Site Management Plan

Brownfield Cleanup Program
7503 Niagara Falls Blvd. Site

Niagara Falls, New York
Site No. C932126

November 2007 0101-002-500

Prepared For:

GLR Holdings, LLC

Prepared By:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

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Site Management Plan (SMP) Checklist
for BCP, ERP, SSF and VCP sites

Site Name: **7503 Niagara Falls Boulevard Site - GLR Holdings, LLC**
Location: **Niagara Falls, New York**
Site No.: **C932126**

Project Manager:

The SMP for a site remedial program must include at a minimum an Institutional and Engineering Control Plan as well as provision for the periodic certification of the institutional control and engineering controls (IC/EC certification) and may include, as required by the remedy, a Site Monitoring Plan and Operation & Maintenance Plan. Each of these individual areas of reporting will need to meet the minimum requirements detailed below.

The SMP being reviewed addresses:

☑ The entire site

An operable unit of the site identified as:_____

An IRM for operable unit ___ identified as_____

A groundwater restriction or short term engineering control for an otherwise unrestricted use site

The SMP period for this site, after an initial one year review, will be:

☑ **Annually** □ **Every 2 years** □ **Every 3 years** □ **Every 5 years** □ **Other**:_____

Institutional and Engineering Control Plan:

☑ Must include a complete description of all institutional and/or engineering controls employed at the site, including the mechanisms that will be used to continually implement, maintain, monitor, and enforce such controls both by the applicant, the applicant's successors and assigns, and by state or local government is presented. **[OM&M Plan (Part I) and SFMP (Part II)]**

☑ A copy of the environmental easement with proof of filing with the responsible municipal authority; **[Part III of SMP]**

☑ Appropriate plans for implementation of the engineering and institutional controls, such as for handling soils removed from beneath a soil cover or cap during maintenance or redevelopment of the site. This would include development of media-specific implementation plans, such as plans for:

☑ Soil management which detail procedures for handling soil excavated from below a soil cover or cap during maintenance or redevelopment of the site (e.g., a soils management plan); or **[SFMP (Part II)]**

Treatment requirements to allow the use of contaminated groundwater, in lieu of

groundwater use restrictions; or

- ☑ Installation/operation of sub-slab vapor depressurization systems, or other types of systems to address vapor intrusion; **[OM&M Plan Attachment A1]**
- ☑ Engineering control inspection plans, for the remedy as implemented or to be installed as part of the site development, such as for a cap or cover system. **[OM&M Plan Section 2.3]**

☑ Provision for the preparation and submittal of a site monitoring plan, to include the IC/EC certification as well as all other reporting of the IC/ECs, site monitoring and/or operation and maintenance of the remedy. **[Attached]**

Institutional Control and Engineering Control (IC/EC) Certification: The applicant or site owner must make a periodic certification of the IC/EC to the Department. The requirements of this periodic IC/EC certification will be described in the SMP and the certification must be included in the site management report, which is prepared and submitted for the Department approved certification period. The IC/EC certification will: **[OM&M Plan Section 2.3 and Attachments A3 –A5]**

☑ Clearly identify the periodic certification period.

☑ Include a complete description of all institutional and/or engineering controls employed at the site, including the mechanisms that will be used to continually implement, maintain, monitor, and enforce such controls both by the applicant, the applicant's successors and assigns, and by state or local government.

☑ Include an evaluation of the plans developed for implementation of the engineering and institutional controls, regarding the continued effectiveness of any institutional and/or engineering controls required by the decision document for a site.

☑ Allow for access by the Department- to the site to evaluate continued maintenance of such controls.

☑ Provide a certification prepared by a professional engineer or other qualified environmental professional, which must certify that the institutional controls and/or engineering controls employed at such site are:

- unchanged from the previous certification, unless otherwise approved by the Department, consistent with the SMP;
- in place and effective;
- performing as designed; and
- that nothing has occurred that would impair the ability of the controls to protect the public health and environment; or constitute a violation or failure to comply with any operation and maintenance plan for such controls.

☑ For BCP sites: For those sites determined to be non-significant threat sites, but where contaminants in groundwater contravene drinking water standards at the site border, in addition to the items noted above; the remedial party will also have to certify: **[OM&M Plan Attachments A3-A5]**

- ☑ On a yearly basis that no new information has come to the site owner`s attention, including groundwater monitoring data from wells located at the site boundary, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid; and

☑ Every five years that the assumptions made in the qualitative exposure assessment remain valid.

Site Monitoring Plan: Includes, as appropriate for the site remedy, sampling and analysis plans for monitoring groundwater, soil vapor or another media as identified by the decision document for the site, designed to: **[OM&M Plan: Attachment A1 – ASD System Operations Manual and Attachment A2 – LTGWM Plan]**

If none is required for the remedy which is the subject of this SMP check here:

☑ Assess the remedy's compliance with groundwater standards.

Assess the remedy's compliance with the cleanup objectives of any other impacted media.

☑ Evaluate site information periodically to confirm that the remedy continues to be effective for the protection of public health and the environment.

☑ Prepare the necessary reports of the results of this monitoring for a period determined by the Department.

Operation & Maintenance Plan: Includes, as appropriate for the site remedy, a plan(s) which: **[OM&M Plan: Attachment A1 – ASD System Operations Manual and Attachment A2 – LTGWM Plan]**

If none is required for the remedy which is the subject of this SMP check here

☑ Identify the operation and maintenance activities necessary for the continued operation of the components of the remedy, including provision for evaluation of the systems and recommendations to optimize performance.

☑ Evaluating site information periodically to confirm that the remedy continues to be effective for the protection of public health and the environment.

☑ Preparing the necessary reports of the results of this evaluation for a period determined by the Department.

Completed by:_____ Date:_____
Project Manager

Reviewed by: _____ Date:_____
Section Chief/Regional HWR Engineer

BROWNFIELD CLEANUP PROGRAM

SITE MANAGEMENT PLAN

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

BCP SITE NO. C932126

November 2007 0101-002-500

Prepared for:

GLR Holdings, LLC

Prepared by:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

1.0 INTRODUCTION

This Site Management Plan (SMP) has been has been prepared on behalf of GLR Holdings, LLC (GLR) for the 7503 Niagara Falls Boulevard Site in Niagara Falls, New York. GLR is redeveloping the 7503 Niagara Falls Boulevard Site and the east adjacent parcel, addressed as 7543-7555 Niagara Falls Boulevard, as a fast food restaurant. 7503 Niagara Falls Boulevard is subject to the BCP, while 7543-7555 Niagara Falls Blvd is not. For purposes of this SMP, reference to the Site from this point forward refers only to the 7503 Niagara Falls Boulevard parcel.

1.1 Site Description

The property located at 7503 Niagara Falls Boulevard, in the City of Niagara Falls, New York (Niagara County Tax Map No. 160.12-2-5) is an approximate 0.89-acre parcel owned by GLR. The property is generally bounded by Niagara Falls Boulevard to the north, a vacant lot to the east (i.e., 7543-7555 Niagara Falls Blvd owned by GLR), private residences to the south, and commercial (fast-food restaurant) property to the west (i.e., 7403 Niagara Falls Blvd.). The Site is currently under construction as a fast-food restaurant.

1.2 Site History

Beginning in the late 1960s and continuing through the mid-1990s, the Site was occupied by several commercial establishments. These included various restaurants, auto parts sales, and auto repair facilities. Based on previous environmental investigations at the Site, portions of the Site have been contaminated with volatile organic compounds (VOCs) that are believed to have been released during the property's previous use as an auto repair facility.

Based on the findings of historic site investigations, a Remedial Investigation (RI) was necessary to confirm the nature and extent of contamination at the Site, to identify a source area and to produce sufficient data to evaluate remedial alternatives for the Site. Benchmark Environmental Engineering & Science, PLLC (Benchmark) implemented RI activities per the approved RI Work Plan in June 2006. Upon evaluation of the RI data and subsequent meetings with the New York State Department of Environmental Conservation (NYSDEC), it was determined that an IRM would be implemented to address groundwater impacted

with VOCs. An IRM Work Plan, which called for in-situ enhanced bioremediation of VOC-impacted groundwater, was submitted and approved by the NYSDEC in November 2006. As part of the IRM, the NYSDEC also required that soil gas samples be collected on-Site. The IRM field work was completed in November 2006 and the soil gas sampling was completed in January 2007. Based on the findings of the soil gas sampling, the NYSDEC and NYSDOH required off-site soil gas sampling at residential properties south of the Site, which was completed in June and July 2007. GLR initiated commercial redevelopment of the Site in September 2007.

The Final Engineering Report documents the details of the IRM, which was considered the final remedy, together with implementation of institutional controls as summarized in this SMP.

2.0 SMP Components

This SMP consists of the following three parts:

PART	TITLE
I	Operation, Monitoring, & Maintenance Plan
II	Soil/Fill Management Plan
III	Environmental Easements

PART I

OPERATION, MONITORING, & MAINTENANCE PLAN

SITE MANAGEMENT PLAN
PART I

OPERATION, MONITORING, & MAINTENANCE PLAN

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

November 2007 0101-002-500

Prepared for:

GLR Holdings, LLC

Prepared by:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

OPERATION, MONITORING & MAINTENANCE PLAN

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1.0 INTRODUCTION

1.1 Purpose and Scope

This Operation, Monitoring, & Maintenance Plan (OM&M Plan) has been prepared for inclusion in the Site Management Plan (SMP). The sole purpose of this Plan, and that of the Soil/Fill Management Plan (SFMP), is to ensure protection of both the environment and human health during redevelopment and use of the Site, subsequent to completion of Brownfield cleanup activities. Following completion of the Brownfield cleanup activities, post-remediation requirements will need to be implemented by subsequent owners or developers of the Site to comply with the Brownfield Cleanup Agreement terms and conditions. This Plan summarizes the tasks and obligations required by those parties.

1.2 Operation, Monitoring, and Maintenance Program Responsibility

The owner/developer, GLR Holdings, LLC, will be responsible for all monitoring, implementation, and reporting as required by the OM&M Plan. The New York State Department of Environmental Conservation (NYSDEC) will be informed of any change in ownership, redevelopment, site configuration, or subdivision of the property and the "Responsible Party" information below will be revised and resubmitted. The implementation of the OM&M Plan will continue until such time as the NYSDEC determines the long-term obligations and implementation of the Plan have been fulfilled.

The property owner/owner's representative will verify that any and all persons on-site will have an appropriate Health and Safety Plan prior to work and/or maintenance on the Site. Additionally, contact information for the party responsible for implementation of the OM&M program will be supplied to the NYSDEC for their files. Currently on file, the owner for the 7503 Niagara Falls Boulevard Site is:

GLR Holdings, LLC
20 North Union Street
Rochester, NY 14607
Attn: Gregory Barkstrom

2.0 OM&M PLAN COMPONENTS

The Operation, Maintenance, & Monitoring (OM&M) Plan for the Site consists of three major components that are described in the following sections:

- Active Sub-slab Depressurization System
- Long-Term Groundwater Monitoring (LTGWM) Plan
- Annual Inspection & Certification Program

2.1 Active Sub-slab Depressurization System OM & M Program

An Active Sub-slab Depressurization (ASD) system will be installed within the Wendy's fast-food restaurant. An ASD system is registered as an engineering control for this Site. The following text explains the general workings of an ASD system, and the required operation, maintenance, and monitoring. Certification and inspection forms referenced in this section are included in Attachment A1.

2.1.1 General

An ASD system creates a negative pressure zone beneath a building slab using a powered fan connected via piping. The low-pressure field prevents soil gas from entering the building. Generally, essential components of an ASD include:

- A clean layer of coarse aggregate beneath the slab.
- Installation of a suction pit beneath the slab for each building area separated by sub slab walls (i.e., footings).
- Installation of a vent stack from the suction pit(s) under the slab to the roof.
- Installation of a continuous operation fan(s) equipped with a pressure gauge to verify the system is under negative pressure.
- Sealed slab and foundation penetrations, including joints, cracks, and utility and pipe penetrations.

The ASD system used for this project was designed in accordance with the EPA design document entitled "Radon Prevention in the Design and Construction of Schools and Other Large Buildings" Third Printing with Addendum (June 1994), and the NYSDOH

"Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (October 2006). The designed system also includes an 8-mil polyethylene vapor barrier extending to the limits of the building footprint. One assembly will be strategically placed within the footprint of the newly constructed building and contains one of each of the following items: a subslab suction pit; vertical piping vent stack and associated materials; exhaust fan; a magnehelic pressure gauge; and an air pressure sensing switch.

2.1.2 ASD System Operation, Maintenance, & Monitoring

2.1.2.1 ASD System Operation

The ASD system has been designed for continuous operation with minimal maintenance and/or operational oversight. It is imperative, however, that the system be inspected periodically to document operation.

Near the suction point, a magnehelic gauge (refer to Attachment A1 for specifications) will be mounted to the column where the vent stack is attached, approximately 5 feet above the finished floor elevation. When the ASD system is operational, the magnehelic gauge will display the effective sub-slab (negative) pressure.

A "normal" operating pressure will be established at the time of system initiation. If there is a significant change in pressure observed after system stabilization, the owner and/or responsible party will be notified.

2.1.2.2 Periodic Visual Inspection

On a periodic basis, the pressure at the suction point will be read and recorded to document that the fan is maintaining negative pressure and the system components will be visually inspected. Any large fluctuations or trends in pressure will be documented and brought to the attention of the owner/responsible party. Visible leaks in piping and/or cracks in the concrete slab will be identified and noted for repair. Changes in use of the space, modifications to the system, building renovations, and/or significant non-running time will be documented on the Inspection Log included as Appendix C of Attachment A1.

2.1.2.3 Annual Certification/Inspection

An annual system certification/inspection report, documenting that the system is performing properly and remains effective, will be submitted to the NYSDEC by a

Professional Engineer or environmental professional. The certification/inspection report will contain the monthly logs, as well as an annual inspection checklist (refer to Attachments A3-A5). The annual inspection of all system components must be conducted by a qualified individual and includes inspection of:

- The exhaust fan for signs of abnormal operation or bearing failure (service and/or replacement if necessary).
- The discharge location to verify no air intake near the vent pipe.
- The HVAC system to determine if it is being maintained and operated as designed.
- The floor, wall, and slab for cracks (resealing if necessary); smoke tubes may be used to check for leaks through floor joints and at suction points while the depressurization system is running.

