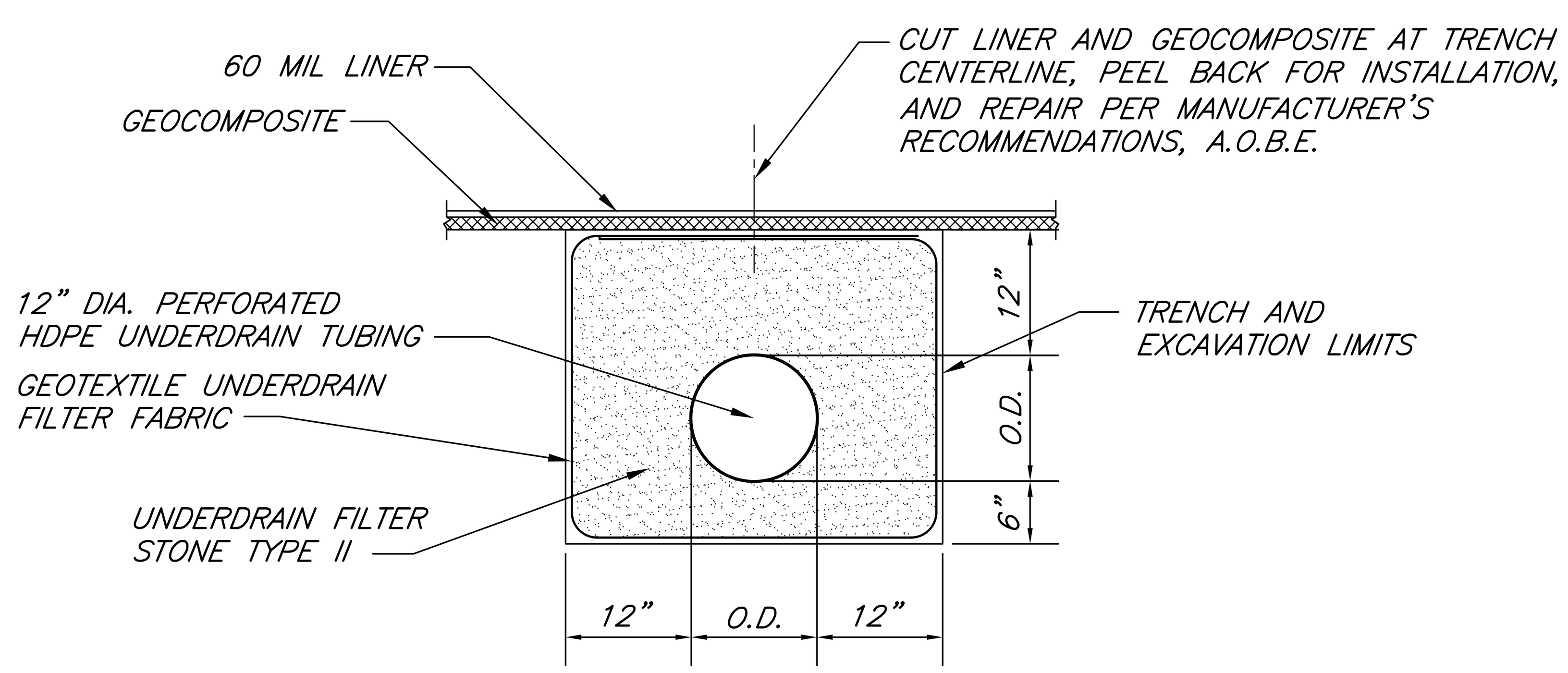

SCHEMATIC SECTION OF TUNNEL APPROACH
AT GROUNDWATER PUMP STATION
(STA. T4+90±)
NTS

SECTION A–A
NTS

1

NOTES:

1. NOT USED 3
2. ALL JOINTS WITHIN 20 L.F. OF THE PUMP STATION SHALL BE RESTRAINED, INCLUDING THE JOINTS AT EACH SIDE OF THE 2" X 1-1/2" REDUCER.

1

AS-BUILT PLANS

CONSULTANT STAMP:

MICHAEL F. LEYDECKER DATE
TVGA ENGINEERING, SURVEYING P.C.
N.Y.S.P.E. LICENSE NO. 062140

CONSULTANT LOGO:

TVGA

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NO.	REVISION	BY	DATE
1	NOTE REVISED	PB	7/28/00
2	RISER TERMINATION	PB	7/28/00
3	PUMP AND PIPING	PB	11/1/00
4	OMIT FLUSH VALVE	PB	12/15/00
1	AS-BUILTS REVISIONS		06/02

F.A.A. AIP NO. – PENDING
NYSDOT PIN NO. – PENDING

BUFFALO NIAGARA INTERNATIONAL AIRPORT
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AND PARKING EXPANSION – PHASE 3

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DRAWING FILE NAME: GPS-2.DWG		

DRAWING
GPS-2
SHEET 73c/73