2.2 Long-Term Groundwater Monitoring (LTGWM) Plan

Attachment A2 includes the LTGWM Plan that is required at the Site to monitor the effectiveness of the in-situ groundwater treatment. Groundwater quality trends shall continue to be monitored in one area of the Site in accordance with the LTGWM Plan.

2.3 Annual Inspection & Certification Program

The 7503 Niagara Falls Boulevard Site shall be inspected annually by a qualified person representing the owner or responsible party. This qualified person shall, at a minimum, hold a 4-year college degree in environmental sciences or engineering, and be supervised by a New York State Licensed Professional Engineer.

The Annual Certification shall be stamped and signed by a New York State Licensed Professional Engineer and must certify and attest that the institutional controls and/or engineering controls employed at the Site are unchanged from the previous certification and:

- Are in place and effective.
- Are performing as designed.

- That nothing has occurred that would impair the ability of the controls to protect the public health and environment.

- That nothing has occurred that would constitute a violation or failure to comply with any operation and maintenance plan for such controls.

- Access is available to the Site to evaluate continued maintenance of such controls.

The Annual Certification will primarily consist of a completed NYSDEC Institutional and Engineering Controls Certification Form stamped and signed by a New York State Licensed Professional Engineer (Attachment A5). In addition to this certification, the completed Environmental Inspection Form (Attachment A3) and associated supporting documents (e.g., ASD annual certification form and ORC Monitoring, & Maintenance Form, etc.) will be required. The Corrective Action Certification (Attachment A4) will be required only if the annual inspections document an inconsistency or malfunction of the engineering and/or institutional controls for the Site (e.g., ASD System malfunction). If maintenance, repair, or corrective action is required, the owner/owner's representative shall notify the NYSDEC, schedule repairs, and subsequently notify the NYSDEC when repairs have been completed.

The property owner/owner's representative shall also certify on an annual basis that no new information has come to the owner's attention, including groundwater monitoring data from the monitored well. This information can be included in either the Annual Certification documentation or the Long Term Groundwater Monitoring Annual Report.

FIGURES

FIGURE 1

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0101-002-500

DATE: OCTOBER 2007

DRAFTED BY: AJZ

SITE LOCATION AND VICINITY MAP

OPERATION, MONITORING, AND MAINTENANCE PLAN

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

PREPARED FOR

GLR HOLDINGS, LLC

FILEPATH(F:\CAD\Benchmark\GLR Holdings - Wendy's\Final Engineering Report\OM&M\figure 1; site location and vicinity map.dwg

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BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0101-002-500

DATE: OCTOBER 2007

DRAFTED BY: AJZ

FILEPATH:

SITE PLAN

OPERATION, MONITORING, & MAINTENANCE PLAN

7503 - 7555 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

PREPARED FOR
GLR HOLDINGS, LLC

FIGURE 2

ATTACHMENT A1

ACTIVE SUB-SLAB DEPRESSURIZATION SYSTEM OPERATIONS MANUAL

ACTIVE SUB-SLAB DEPRESSURIZATION SYSTEM OPERATIONS MANUAL (DESIGN, INSTALLATION, & TESTING)

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

November 2007 0101-002-500

Prepared for:

GLR Holdings, LLC

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BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

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1.0 INTRODUCTION

1.1 Background and History

GLR Holdings, LLC (GLR) is redeveloping the 7503 Niagara Falls Boulevard Site and the east adjacent parcel addressed at 7543-7555 Niagara Falls Boulevard as a fast food restaurant. 7503 Niagara Falls Boulevard is subject to the BCP, while 7543-7555 Niagara Falls Blvd is not. For purposes of this Active Sub-slab Depressurization (ASD) System Operations Manual, reference to the Site from this point forward refers only to 7503 Niagara Falls Boulevard parcel.

The Site encompasses approximately 0.89 acres of vacant land along Niagara Falls Boulevard in the City of Niagara Falls, New York (see Figure 1). The property is generally bounded by Niagara Falls Boulevard to the north, a vacant lot and apartment buildings to the east (i.e., 7543-7555 Niagara Falls Blvd owned by GLR), private residences to the south, and commercial (fast-food restaurant) property to the west (i.e., 7403 Niagara Falls Blvd.). A concrete slab remnant from a former building foundation was present across the majority of the western portion of the property. The remainder of the Site was generally covered by asphalt.

Based on the nature and extent of contamination as indicated by prior investigations, the most applicable remedial measure was in-situ enhanced bioremediation of impacted groundwater and saturated soils via direct injection of hydrogen releasing compounds (HRC®) into the impacted zones. The interim remedial measures (IRM) was completed in November 2006 and consisted of injection of Hydrogen Release Compounds (HRC) into the groundwater at two areas of the Site as described in the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) approved IRM Work Plan, dated October 2006. Subsequent to HRC injection, groundwater monitoring was completed at sampling locations MW-14 and MW-19 to monitor the concentrations of chlorinated volatile organic compounds (cVOCs). Soil gas samples were also collected at four locations on-site (see Figure 2).

Concentrations of cVOCs have significantly decreased at both monitoring locations subsequent to HRC injection. This evaluation is based on baseline cVOCs concentrations

and three subsequent groundwater monitoring events. Groundwater monitoring will continue until Site construction activities commence.

As summarized in the letter to NYSDEC dated March 29, 2007 concerning the status of the IRM, cVOCs were detected in soil gas samples on-site. As such, the remedial design for the Site includes provisions to design, install, monitor, and maintain an ASD system beneath all newly constructed on-site structures to mitigate intrusion of vapors from residual VOCs in soil and groundwater.

2.0 ACTIVE SUB-SLAB DEPRESSURIZATION (ASD) SYSTEM DESIGN & INSTALLATION

2.1 General

An ASD system creates a negative pressure zone beneath a building slab using a powered fan connected via piping. The low-pressure field prevents soil gas from entering the building. Generally, essential components of an ASD include:

- A clean layer of coarse aggregate beneath the slab.
- Installation of a suction pit beneath the slab for each building area separated by sub slab walls (i.e., footings).
- Installation of a vent stack from the suction pit(s) under the slab to the roof.
- Installation of a continuous operation fan(s) equipped with a pressure gauge to verify the system is under negative pressure.
- Sealed slab and foundation penetrations, including joints, cracks, and utility and pipe penetrations.

The ASD system used for this project was designed in accordance with the EPA design document entitled "Radon Prevention in the Design and Construction of Schools and Other Large Buildings" Third Printing with Addendum (June 1994), and the NYSDOH "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (October 2006). The designed system also includes an 8-mil polyethylene vapor barrier extending to the limits of the building footprint. One assembly has been strategically placed within the footprint of the newly constructed building and contains one of each of the following items: perforated pipe suction assembly; vertical piping vent stack and associated materials; exhaust fan; and magnehelic pressure gauges. The following sections detail portions of the design criteria, methodology, and critical installation methods.

2.2 ASD System Design

Structural requirements for the building will require a compacted aggregate beneath the concrete slab. The system will consist of one operating suction pit, blower, and vent stack located to optimize the area of influence with the choice of aggregate (see Figure 3).

An 8-mil polyethylene vapor barrier will be placed above the aggregate, prior to pouring the concrete floor slab, as a passive secondary engineering control and to assist in maintaining a sub-slab pressure differential. A suction pit will be constructed by creating a 4-ft x 4-ft x 8-inch (min. depth) void at the location indicated in Figure 3. The pit will then be covered by a ¾-inch pressure treated plywood panel supported by concrete blocks, and reinforced concrete flooring will be poured on top of the plywood and surrounding aggregate (refer to Figure 4).

Sub-slab, 6-inch Schedule 40 PVC piping will run laterally from the center of the suction pit as close as practicable to an adjacent roof column or wall, elbow 90° to vertical, and penetrate through a pipe sleeve in the slab. Once above the slab, the pipe will elbow 90° to horizontal and travel to the designated roof column or wall where it will again elbow 90° to rise vertically along the column. This formation will ensure that the vent piping will not interfere with column foundations and/or footings. The vent stack will penetrate the roof of the building, and exhaust a minimum of 12-inches above the finished roof elevation and 25 feet away from any air intake (refer to Figure 4).

A Fan Tech Model FR 160 (or similar fan; refer to Appendix A for specifications) will be installed inline with the vent pipe on the exterior of the building roof to provide negative pressure in the sub-slab soil. A Dwyer Model 2002 – AV Magnehelic Gauge will be mounted to the vent stack in the western maintenance area of the building, using a Dwyer Model A-368 Surface mount bracket. This magnehelic gauge will measure and display the instantaneous negative pressure produced by the fan and indicates the system is operational.

A Cleveland Controls Model AFS-222 air pressure sensing switch (or similar unit; refer to Appendix B for specifications) will be installed inline with the vent pipe as a warning device. A red light indicator will be attached to the sensing switch; if the vent pipe does not provide a negative pressure, the red light will illuminate indicating the system is not working properly.

2.3 ASD System Installation

The ASD system will be installed in accordance with the design criteria and specifications on Figure 4 and/or typical construction practices.

Installation of the suction pit, sub-slab piping, and the 8-mil polyethylene vapor barrier will be completed prior to pouring the slab. All other piping and fixtures will be installed following significant completion of the overall structure, and/or at the scheduling discretion of the owner and contractor. All 6-inch Schedule 40 PVC piping will be pitched toward the suction pit to promote drainage of any condensate below the fan.

The exhaust fan will be installed and vented a minimum of 12 inches above the finished roof elevation. The fan will be hard-wired to a dedicated electrical circuit for which a dedicated breaker will be installed and properly labeled in the breaker box.

The vent stack will extend above the exhaust fan to a point not less than 36 inches above the finished roof elevation to which a rain cap will be fastened. The vent pipe roof penetration will be sealed using a polyurethane sealant applied in accordance with manufacturer's instructions.

Upon system installation, all penetrations, expansion joints, cracks, and/or any other gaps in the slab and/or subsurface walls will require a polyurethane sealant applied in accordance with manufacturer's instructions.

3.0 POST MITIGATION/ CONFIRMATION TESTING

3.1 General

The ASD system will require performance testing to confirm proper installation and effectiveness. Post-mitigation testing will be conducted prior to building occupation and within 60 days of system installation. The following steps will be performed, documented, and reported.

3.2 Visual Inspection

All system components will be visually inspected by a qualified person to ensure proper installation. With the ASD system operating, smoke tubes may be used to check for leaks through floor joints and at suction points. Any leaks will be identified, noted, and repaired before continuing with testing and confirmation.

3.3 ASD System Confirmation

A field test will be conducted to confirm the negative pressure created beneath the slab. One-quarter inch diameter holes will be drilled through the concrete slab and into the sub-slab aggregate at points starting near the suction pit and continuing to points furthest from the suction pit that are accessible. With the ASD system operating, the vacuum will be measured using a handheld digital micro-manometer or comparable instrument at the test locations. If adequate depressurization is not occurring, the following procedures will be enacted:

- All testing procedures will be repeated to ensure proper testing protocol.
- Owner and NYSDEC personnel will be informed of inadequate vacuum results.

The following system troubleshooting will then be completed:

- Confirmation of fan operation.
- Inspection and sealing of all major entry routes and penetrations (if necessary).
- Location of potential sub-slab barriers.
- Inspection of aggregate.

- Inspection of the HVAC system and determination whether the HVAC system has a negative effect on the performance of the ASD system.

If re-testing sub-slab test points indicate insufficient communication, the following measures will be considered:

- Adjustment of the HVAC system, and/or
- Installation of additional suction points.

4.0 ASD SYSTEM OPERATION, MAINTENANCE, & MONITORING

4.1 ASD System Operation

This ASD system has been designed for continuous operation with minimal maintenance and/or operational oversight. It is imperative however, that the system be inspected monthly and annually to ensure consistent and optimal operation.

Near the suction point, a magnehelic gauge will be mounted to the column where the vent stack is attached, approximately 5 feet above the finished floor elevation. When the ASD system is operational, the magnehelic gauge will display the effective sub-slab (negative) pressure.

A "normal" operating pressure will be established by recording the displayed pressure approximately 4 hours after initial system start-up. Another reading will be taken and recorded after approximately 1 week of operation to check if a significant change in pressure is observed relative to the initial "normal" operating pressure. If there is a significant pressure difference, weekly inspections will be made until the pressure stabilizes, for up to four weeks. If readings do not stabilize within four weeks or a significant change in pressure is observed after system stabilization, the owner or owner's representative will be notified.

4.2 Monthly Visual Inspection

On a monthly basis, system components will be visually inspected and the pressure at the suction pit will be recorded to verify that the fan is maintaining adequate negative pressure. Any large fluctuations or trends in pressure will be documented and brought to the attention of the owner/owner's representative. Visible leaks in piping and/or the concrete slab will be identified and noted for repair. Changes in use of the space, modifications to the system, building renovations, and/or significant non-running time will be documented on the Monthly Inspection Log included in Appendix C).

4.3 Annual Certification/Inspection

An annual system certification/inspection report, documenting that the system is performing properly and remains effective, will be submitted to the NYSDEC by a

Professional Engineer or environmental professional. The certification/inspection report will contain the monthly logs, as well as an annual inspection checklist (refer to Attachments A3-A5). The annual inspection of all system components must be conducted by a qualified individual and includes inspection of:

- The exhaust fan for signs of abnormal operation or bearing failure (service and/or replacement if necessary).
- The discharge location to verify no air intake near the vent pipe.
- The HVAC system to determine if it is being maintained and operated as designed.
- The floor, wall, and slab for cracks (resealing if necessary); smoke tubes may be used to check for leaks through floor joints and at suction points while the depressurization system is running.

4.4 System Failure Protocols

In the event that the ASD system is not working properly, the warning light located in the maintenance area will illuminate indicating that there is insufficient vacuum in the associated vent pipe. The following protocols will be followed:

- Contact the building owner/operator and maintenance personnel immediately.
- Record the date and time of the system failure.
- Inspect the fan to confirm operation; if a circuit breaker was tripped causing the fan to cease operation, reset the circuit breaker.
- Visually inspect system components for signs of damage or dysfunction.

If the system failure is not remedied, the building owner should contact a qualified engineer or other person with experience in ASD systems to inspect the system and take the necessary measures to place the system back in service. The NYSDEC should be apprised of the system failure and what measures were taken to place the system back in service.

FIGURES

FIGURE 1

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0101-002-500

DATE: OCTOBER 2007

DRAFTED BY: AJZ

SITE LOCATION AND VICINITY MAP

ACTIVE SUBSLAB DEPRESSURIZATION SYSTEM

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

PREPARED FOR
GLR HOLDINGS, LLC

FILEPATH=F:\CAD\Benchmark\GLR Holdings - Wendy's\Final Engineering Report\ASD\figure 1; site location and vicinity map.dwg

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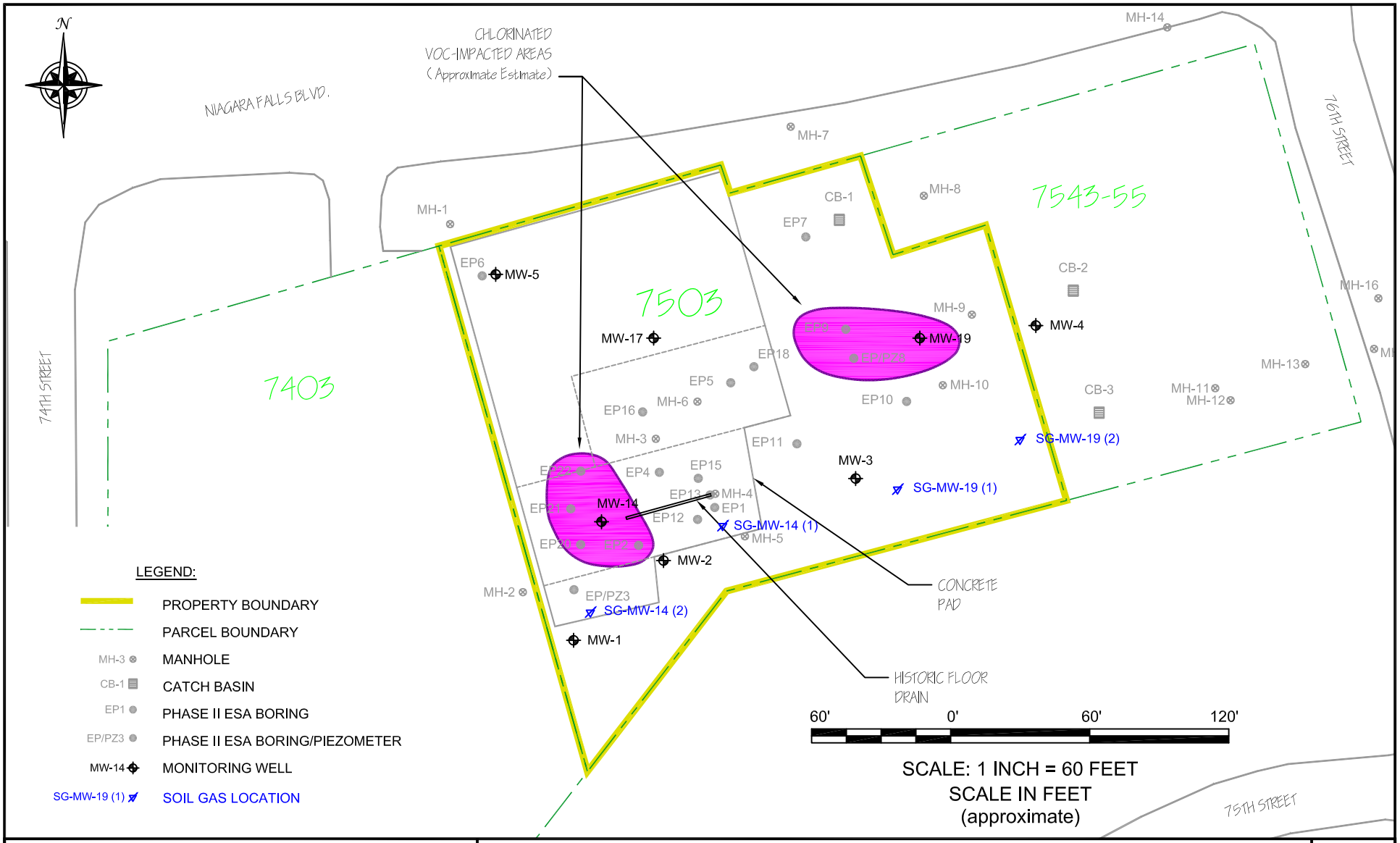

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SOIL-GAS SAMPLING LOCATIONS

ACTIVE SUBSLAB DEPRESSURIZATION SYSTEM

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FIGURE 2

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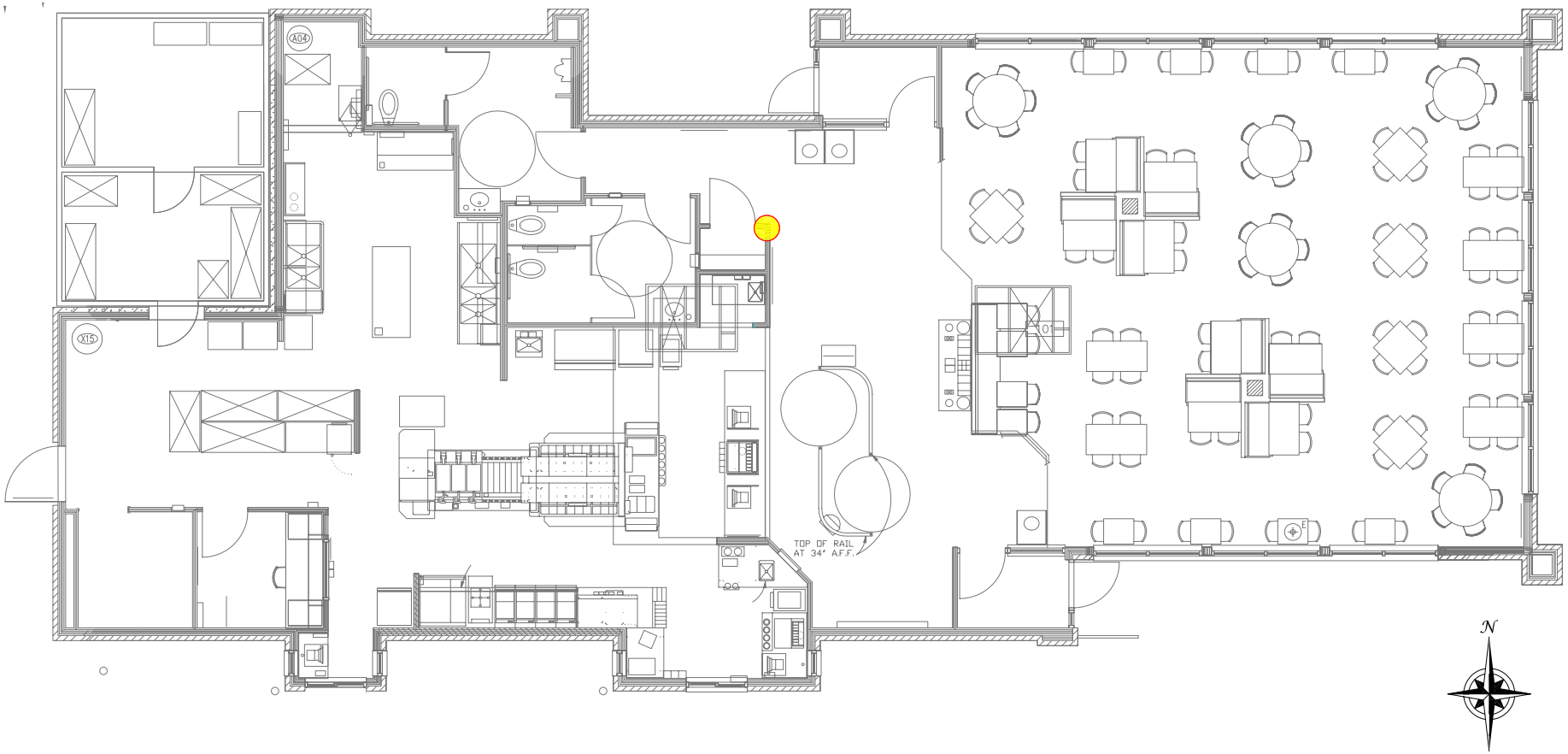

LEGEND:

PROPOSED ACTIVE SUBSLAB DEPRESSURIZATION SYSTEM LOCATION

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DATE: OCTOBER 2007

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FOUNDATION PLAN

ACTIVE SUBSLAB DEPRESSURIZATION SYSTEM

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NIAGARA FALLS, NEW YORK

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FIGURE 3

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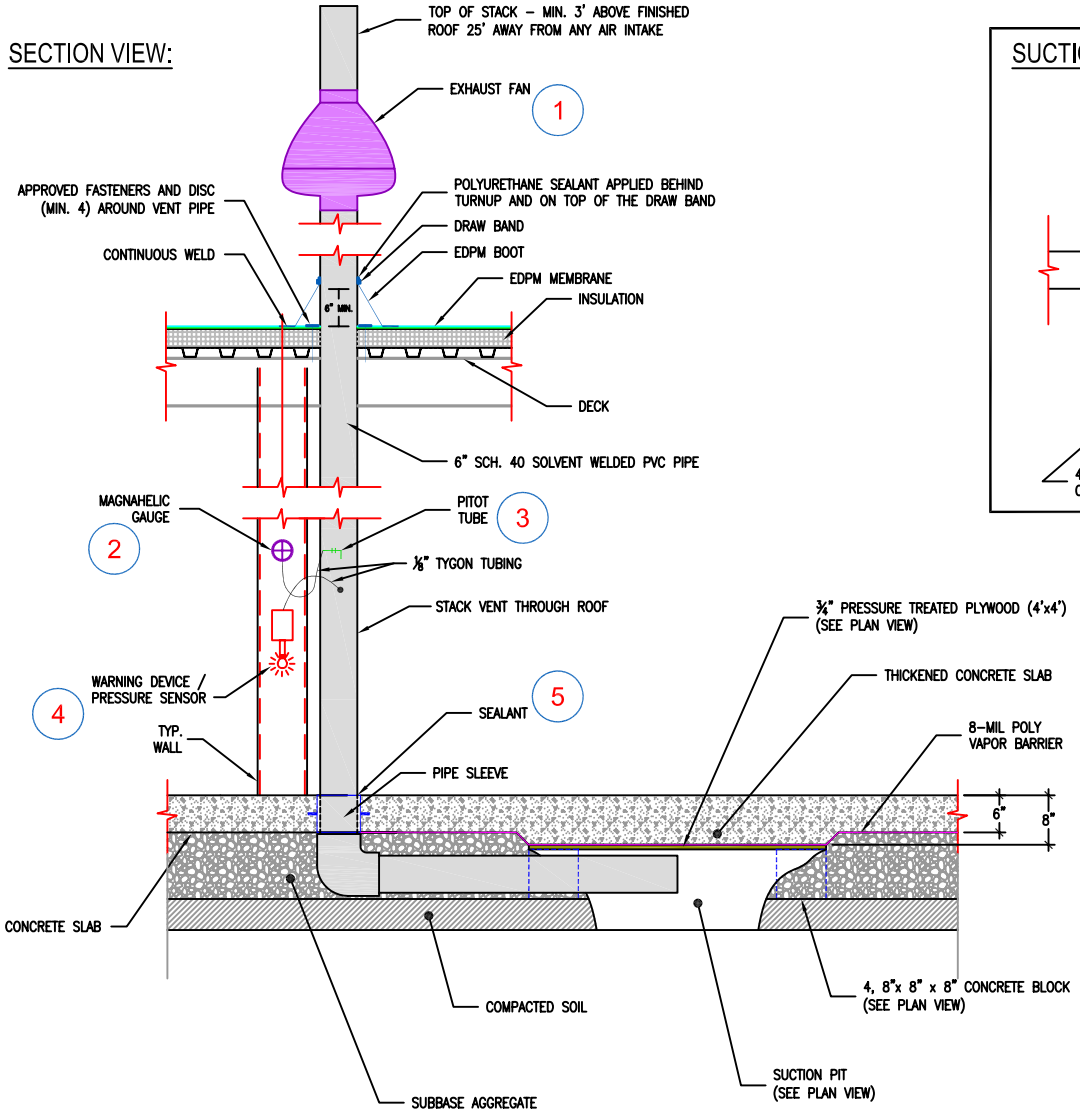
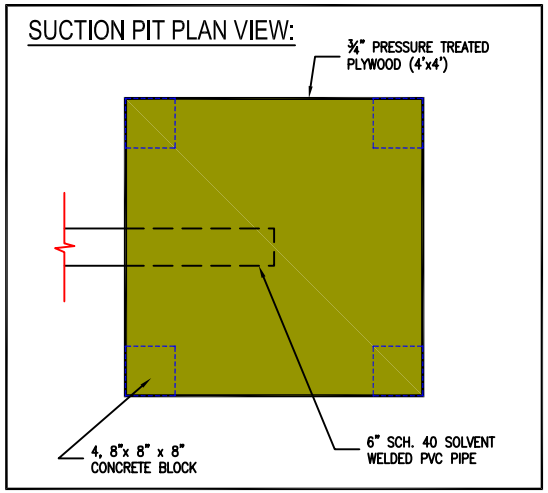
SECTION VIEW:



SUCTION PIT PLAN VIEW:



NOTES:

1. FANTECH MODEL FR 160. 115 VOLT 71 RATED WATTS CONT. DUTY
2. DWYER MODEL 2002 – AV MAGNAHELIC GAUGE; DWYER MODEL A-368 SURFACE MOUNT BRACKET. MOUNT ON COLUMN AT 5 FEET ABOVE FINISHED FLOOR.
3. DWYER MODEL 166-6CF ⅛" NPT PITOT TUBE WITH COMPRESSION FITTINGS
4. CLEVELAND CONTROLS MODEL AFS-222 AIR PRESSURE SWITCH WITH ADJUSTABLE SET POINT RANGE. MOUNT ON EXTERIOR WALL AT 5 FEET ABOVE FINISHED FLOOR.
5. POLYURETHANE SEALANT APPLIED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS TO SEAL ALL GAPS. USE OF SILICONE SEALANTS IS NOT PERMITTED.

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SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0101-002-500

DATE: OCTOBER 2007

DRAFTED BY: BCH/AJZ

ACTIVE SUBSLAB DEPRESSURIZATION SYSTEM DESIGN

ACTIVE SUBSLAB DEPRESSURIZATION SYSTEM

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

PREPARED FOR
GLR HOLDINGS, LLC

FIGURE 4

APPENDIX A

EXHAUST FAN PRODUCT INFORMATION

Fantech FR Series

Versatility and Value

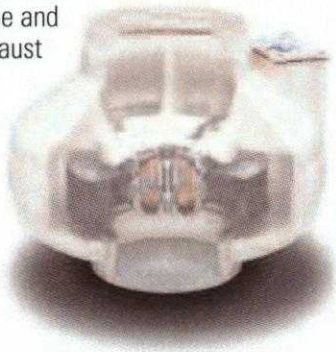
Fantech's versatile FR Series fans feature a plastic housing constructed of UL-recognized, UV-protected thermoplastic resin. This tough protective shell allows the fan to be mounted in outdoor and wet locations.* Ideal for multiple point exhaust, dual bathroom exhaust, or new room additions, Fantech's FR Series fans are caulked at the motor screws, the wiring cables and along the seams of the fan to prevent moisture from entering the housing. Fantech's FR Series fans have long been the choice of residential builders and remodelers but now can be used for commercial projects with our recent UL commercial applications rating.

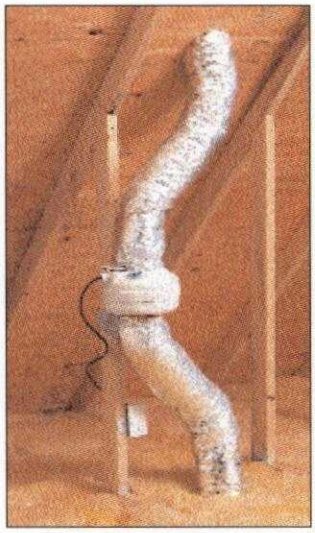
Easy to install
Loaded with features

- Prewired and supplied with a mounting bracket for easy installation
- Available singularly with bracket or in a variety of kits for specific applications. Each kit includes the appropriate fan and accessories
- UL Listed; CSA Certified
- Approved for residential and commercial applications and for wet locations
- Suitable for airstream temperatures up to 140° F
- Easy connection using external wiring box with waterproof gasket
- 122-649 CFM
- 4" to 10" duct diameters
- 100% speed controllable
- Five-year factory warranty

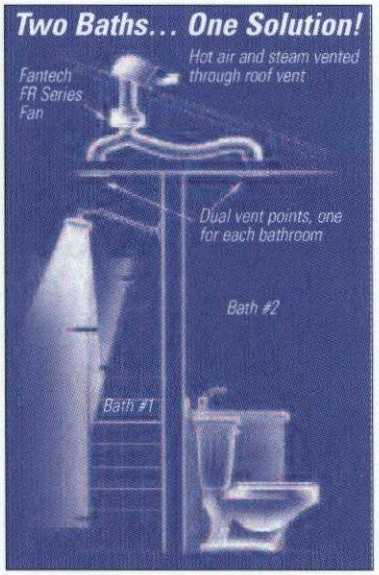
Kits are available for the following applications:

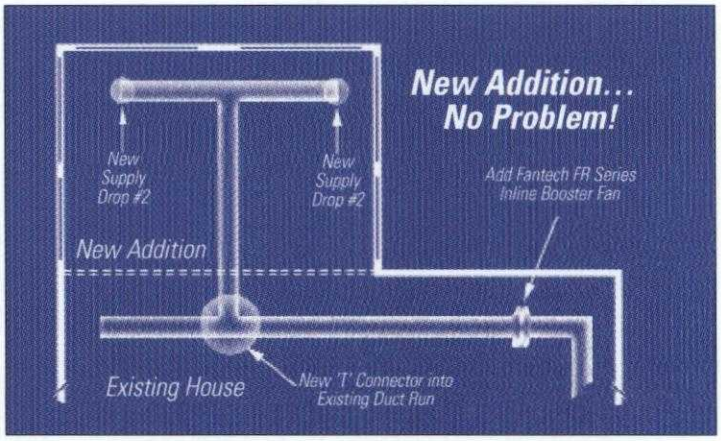
- Regular Kits (REG 100 and REG 140) for single point exhaust applications
- Deluxe Kits (DLX 110, DLX 150, and DLX 200) designed for dual point exhaust applications
- Vent Light Kits (REG 100L, DLX 150L) for single and dual vent light exhaust applications





Typical attic installation





** The FR Series is not manufactured to operate with water running through the motor compartment, or to be used in applications where the fan would be buried underground. A UL-recognized waterproof conduit should be used for all outdoor applications to prevent moisture entry via knockout in wiring box.*

FR Kits

Pictured from left to right: DLX150 – Dual Point Ventilation Kit; REG100L – Single Vent Light Kit. Additional kits (not pictured) are available.

DLX150

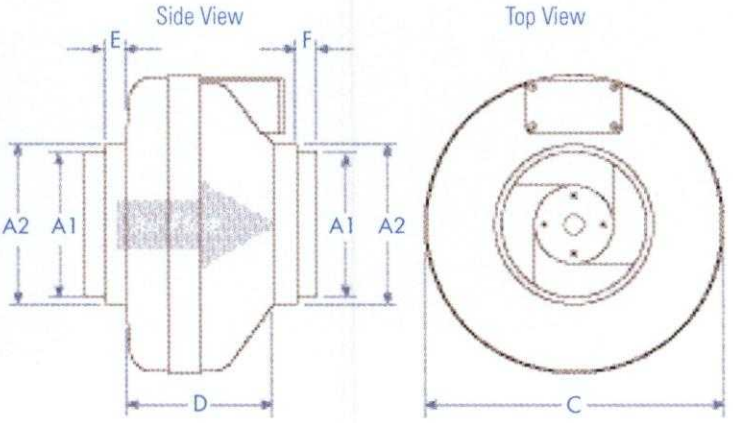
REG100L

Specifications

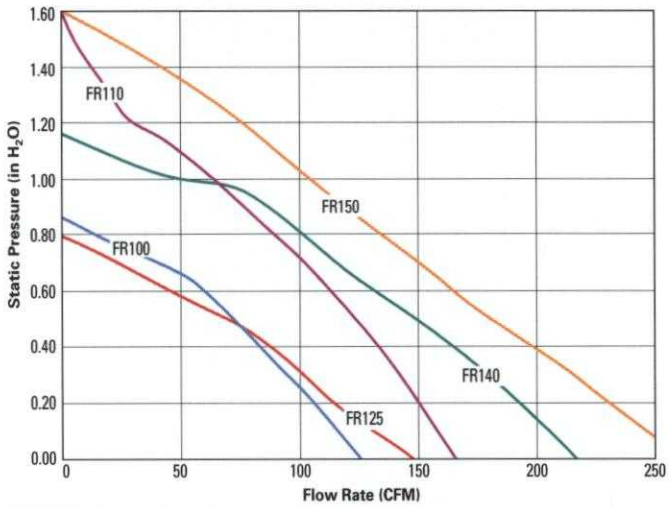
FR Series Dimensional Data

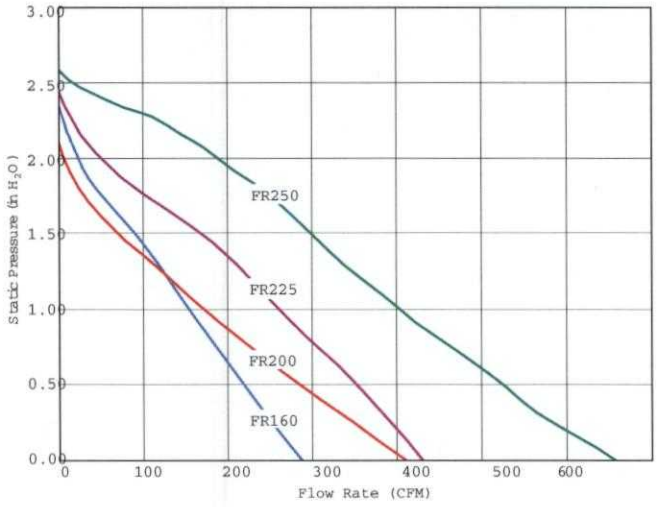
model	†A1	A2	C	D	E	F
FR 100	4	5	9½	6⅛	⅞	⅞
FR 110	4	5	9½	6⅛	⅞	⅞
FR 125	—	5	9½	6⅛	⅞	—
FR 140	6	6¼	11¾	5⅞	1	⅞
FR 150	6	6¼	11¾	5⅞	1	⅞
FR 160	6	6¼	11¾	6⅜	1	⅞
FR 200	8	10	13¼	6¼	1½	1½
FR 225	8	10	13¼	6¼	1½	1½
FR 250	—	10	13¼	6¼	1½	—

All dimensions in inches. † Duct connections are ⅛" smaller than duct size.



FR Series Air Performance Graphs





FR Series Performance Data

Fan Model	Energy Star	RPM	Volts	Rated Watts	Wattage Range	Max. Amps	Static Pressure in Inches W.G							Max. Ps	Duct Dia.
							0"	.2"	.4"	.6"	.8"	1.0"	1.5"		
FR 100	√	2900	115	19	13 – 19	0.18	122	100	78	55	15	—	—	0.87"	4"
FR 110	—	2900	115	80	62 – 80	0.72	167	150	133	113	88	63	4	1.60"	4"
FR 125	√	2950	115	18	15 – 18	0.18	148	120	88	47	—	—	—	0.79"	5"
FR 140	√	2850	115	61	47 – 62	0.53	214	190	162	132	99	46	—	1.15"	6"
FR 150	√	2750	120	71	54 – 72	0.67	263	230	198	167	136	106	17	1.58"	6"
FR 160	—	2750	115	129	103 – 130	1.14	289	260	233	206	179	154	89	2.32"	6"
FR 200	√	2750	115	122	106 – 128	1.11	408	360	308	259	213	173	72	2.14"	8"
FR 225	√	3100	115	137	111 – 152	1.35	429	400	366	332	297	260	168	2.48"	8"
FR 250	—	2850	115	241	146 – 248	2.40	649	600	553	506	454	403	294	2.58"	10"

FR Series performance is shown with ducted outlet. Per HVI's Certified Ratings Program, charted air flow performance has been derated by a factor based on actual test results and the certified rate at .2 inches WG.

APPENDIX B

WARNING DEVICE PRODUCT INFORMATION

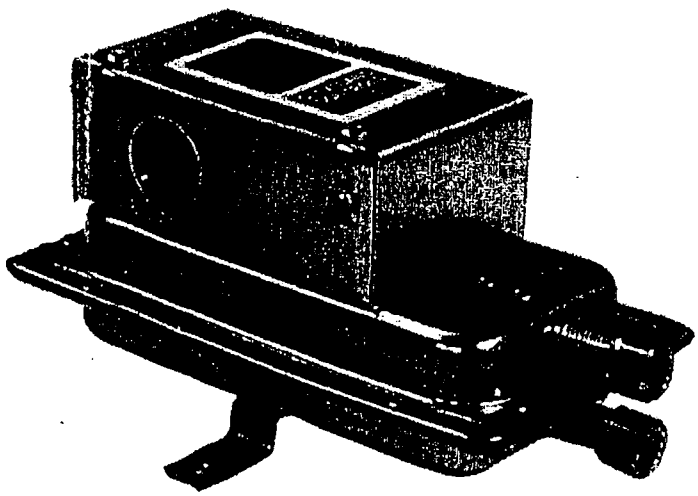
Cleveland Controls
Division of UniControl Inc.

Model AFS–222

AIR PRESSURE SENSING SWITCH WITH ADJUSTABLE SET POINT RANGE

APPLICATION

Model AFS-222 Air Pressure Sensing Switch is a general purpose proving switch designed for HVAC and Energy Management applications. It may be used to sense positive, negative, or differential air pressure.



GENERAL DESCRIPTION & OPERATION

The plated housing contains a diaphragm, a calibration spring and a snap-acting SPDT switch. The sample connections located on each side of the diaphragm accept ¼" OD metallic tubing via the integral compression ferrule and nut.

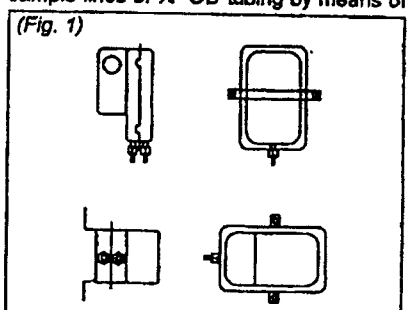
An enclosure cover guards against accidental contact with the live switch terminal screws and the set point adjusting screw. The enclosure cover will accept a ½" conduit connection.

MOUNTING (SEE FIGURE 1)

Select a mounting location which is free from vibration. The **AFS-222** must be mounted with the diaphragm in any vertical plane in order to obtain the lowest specified operating set point. Avoid mounting with the sample line connections in the "up" position. Surface mount via the two 3/16" diameter holes in the integral mounting bracket. The mounting holes are 3-7/8" apart.

The **AFS-222** is designed to accept firm-wall sample lines of ¼" OD tubing by means of ferrule and nut compression connections. For sample lines of up to 10 feet, ¼" OD tubing is acceptable. For lines up to 20 feet, use ¼" ID tubing. For lines up to 60 feet, use ½" ID tubing. A ¼" OD adapter, suitable for slip-on flexible tubing is available: order part number 18311.

(Fig. 1)



AIR SAMPLING CONNECTION (SEE FIGURE 2)

Locate the sampling probe a minimum of 1.5 duct diameters downstream from the air source. Install the sampling probe as close to the center of the airstream as possible. Refer to Figure 2 to identify the high pressure inlet (H) and the low pressure inlet (L). Select one of the five application options listed below, and connect the sample lines as recommended.

POSITIVE PRESSURE ONLY: Connect the sample line to inlet H; inlet L remains open to the atmosphere.

NEGATIVE PRESSURE ONLY: Connect the sample line to inlet L; inlet H remains open to the atmosphere.

TWO NEGATIVE SAMPLES: Connect the higher negative sample to inlet L. Connect the lower negative sample to inlet H.

TWO POSITIVE SAMPLES: Connect the higher positive sample to inlet H. Connect the lower positive sample to inlet L.

ONE POSITIVE AND ONE NEGATIVE SAMPLE: Connect the positive sample to inlet H. Connect the negative sample to inlet L.

Cleveland Controls
DIVISION OF UNICONTROL INC.
1111 Brookpark Rd
Cleveland OH 44109

Tel: 216-398-0330
Fax: 216-398-8558
Email: saleshvac@unicontrolinc.com
Web page: http://www.clevelandcontrols.com

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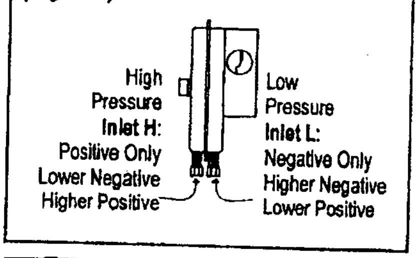
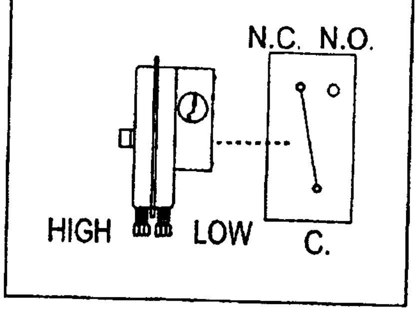
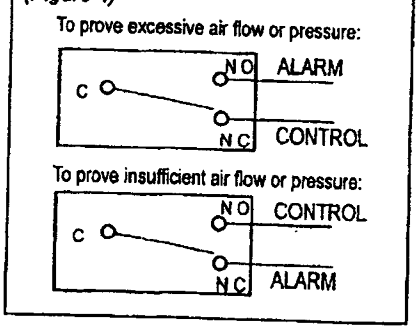
(Figure 2)



(Figure 3)



(Figure 4)



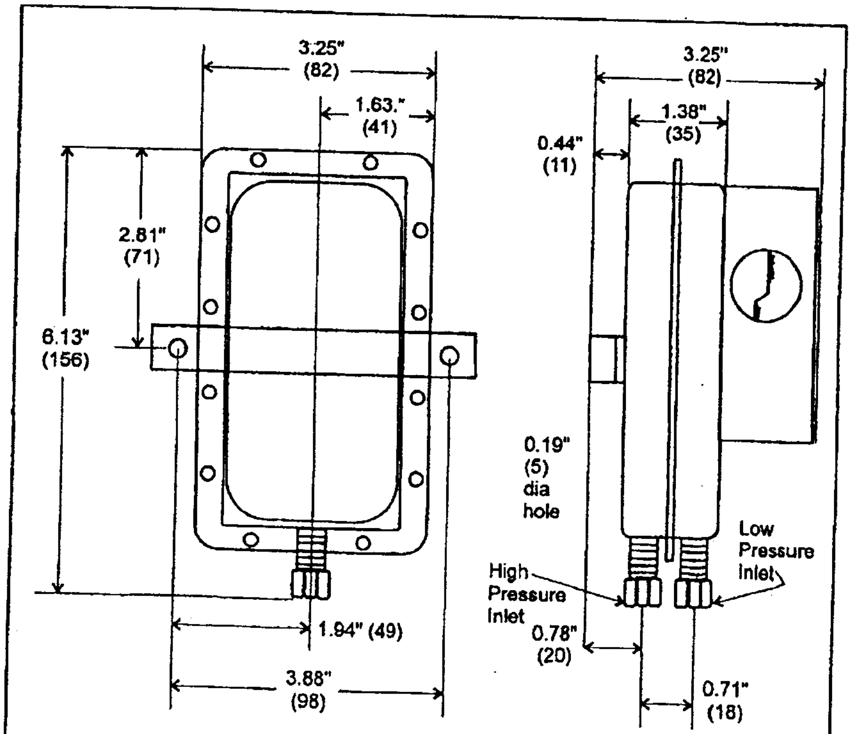
ELECTRICAL CONNECTIONS (SEE FIGURE 3)

Before pressure is applied to the diaphragm, the switch contacts will be in the normally closed (NC) position. The snap switch has screw top terminals with cup washers. Wire alarm and control applications as shown in Figure 4.

FIELD ADJUSTMENT

The adjustment range of an **AFS-222** Air Switch is 0.05±.02" w.c. to 12.0" w.c. To adjust the set point, turn the adjusting screw counterclockwise until motion has stopped. Next, turn the adjusting screw 4 complete turns in a clockwise direction to engage the spring. From this point, the next ten turns will be used for the actual calibration. **Each full turn represents approximately 1.2" w.c.**

Please note: To properly calibrate an air switch, a digital manometer or other measuring device should be used to confirm the actual set point.



Nominal Dimensions in Inches (Millimeters)

SPECIFICATIONS

MODEL AFS-222 AIR PRESSURE SENSING SWITCH WITH ADJUSTABLE SET POINT RANGE

Mounting Position:
Mount with the diaphragm in any vertical plane.

Set Point Range:
0.05±0.02" w.c. to 12.0" w.c.

Field Adjustable Operate Range:
[illegible] to 12.0" w.c.

Field Adjustable Release Range:
[illegible]

Approximate Switching Differential:
Progressively increasing from 0.02 to 0.15" w.c. at minimum set point to approximately [illegible] w.c. at maximum set point.

Measured Media:
Air or combustion by-products that will not degrade silicone.

Maximum Pressure:
10 psi (0.69 bar)

Operating Temperature Range:
-40 to 180°F (-40 to 82°C)

Life:
100,000 cycles minimum at 1/2 psi maximum pressure each cycle and at maximum rated electrical load.

Electrical Rating:
300 VA pilot duty at 115 to 277 VAC, 15 A non-inductive to 277 VAC, 60 Hz.

Contact Arrangement: SPDT

Electrical Connections:
Screw-type terminals with cup washers.

Conduit Opening:
7/8" diameter opening accepts 1/2" conduit.

Sample Line Connectors:
Male, externally threaded 7/16"-24 UNS-2A thread, complete with nuts and self-aligning ferrules.

Sample Line Connections:
Connectors will accept 1/4" OD rigid or semi-rigid tubing.

Approvals: UL, FM, CSA

Shipping Weight: 1.2 lbs.

Accessories:
- P/N 18311 Slip-on 1/4" OD Tubing Adapter, suitable for slipping on flexible plastic tubing.
- Sample line probes
- Orifice plugs (pulsation dampers)

APPENDIX C

OPERATIONS AND MAINTENANCE LOGS

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

Monthly Operation & Maintenance Log
Active Sub-Slab Depressurization System

Project Name:	Project No.:
Project Location:	Client:
Preparer's Name:	Date/Time:

Notes:

Monthly Operating Status:

System(s) currently running? ☐ yes ☐ no

Has the system been off-line in the past month? ☐ yes ☐ no

If yes, please list the dates and brief description why (i.e. maintenance, part replacement, etc.):

What is the current Vacuum reading? ☐

Visual Inspection:

Any piping disconnected?	☐ yes	☐ no
Any cracks visible in piping?	☐ yes	☐ no
Any new cracks visible in slab floor?	☐ yes	☐ no
Magnehelic guage reading 0?	☐ yes	☐ no

If yes to any question above, please provide more information below.

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

Monthly Operation & Maintenance Log
Active Sub-Slab Depressurization System

Change in Occupancy / Use of Space:

Please indicate general use of floor space? _____

Has this general use changed in the past month? ☐ yes ☐ no

If yes, please explain:

System Modifications:

Have any modifications been made to the Sub-Slab Depressurization System? ☐ yes ☐ no

If so, please list with date:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

Annual Operation & Maintenance
Active Sub-Slab Depressurization System
Certification Checklist

Project Name:	Project No.:
Project Location:	Client:
Preparer's Name:	Date/Time:

Notes:

System Information

Has monthly system inspection been completed regularly?	☐ yes	☐ no
Are last 11 inspection logs attached for the past 12 months?	☐ yes	☐ no

What is the current Vacuum reading? ☐

System Updates, Maintenance, Part Replacement

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

Annual Operation & Maintenance
Active Sub-Slab Depressurization System
Certification Checklist

Change in Occupancy / Use of Space:

Please indicate general use of floor space? _____

Has this general use changed in the past year? ☐ yes ☐ no

If yes, please explain:

Building Renovations:

Have any building renovations taken place in the last month? ☐ yes ☐ no

If yes, please provide more information below, and sketch any basement floor plan modifications on the floor plan sketch below.

System Modifications:

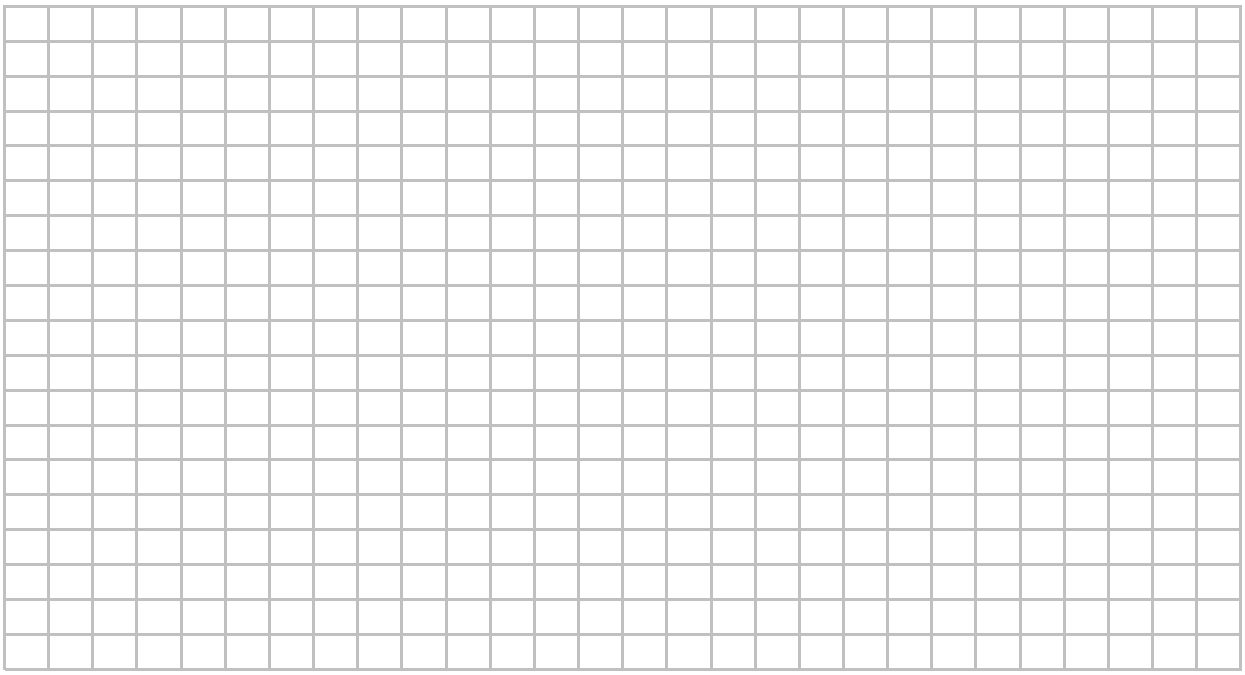
Have any modifications been made to the Sub-Slab Depressurization System? ☐ yes ☐ no

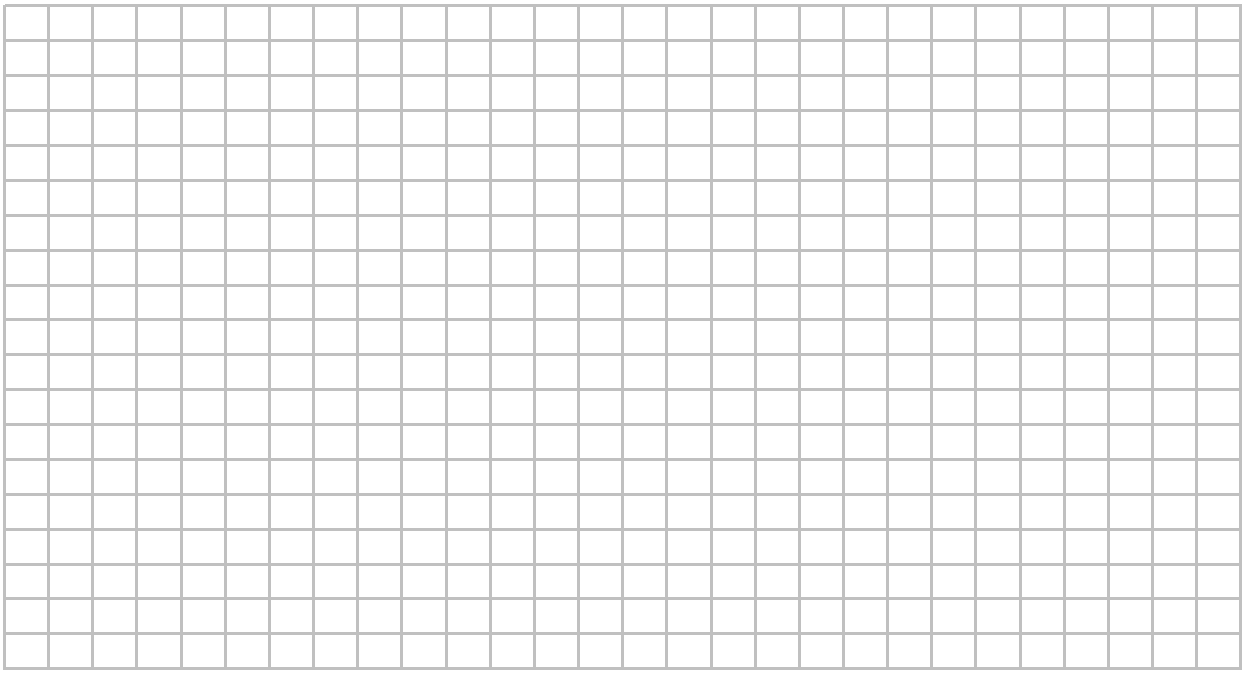
If so, please list with date:

Annual Operation & Maintenance
Active Sub-Slab Depressurization System
Certification Checklist

Floor Plan Sketch:

Draw a plan view sketch of the basement of the building. Indicate Sub-Slab Depressurization system location. Please also note and include, any alterations to the system, locations of visible cracks and/or repairs needed, and changes or alterations to the usage of this space.





ATTACHMENT A2

LONG-TERM GROUNDWATER MONITORING PLAN

LONG-TERM GROUNDWATER MONITORING PLAN

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

November 2007 0101-002-500

Prepared for:

GLR Holdings, LLC

Prepared by:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

LONG-TERM GROUNDWATER MONITORING PLAN

TABLE OF CONTENTS

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1.0 INTRODUCTION

This Long-Term Groundwater Monitoring Plan (LTGWM Plan) has been prepared for the 7503 Niagara Falls Boulevard Site in Niagara Falls, New York (see Figure 1). Benchmark Environmental Engineering & Science, PLLC (Benchmark) has prepared this report on behalf of the Site owner, GLR Holdings, LLC (GLR). This LTGWM Plan is required to monitor the effectiveness of the source area removals, treatment, and controls implemented in accordance with the Brownfield Cleanup Agreement. The proposed LTGWM Plan will provide for the comprehensive monitoring, documentation, and evaluation of groundwater quality at the Site.

2.0 GROUNDWATER MONITORING PROGRAM

2.1 Monitoring Network

The long-term groundwater monitoring network for this program will include only one monitoring well, identified on Figure 1 as MW-14R. The "R" suffix indicates a replacement of the original well, MW-14, that, along with all other on-site monitoring wells, will be decommissioned during construction activities. The replacement well will be installed as close as possible to the location of existing well MW-14 within 30 days of completion of construction activities. If replacement well MW-14R becomes damaged or unusable during the long-term groundwater monitoring program, it will be replaced within 30 days of discovery.

2.2 Sampling Frequency

Monitoring well MW-14 will be sampled on an annual basis for the first 5 years. Following a review of the data after the 5-year monitoring program, a determination will be made as to whether the well will continue to be sampled and at what frequency.

2.3 Sampling Method

Due to low permeability of the Site soils, groundwater monitoring will be performed using conventional purge and sample techniques via disposable polyethylene bailer. Benchmark's Field Operating Procedures (FOPs) entitled "Groundwater Purging Prior to Sample Collection" and "Groundwater Sample Collection Procedures" are provided as Appendix A.

2.4 Analyses

For the first year, groundwater samples will be analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) via Method 8260 using SW-846 protocol. After the first year, the parameter list will be reviewed to determine whether it can be reduced based on the analytical results as well as the proposed activities for the Site.

3.0 REPORTING

Annual monitoring reports will be provided to the NYSDEC Region 9 Office by March 1 of each calendar year and will include, at a minimum, the data collected during each monitoring event. Any and all changes to the Monitoring Program will be approved by the NYSDEC prior to implementation.

FIGURES

FIGURE 1

BENCHMARK
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726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0101-002-500

DATE: OCTOBER 2007

DRAFTED BY: AJZ

SITE LOCATION AND VICINITY MAP

LONG-TERM GROUNDWATER MONITORING PLAN

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

PREPARED FOR

GLR HOLDINGS, LLC

FILEPATH=F:\CAD\Benchmark\GLR Holdings - Wendy's\Final Engineering Report\LTGWM Plan\figure 1; site location and vicinity map.dwg

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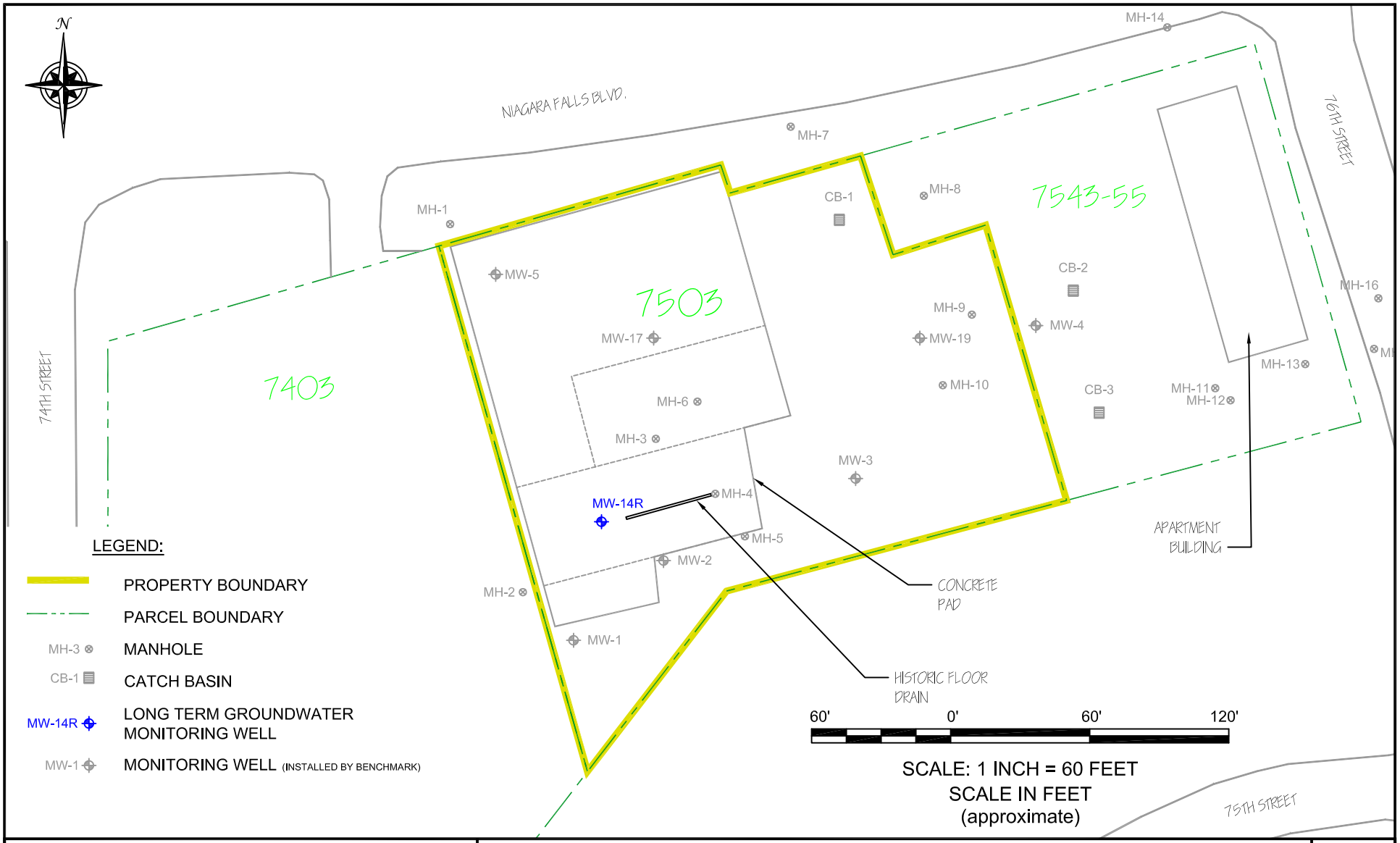

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
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PROJECT NO.: 0101-002-500

DATE: OCTOBER 2007

DRAFTED BY: AJZ

GROUNDWATER MONITORING NETWORK

LONG-TERM GROUNDWATER MONITORING PLAN

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

PREPARED FOR
GLR HOLDINGS, LLC

FIGURE 2

APPENDIX A

FIELD OPERATING PROCEDURES

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

FIELD OPERATING PROCEDURES

Groundwater Purging Procedures Prior to Sample Collection

FOP 023.0

GROUNDWATER PURGING PROCEDURES PRIOR TO SAMPLE COLLECTION

PURPOSE

This procedure describes the methods for monitoring well/piezometer purging prior to groundwater sample collection in order to collect representative groundwater samples. The goal of purging is to remove stagnant, non-representative groundwater from the well and/or prevent stagnant water from entering collected samples. Purging involves the removal of at least three to five volumes of water in wells with moderate yields and at least one well volume from wells with low yields (slow water level recovery).

Purge and sample wells in order of least-to-most contaminated (this is not necessary if dedicated or disposable equipment is used). If you do not know this order, sample the upgradient wells first, then the furthest down-gradient or side-gradient wells, and finally the wells closest to, but down-gradient of the most contaminated area. Sampling should commence immediately following purging or as soon as the well has adequately recharged and not more than 24-hours following end time of evacuation.

PROCEDURE

1. Prepare the electronic water level indicator (e-line) in accordance with the procedures referenced in the Benchmark Field Operating Procedure for Groundwater Level Measurement and decontaminate the e-line probe and a lower portion of cable following the procedures referenced in the Benchmark Field Operating Procedure for Non-disposable and Non-dedicated Sampling Equipment Decontamination. Store the e-line in a protected area until use. This may include wrapping the e-line in clean plastic until the time of use.

2. Inspect the interior and exterior of the well/piezometer for signs of vandalism or damage and record condition on the Groundwater Well Purge & Sample Collection Log and/or Groundwater Well Inspection Form (samples

attached). Specifically, inspect the integrity of the following: concrete surface seal, lock, protective casing and well cover, well riser and J-plug/cap. Report any irregular findings to the Project Manager.

3. Unlock and remove the well protective cap or cover and place on clean plastic to avoid introducing foreign material into the well.

4. Calibrate the photoionization detector (PID) in accordance with the Benchmark Field Operating Procedure for Calibration and Maintenance of Portable Photoionization Detector.

5. Monitor the well for organic vapors using a PID, as per the Work Plan. If a reading of greater than 5 ppm is recorded, the well should be allowed to vent until levels drop below 5 ppm before proceeding with purging.

6. Lower the e-line probe slowly into the monitoring well and record the initial water level in accordance with the procedures referenced in the Benchmark Field Operating Procedure for Groundwater Level Measurement.

7. Following static water level determinations, slowly lower the e-line to the bottom of the well/piezometer. Record the total depth to the nearest 0.01-foot and compare to the previous total depth measurement. If a significant discrepancy exists, re-measure the total depth. Continue with purging activities observing purge water to determine whether the well/piezometer had become silted due to inactivity or damaged (i.e., well sand within purge water). Upon confirmation of the new total depth and determination of the cause (i.e., siltation or damage), notify the Project Manager following field activities.

8. Calculate the volume of water in the well based on the water level below the top of riser and the total depth of the well using the following equation:

$$V = 0.0408[(B)^2 \times \{(A) - (C)\}]$$

Where,

A = Total Depth of Well (feet below measuring point)
B = Casing diameter (inches)
C = Static Water Level (feet below measuring point)

9. **For wells where the water level is 20 feet or less below the top of riser**, a peristaltic pump may be used to purge the well. Measure the purged volume using a calibrated container (i.e., graduated 5-gallon bucket) and record measurements on the attached Groundwater Well Development and Purge Log. Use new and dedicated tubing for each well. During the evacuation of shallow wells, the intake opening of the pump tubing should be positioned just below the surface of the water. As the water level drops, lower the tubing as needed to maintain flow. For higher yielding wells, the intake level should not be lowered past the top of the screen. Pumping from the top of the water column will ensure proper flushing of the well. Continue pumping until the required volumes are removed (typically three well volumes). For higher yielding wells, adjust the purging rate to maintain the water level above the screen. For lower yielding wells or wells where the screen straddles the water table, maintain purging at a rate that matches the rate of recovery of the well (well yield). If the well purges to dryness and is slow to recharge (greater than 15 minutes), terminate evacuation.

10. **For wells where the water level is initially below 20 feet,** or drawn down to this level because of slow recharge rate, conduct purging using one of three devices listed below:

- Bailer – A bottom filling dedicated polyethylene bailer attached to a length of dedicated hollow-braid polypropylene rope. Purging a well utilizing a bailer should be conducted smoothly and slowly as not to agitate the groundwater or damage the well.

- Well Wizard Purge Pump (or similar) – This pneumatic bladder pump uses compressed air to push water to the surface. Groundwater is not in contact with the drive air during the pumping process, therefore the pump may be used for sample collection.

- Waterra™ Pump – This manually operated pump uses dedicated polyethylene tubing and a check valve that can be used as an optional method for purging deeper wells. The pump utilizes positive pressure to evacuate the well, therefore the pump may be used for sample collection, and however over-agitation groundwater should be avoided.

Prior to use in a well, non-dedicated bailers, exterior pump bodies and pump tubing should be cleaned in accordance with the Benchmark Field Operating Procedure for Non-Disposable and Non-Dedicated Sampling Equipment Decontamination. Dedicated and/or disposable equipment should be contained within the sealed original manufacturers packaging and certified pre-cleaned by the manufacturer with a non-phosphate laboratory detergent and rinsed using de-ionized water.

8. Purging will continue until a predetermined volume of water has been removed (typically three well volumes) or to dryness. Measurements for pH, temperature, specific conductance, dissolved oxygen (optional), Eh (optional) and turbidity will be recorded following removal of each well volume. Purge the well to dryness or until the readings for indicator parameters listed above (or well-specific indicator parameters) stabilize within the following limits for each parameter measured:

Field Parameter	Stabilization Criteria
Dissolved Oxygen	± 0.3 mg/L
Turbidity	± 10 %
Specific Conductance	± 3 %
Eh	± 10 mV
PH	± 0.1 unit

Stabilization criteria presented within the project Work Plan will take precedence.

DOCUMENTATION AND SAMPLE COLLECTION

This section pertains to the documentation of collected field data during and following purging activities and sample collection.

1. Record all data including the final three stable readings for each indicator parameter on the attached Groundwater Well Purge & Sample Log.

2. Record, at a minimum, the "volume purged," "purging stop-time," "purged dry (Y/N)," "purged below sand pack (Y/N)," and any problems purging on the attached Groundwater Well Purge & Sample Log.

3. Collect groundwater samples in accordance with the Benchmark Field Operating Procedure for Groundwater Sample Collection. Record "sample flow rate" as an average, "time sample collected," and any other pertinent information related to the sampling event on the attached Groundwater Well Purge & Sample Log.

4. Restore the well to its capped/covered and locked condition.

ALTERNATIVE METHODS

Alternative purging and sampling methods and equipment, other than those described herein are acceptable if they provide representative groundwater samples. The purging and sampling method and equipment must not adversely affect sample integrity, chemistry, temperature and turbidity. In addition, alternative equipment must have minimal or no effect on groundwater geochemistry, aquifer permeability and well materials. Equipment materials must also minimize sorption and leaching. The field team is responsible for documenting

and describing any alternative equipment and procedures used to purge a well and collect samples.

ATTACHMENTS

Groundwater Well Purge & Sample Collection Log
Groundwater Well Inspection Form

REFERENCES

Benchmark FOPs:

011 Calibration and Maintenance of Portable Photoionization Detector
022 Groundwater Level Measurement
024 Groundwater Sample Collection Procedures
040 Non-disposable and Non-dedicated Sampling Equipment Decontamination

GROUNDWATER PURGING PROCEDURES PRIOR TO SAMPLE COLLECTION

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

GROUNDWATER WE
PURGE & SAMPLE COLLECTION L(

Project Name:	WELL NUMBER:
Project Number:	Sample Matrix:
Client:	Weather:

WELL DATA: DATE: | TIME:

Casing Diameter (inches):	Casing Material:
Screened interval (fbTOR):	Screen Material:
Static Water Level (fbTOR):	Bottom Depth (fbTOR):
Elevation Top of Well Riser (fmsl):	Ground Surface Elevation (fmsl):
Elevation Top of Screen (fmsl):	Stick-up (feet):

PURGING DATA: DATE: | START TIME: | END TIME:

Method:	Is purge equipement ded ed to sample location? yes
No. of Well Volumes Purged:	Was well purged to d yes
Standing Volume (gallons):	Was well purged l sand pack? yes
Volume Purged (gallons):	Condition of W
Purge Rate (gal/min):	Field Personnel:

VOLUME CALCULATION:

(A) Total Depth of Well (fbTOR):	
(B) Casing Diameter (inches):	
(C) Static Water Level (fbTOR):	
One Well Volume (V, gallons): V = 0.0408 [$(B)^2$ x { (A) - (C) }]	

* Use the table to the right to calculate one well volume by subtracting
then multiplying by the volume calculation in the table per well diamter.

e Calculation

W Diame	Volume gal/ft
	041
3	
4	0.65
	1.020
	1.469

Stabilization Criteria

eter	Criteria
pH	+/- 0.1 un
SC	+/- 3%
Turbidity	+/- 10%
DO	+/- 0.3 mg
ORP	+/- 10 mV

EVACUATION STABILIZATIO T D

Time	Water Level (fbTOR)	Accumulated Volum (gallo	pH (units)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance Odor
		initial					

SAMPLING DATA: START TIME: | END TIME:

Method:	Is sampling equipement dedicated to sample location? yes
Initial Water Level (fbTOR):	Was well sampled to dryness? yes
Final Water Level (fbTOR):	Was well sampled below top of sand pack? yes
Air Temperature (°F):	Field Personnel:
Source and type of water used in the field for QC purposes:	

PHYSICAL & CHEMICAL DATA:

DESCRIPTION OF WATER SAMPLE		
Odor		
Color		
NAPL		
Contains Sediment?	yes	no

WATER QUALITY MEASUREMENTS							
Sample	Time	pH (units)	TEMP. (°C)	SC (uS)	TURB. (NTU)	DO (ppm)	ORP (mV)
initial							
final							

REMARKS:

PREPARED BY:

SAMPLE

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

GROUNDWATER WELL INSPECTION FORM

Project:	**WELL I.D.:**
Client:	
Job No.:	
Date:	
Time:	

EXTERIOR INSPECTION

Protective Casing:
Lock:
Hinge/Lid:
Concrete Surface Seal:
Bollards:
Label/I.D.:
Other:

[illegible] INSPECTION

Well Riser:
Annular Space:
Well Cap:
Water Level (fbTOR):
Total Depth (fbTOR):
Other:

Comments/Corrective Actions:

PREPARED BY: DATE:

SAMPLE

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

FIELD OPERATING PROCEDURES

Groundwater Sample Collection Procedures

FOP 024.0

GROUNDWATER SAMPLE COLLECTION PROCEDURES

PURPOSE

This procedure describes the methods for collecting groundwater samples from monitoring wells and domestic supply wells following purging and sufficient recovery. This procedure also includes the preferred collection order in which water samples are collected based on the volatilization sensitivity or suite of analytical parameters required.

PROCEDURE

Allow approximately 3 to 10 days following well development before performing purge and sample activities at any well location. Conversely, perform sampling as soon as practical after sample purging at any time after the well has recovered sufficiently to sample, or within 24 hours after evacuation, if the well recharges slowly. If the well does not yield sufficient volume for all required laboratory analytical testing (including quality control), a decision should be made to prioritize analyses based on contaminants of concern at the site. If the well takes longer than 24 hours to recharge, the Project Manager should be consulted. The following two procedures outline sample collection activities for monitoring and domestic type wells.

Monitoring Wells

1. Purge the monitoring well in accordance with the Benchmark FOPs for Groundwater Purging Procedures Prior to Sample Collection or Low Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedures. Perform sampling as soon as practical after purging at any time after the well has recovered sufficiently to sample, or within 24 hours after evacuation, if the well recharges slowly. If the well does not yield sufficient volume for all required laboratory analytical testing (including quality control), a decision should be made to prioritize analyses based on contaminants of concern at the site. Analyses will be prioritized in the order of the parameters volatilization sensitivity. After volatile organics have been collected, field parameters

must be measured from the next sample collected. If a well takes longer than 24 hours to recharge, the Project Manager should be consulted.

2. Sampling equipment that is not disposable or dedicated to the well will be decontaminated in accordance with the Benchmark Field Operating Procedure for Non-Disposable and Non-Dedicated Sampling Equipment Decontamination.

3. Calibrate all field meters (i.e., pH/Eh, turbidity, specific conductance, dissolved oxygen, PID etc.) in accordance with the Benchmark Field Operating Procedure for Calibration and Maintenance of the specific field meter.

4. Prepare the electronic water level indicator (e-line) in accordance with the procedures referenced in the Benchmark Field Operating Procedure for Groundwater Level Measurement and decontaminate the e-line probe and a lower portion of cable following the procedures referenced in the Benchmark Field Operating Procedure for Non-disposable and Non-dedicated Sampling Equipment Decontamination. Store the e-line in a protected area until use. This may include wrapping the e-line in clean plastic until the time of use.

5. Inspect the well/piezometer for signs of vandalism or damage and record condition on the Groundwater Well Purge & Sample Collection Log (sample attached). Specifically, inspect the integrity of the following: concrete surface seal, lock, protective casing and well cover, well casing and J-plug/cap. Report any irregular findings to the Project Manager.

6. Unlock and remove the well protective cap or cover and place on clean plastic to avoid introducing foreign material into the well.

7. Calibrate the photoionization detector (PID) in accordance with the Benchmark Field Operating Procedure for Calibration and Maintenance of Portable Photoionization Detector.

8. Monitor the well for organic vapors using a PID, as per the Work Plan. If a reading of greater than 5 ppm is recorded, the well should be allowed to vent until levels drop below 5 ppm before proceeding with purging. Record PID measurements on a well-specific Groundwater Well Purge & Sample Collection Log (sample attached).

9. Lower the e-line probe slowly into the monitoring well and record the measurement on a well-specific Groundwater Well Purge & Sample Collection Log (sample attached).

10. Groundwater samples will be collected directly from the sampling valve on the flow through cell (low-flow), discharge port of a standard pump assembly (peristaltic, pneumatic, submersible, or Waterra™ pump) or bailer (stainless steel, PVC or polyethylene) into appropriate laboratory provided containers. In low-yielding wells at which the flow through cell is not used, the samples may be collected using a disposable bailer.

11. If disposable polyethylene bailers are used, the bailer should be lowered *slowly* below the surface of the water to minimize agitation and volatilization. For wells that are known to produce turbid samples (values greater than 50 NTU), the bailer should be lowered and retrieved at a rate that limits surging of the well.

12. Sampling data will be recorded on a Groundwater Well Purge & Sample Collection Log (sample attached).

13. Pre-label all sample bottles in the field using a waterproof permanent marker in accordance with the Benchmark Sample Labeling, Storage and Shipment FOP. The following information, at a minimum, should be included on the label:

    - Project Number;
    - Sample identification code (as per project specifications);
    - Date of sample collection (mm, dd, yy);
    - Time of sample collection (military time only) (hh:mm);
    - Specify "grab" or "composite" sample type;
    - Sampler initials;
    - Preservative(s) (if applicable); and
    - Analytes for analysis (if practicable).

14. Collect a separate sample of approximately 200 ml into an appropriate container prior to collecting the first and following the last groundwater sample collected to measure the following field parameters:

Parameter	Units
Dissolved Oxygen	parts per million (ppm)
Specific Conductance	μmhos/cm or μS or mS
pH	pH units
Temperature	^{o}C or ^{o}F
Turbidity	NTU
Eh (*optional*)	mV
PID VOCs (*optional*)	ppm

Record all field measurements on a Groundwater Well Purge & Sample Collection Log (sample attached).

15. Collect samples into pre-cleaned bottles provided by the analytical laboratory with the appropriate preservative(s) added based on the volatilization sensitivity or suite of analytical parameters required, as designated in the **Sample Collection Order** section below.

16. Lower the e-line probe slowly into the monitoring well and record the measurement on a well-specific Groundwater Well Purge & Sample Collection Log (sample attached).

17. The samples will be labeled, stored and shipped in accordance with the Benchmark Field Operating Procedure for Sample Labeling, Storage and Shipment Procedures.

Domestic Supply Wells

1. Calculate or estimate the volume of water in the well. It is desirable to purge at least one casing volume before sampling. This is controlled, to some extent, by the depth of the well, well yield and the rate of the existing pump. If the volume of water in the well cannot be calculated, the well should be purged continuously for no less than 15 minutes.

2. Connect a sampling tap to an accessible fitting between the well and the pressure tank where practicable. A hose will be connected to the device and the hose discharge located 25 to 50 feet away. The well will be allowed to pump until the lines and one well volume is removed. Flow rate will be measured with a container of known volume and a stopwatch.

3. Place a clean piece of polyethylene or Teflon™ tubing on the sampling port and collect the samples in the order designated below and in the sample containers supplied by the laboratory for the specified analytes. ***DO NOT*** use standard garden hose to collect samples.

4. Sampling results and measurements will be recorded on a Groundwater Well Purge & Sample Collection Log (sample attached) as described in the previous section.

5. Collect samples into pre-cleaned bottles provided by the analytical laboratory with the appropriate preservative(s) added based on the volatilization sensitivity or suite of analytical parameters required, as designated in the **Sample Collection Order** section below.

6. The samples will be labeled, stored and shipped in accordance with the Benchmark Field Operating Procedure for Sample Labeling, Storage and Shipment Procedures.

SAMPLE COLLECTION ORDER

All groundwater samples, from monitoring wells and domestic supply wells, will be collected in accordance with the following.

1. Samples will be collected preferentially in recognition of volatilization sensitivity. The preferred order of sampling if no free product is present is:

    - Field parameters
    - Volatile Organic Compounds (VOCs)
    - Purgeable organic carbons (POC)
    - Purgeable organic halogens (POH)
    - Total Organic Halogens (TOX)
    - Total Organic Carbon (TOC)

- Extractable Organic Compounds (i.e., BNAs, SVOCs, etc.)
- Total petroleum hydrocarbons (TPH) and oil and grease
- PCBs and pesticides
- Total metals (Dissolved Metals)
- Total Phenolic Compounds
- Cyanide
- Sulfate and Chloride
- Turbidity
- Nitrate (as Nitrogen) and Ammonia
- Preserved inorganics
- Radionuclides
- Unpreserved inorganics
- Bacteria
- Field parameters

2. Document the sampling procedures and related information in the Project Field Book and on a Groundwater Well Purge & Sample Collection Log (sample attached).

DOCUMENTATION

The three words used to ensure adequate documentation for groundwater sampling are accountability, controllability, and traceability. Accountability is undertaken in the sampling plan and answers the questions who, what, where, when, and why to assure that the sampling effort meets its goals. Controllability refers to checks (including QA/QC) used to ensure that the procedures used are those specified in the sampling plan. Traceability is documentation of what was done, when it was done, how it was done, and by whom it was done, and is found in the field forms, Project Field Book, and chain-of-custody forms. At a minimum, adequate documentation of the sampling conducted in the field consists of an entry in the Project Field Book (with sewn binding), field data sheets for each well, and a chain-of-custody form.

As a general rule, if one is not sure whether the information is necessary, it should nevertheless be recorded, as it is impossible to over-document one's fieldwork. Years may go by before the documentation comes under close scrutiny, so the documentation must be capable of defending the sampling effort without the assistance or translation of the sampling crew.

The minimum information to be recorded daily with an indelible pen in the Project Field Book and/or field data sheets includes date and time(s), name of the facility, name(s) of the sampling crew, site conditions, the wells sampled, a description of how the sample shipment was handled, and a QA/QC summary. After the last entry for the day in the Project Field Book, the Field Team Leader should sign the bottom of the page under the last entry and then draw a line across the page directly under the signature.

PRECAUTIONS/RECOMMENDATIONS

The following precautions should be adhered to prior to and during sample collection activities:

- Field vehicles should be parked downwind (to avoid potential sample contamination concerns) at a minimum of 15 feet from the well and the engine turned off prior to PID vapor analysis and VOC sample collection.

- Ambient odors, vehicle exhaust, precipitation, or windy/dusty conditions can potentially interfere with obtaining representative samples. These conditions should be minimized and should be recorded in the field notes. Shield sample bottles from strong winds, rain, and dust when being filled.

- The outlet from the sampling device should discharge below the top of the sample's air/water interface, when possible. The sampling plan should specify how the samples will be transferred from the sample collection device to the sample container to minimize sample alterations.

- The order of sampling should be from the least contaminated to the most contaminated well to reduce the potential for cross contamination of sampling equipment (see the Sampling Plan or Work Plan).

- Samples should not be transferred from one sampling container to another.

- Sampling equipment must not be placed on the ground, because the ground may be contaminated and soil contains trace metals. Equipment and supplies should be removed from the field vehicle only when needed.

- Smoking and eating should not be allowed until the well is sampled and hands are washed with soap and water, due to safety and possibly sample contamination concerns. These activities should be conducted beyond a 15-foot radius of the well.

- No heat-producing or electrical instruments should be within 15 feet of the well, unless they are intrinsically safe, prior to PID vapor analysis.

- Minimize the amount of time that the sample containers remain open.

- Do not touch the inside of sample bottles or the groundwater sample as it enters the bottle. Disposable gloves may be a source of phthalates, which could be introduced into groundwater samples if the gloves contact the sample.

- Sampling personnel should use a new pair of disposable gloves for each well sampled to reduce the potential for exposure of the sampling personnel to contaminants and to reduce sample cross contamination. In addition, sampling personnel should change disposable gloves between purging and sampling operations at the same well.

- Sampling personnel should not use perfume, insect repellent, hand lotion, etc., when taking groundwater samples. If insect repellent must be used, then sampling personnel should not allow samples or sampling equipment to contact the repellent, and it should be noted in the documentation that insect repellent was used.

- Complete the documentation of the well. A completed assemblage of paperwork for a sampling event includes the completed field forms, entries in the Project Field Book (with a sewn binding), transportation documentation (if required), and possibly chain-of-custody forms.

ATTACHMENTS

Groundwater Well Purge & Sample Collection Log (sample)

REFERENCES

1. Wilson, Neal. *Soil Water and Ground Water Sampling*, 1995

Benchmark FOPs:

007 Calibration and Maintenance of Portable Dissolved Oxygen Meter
008 Calibration and Maintenance of Portable Field pH/Eh Meter
009 Calibration and Maintenance of Portable Field Turbidity Meter
011 Calibration and Maintenance of Portable Photoionization Detector
012 Calibration and Maintenance of Portable Specific Conductance Meter
022 Groundwater Level Measurement
023 Groundwater Purging Procedures Prior to Sample Collection (optional)
031 Low Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedures (optional)
040 Non-Disposable and Non-Dedicated Sampling Equipment Decontamination
046 Sample Labeling, Storage and Shipment Procedures

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

GROUNDWATER WE
PURGE & SAMPLE COLLECTION L

Project Name:	WELL NUMBER:
Project Number:	Sample Matrix:
Client:	Weather:

WELL DATA: DATE: TIME:

Casing Diameter (inches):	Casing Material:
Screened interval (fbTOR):	Screen Material:
Static Water Level (fbTOR):	Bottom Depth (fbTOR):
Elevation Top of Well Riser (fmsl):	Ground Surface Elevation (fmsl):
Elevation Top of Screen (fmsl):	Stick-up (feet):

PURGING DATA: DATE: START TIME: END TIME:

Method:	Is purge equipement dedicated to sample location? yes
No. of Well Volumes Purged:	Was well purged to dry yes
Standing Volume (gallons):	Was well purged bel nd pack? yes
Volume Purged (gallons):	Condition of We
Purge Rate (gal/min):	Field Personne

VOLUME CALCULATION:

(A) Total Depth of Well (fbTOR):	
(B) Casing Diameter (inches):	
(C) Static Water Level (fbTOR):	
One Well Volume (V, gallons):	
$V = 0.0408 [(B)^2 \times \{ (A) - (C) \}]$	

* Use the table to the right to calculate one well volume by subtracting C f
then multiplying by the volume calculation in the table per well diamet

Volume Calculation

Dia	Volume gal/ft
1"	0.041
	163
4	
	1.02
	1.469

Stabilization Criteria

ter	Criteria
pH	+/- 0.1 un
SC	+/- 3%
Turbidity	+/- 10%
DO	+/- 0.3 m
ORP	+/- 10 mV

EVACUATION STABILIZATIO EST

Time	Water Level (fbTOR)	Accumulated Volume (gallons	pH (units)	cific nce	urbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance Odor
		initial						

SAMPLING DATA: DATE: START TIME: END TIME:

Method:	Is sampling equipement dedicated to sample location? yes
Initial Water Level (fbTOR):	Was well sampled to dryness? yes
Final Water Level (fbTOR):	Was well sampled below top of sand pack? yes
Air Temperature (°F):	Field Personnel:
Source and type of water used in the field for QC purposes:	

PHYSICAL & CHEMICAL DATA:

DESCRIPTION OF WATER SAMPLE		
Odor		
Color		
NAPL		
Contains Sediment?	yes	no

WATER QUALITY MEASUREMENTS							
Sample	Time	pH (units)	TEMP. (°C)	SC (uS)	TURB. (NTU)	DO (ppm)	ORP (mV)
initial							
final							

REMARKS:

PREPARED BY:

SAMPLE

ATTACHMENT A3

ENVIRONMENTAL INSPECTION FORM

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

Environmental Inspection Form
Operation, Monitoring, & Maintenance Plan

Property Name:		Project No.:	
Client:			
Property Address:		City, State:	Zip Code:
Property ID: (Tax Assessment Map)	Section:	Block:	Lot(s):
Preparer's Name:		Date/Time:	

CERTIFICATION

The results of this inspection were discussed with the owner and/or owner's representative. Any corrective actions required have been identified and noted in this report, and a supplemental Corrective Action Form has been completed. Proper implementation of these corrective actions have been discussed with the owner, agreed upon, and scheduled.

Preparer / Inspector: **Date:**

Signature: _____

Next Scheduled Inspection Date: _____

Final Surface Cover / Vegetation

In accordance with the Soil/Fill Management Plan, the integrity of the vegetative soil cover or other surface coverage (e.g., asphalt, concrete) over the entire Site must be maintained. The following documents the condition of the above.

1. Final Cover is in Place and in good condition?	☐ yes	☐ no	☐ N/A
Cover consists of (mainly): _____			
2. Evidence of erosion?	☐ yes	☐ no	☐ N/A
3. Cracks visible in pavement?	☐ yes	☐ no	☐ N/A
4. Evidence of distressed vegetation/turf?	☐ yes	☐ no	☐ N/A
5. Evidence of unintended traffic and/or rutting?	☐ yes	☐ no	☐ N/A
6. Evidence of uneven settlement and/or ponding?	☐ yes	☐ no	☐ N/A
7. Damage to any surface coverage?	☐ yes	☐ no	☐ N/A

If yes to any question above, please provide more information below.

Environmental Inspection Form
Operation, Monitoring, & Maintenance Plan

Property Use Changes / Site Development

Has the property usage changed, or site been redeveloped since the last inspection?

☐ yes ☐ no ☐ N/A

If so, please list with date: _____

Active Sub-Slab Depressurization (ASD) System

Is there an ASD present on-site?

yes no N/A

If yes, is it currently operating?

yes no N/A

Is the ASD annual inspection checklist completed and enclosed?

yes no N/A

Long-Term Ground Water Monitoring ☐ ☐ ☐

Is there a plan in place and currently being followed?

☐ yes ☐ no ☐ N/A

Are the wells currently intact and operational?

☐ yes ☐ no ☐ N/A

When was the most recent sampling event report and submittal? Date: _____

When is the next projected sampling event? Date: _____

New Information

Has any new information been brought to the owner/engineer's attention regarding any and/or all engineering and institutional controls and their operation and effectiveness?

☐ yes ☐ no ☐ N/A

Comments: _____

This space for Notes and Comments

Please include the following Attachments:

1. Site Sketch
2. Photographs

ATTACHMENT A4

CORRECTIVE ACTION CERTIFICATION

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

Corrective Action Certification
Operation, Monitoring, & Maintenance Plan

Property Name:		Project No.:	
Client:			
Property Address:		City, State:	Zip Code:
Property ID: (Tax Assessment Map)	Section:	Block:	Lot(s):
Preparer's Name:		Date/Time:	

Issue Addressed

The Environmental Inspection of the above property determined the need for corrective action. This form has been completed to document the required corrective action and it's implementation.

Description of Site Issue identified during Environmental Inspection (include sketch & photographs):

Corrective Action Taken

Date Completed:

Describe Action Taken (include sketch & photographs):

Certification of Implementation

The signatory hereby certifies that the corrective action as described in this form has been completed in accordance with all relevant requirements of the Soil/Fill Management Plan and other applicable documents.

Preparer / Inspector: **Date:**

Signature:

Please verify inclusion of the following Attachments:

1. Site Sketch
2. Photographs

ATTACHMENT A5

NYSDEC INSTITUTIONAL AND ENGINEERING CONTROLS CERTIFICATION FORM

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. C932126

Site Name 7503 Niagara Falls Boulevard Site

Site Address: 7503 Niagara Falls Boulevard Zip Code: 14302

City/Town: Niagara Falls

County: Niagara

Current Use: Vacant

Intended Use: Commercial – fast food restaurant with parking

Verification of Site Details	**Box 2** YES	NO
1. Are the Site Details above, correct?	☐	☐
If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4. Has a change-of-use occurred since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NO. C932126 **Box 3**

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	□	□
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	□	□
3. Groundwater monitoring as specified in the SMP:	□	□
4. Operation and maintenance of the ASD system as specified in the SMP:	□	□

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems over the Site:	□	□

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NO. C932126

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification | Stamp (if Required) | Date

Enclosure 2

Certification of Institutional Controls/ Engineering Controls (ICs/ECs)
Step-by-Step Instructions, Certification Requirements and Definitions

The Owner, or Remedial Party, and when necessary, a Professional Engineer (P.E.), or the Qualified Environmental Professional (QEP), must review and complete the IC/EC Certification Form, sign the IC/EC Certifications Signature Page, and return it, along with the Periodic Review Report (PRR), within 45 days of the date of this notice.

Please use the following instructions to complete the IC/EC Certification.

I. Verification of Site Details (Box 1 and Box 2):

Answer the six questions in the Verification of Site Details Section. Questions 5 and 6 refer to only sites in the Brownfield Cleanup Program. ECL Section 27-1415-7(c) is included in **IV. IC/EC Certification Requirements**. The Owner and/or your P.E. or QEP may include handwritten changes and/or other supporting documentation, as necessary.

II. Verification of Institutional / Engineering Controls (Box 3 and Box 4)

Review the listed Institutional / Engineering Controls, confirming that all existing controls are listed, and that all existing controls are still applicable. If there is a control that is no longer applicable the Owner / Remedial Party is to petition the Department requesting approval to remove the control.

2. Select "YES" or "NO" for **Control Certification** for each IC/EC, based on Sections (a)-(e) of the **Control Certification Statement**.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. If the Department has any questions or concerns regarding the completion of the certification, the Project Manager will contact you.

3. If you cannot certify "Yes" for each Control, please continue to complete the remainder of this **Control Certification** form. Attach supporting documentation that explains why the **Control Certification** cannot be rendered, as well as a statement of proposed corrective measures, and an associated schedule for completing the corrective measures. Note that this **Control Certification** form must be submitted even if an IC or EC cannot be certified; however, the certification process will not be considered complete until corrective action is conducted.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. Once the corrective measures are complete a new Periodic Review Report (with IC/EC Certification) is to be submitted within 45 days to the Department. If the Department has any questions or concerns regarding the PRR and/or completion of the IC/EC Certification, the Project Manager will contact you.

III. IC/EC Certification by Signature (Box 5 and Box 6):

1. If you certified "Yes" for each Control, please complete and sign the IC/EC Certifications page. To determine WHO signs the **IC/EC Certification,** please use Table 1. Signature Requirements for the IC/EC Certification, which follows.

Table 1. Signature Requirements for Control Certification Page

Type of Control	Example of IC/EC	Required Signatures
IC only	Environmental Easement Deed Restriction.	A site or property owner or remedial party.
IC with an EC which does not include a treatment system or engineered caps.	Fence, Clean Soil Cover, Individual House Water Treatment System, Vapor Mitigation System	A site or property owner or remedial party, and a QEP. (P.E. license not required)
IC with an EC that includes treatment system or an engineered cap.	Pump & Treat System providing hydraulic control of a plume, Part 360 Cap.	A site or property owner or remedial party, and a QEP with a P.E. license.

IV. IC/EC Certification Requirements:

Division of Environmental Remediation Program Policy requires periodic certification of IC(s) and EC(s) as follows:

For Environmental Restoration Projects: N.Y. Envtl Conserv.Law Section 56-0503 (Environmental restoration projects; state assistance)

For State Superfund Projects: Envtl Conserv.Law Section 27-1318. (Institutional and engineering controls)

For Brownfields Cleanup Program Projects: Envtl Conserv.Law Section 27-1415. (Remedial program requirements)

Envtl Conserv.Law Section 27-1415-7(c) states:

(c) At non-significant threat sites where contaminants in groundwater at the site boundary contravene drinking water standards, such certification shall also certify that no new information has come to the owner's attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid. Every five years the owner at such sites shall certify that the assumptions made in the qualitative exposure assessment remain valid. The requirement to provide such certifications may be terminated by a written determination by the Commissioner in consultation with the Commissioner of Health, after notice to the parties on the brownfield site contact list and a public comment period of thirty days.

Voluntary Cleanup Program: Applicable program guidance.

Petroleum Remediation Program: Applicable program guidance.

Federal Brownfields: Applicable program guidance.

Manufactured Gas Plant Projects: Applicable program guidance (including non-registry listed MGPs).

WHERE to mail the signed Certification Form by Thursday, May 24, 2007 (45 days of the date of the notice):

New York State Department of Environmental Conservation
Division of Environmental Remediation

Attn: Division of Environmental Remediation – North Section
NYSDEC
270 Michigan Avenue
Buffalo, NY 14203-2999

Please note that extra postage may be required.

V. Definitions

"Engineering Control" (EC), means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.

"Institutional Control" (IC), means any non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial site.

"Professional Engineer" (P.E.) means an individual or firm licensed or otherwise authorized under article 145 of the Education Law of the State of New York to practice engineering.

"Property Owner" means, for purposes of an IC/EC certification, the actual owner of a property. If the site has multiple properties with different owners, the Department requires that the owners be represented by a single representative to sign the certification.

"Oversight Document" means any document the Department issues pursuant to each Remedial Program (see below) to define the role of a person participating in the investigation and/or remediation of a site or area(s) of concern. Examples for the various programs are as follows:

BCP (after approval of the BCP application by DEC) - Brownfield Site Cleanup Agreement.
ERP (after approval of the ERP application by DEC) - State Assistance Contract.
Federal Superfund Sites - Federal Consent Decrees, Administrative Orders on Consent or Unilateral Orders issued pursuant to CERCLA.
Oil Spill Program - Order on Consent, or Stipulation pursuant to Article 12 of the Navigation Law (and the New York Environmental Conservation Law).
State Superfund Program - Administrative Consent Order, Record of Decision.
VCP (after approval of the VCP application by DEC) - Voluntary Cleanup Agreement.
RCRA Corrective Action Sites- Federal Consent Decrees, Administrative Orders on Consent or permit conditions issued pursuant to RCRA.

“Qualified Environmental Professional” (QEP), means a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas, sufficient to meet the objectives and performance factors for the areas of practice identified by this Part. Such a person must:

(1) hold a current professional engineer’s or a professional geologist’s license or registration issued by the State or another state, and have the equivalent of three years of full-time relevant experience in site investigation and remediation of the type detailed in this Part; or

(2) be a site remediation professional licensed or certified by the federal government, a state or a recognized accrediting agency, to perform investigation or remediation tasks consistent with Department guidance, and have the equivalent of three years of full-time relevant experience.

“Qualitative Exposure Assessment” means a qualitative assessment to determine the route, intensity, frequency, and duration of actual or potential exposures of humans and/or fish and wildlife to contaminants.

“Remedial Party” means a person implementing a remedial program at a remedial site pursuant to an order, agreement or State assistance contract with the Department.

“Site Management” (SM) means the activities undertaken as the last phase of the remedial program at a site, which continue after a Certificate of Completion is issued. Site management is conducted in accordance with a site management plan, which identifies and implements the institutional and engineering controls required for a site, as well as any necessary monitoring and/or operation and maintenance of the remedy.

“Site Management Plan” (SMP) means a document which details the steps necessary to assure that the institutional and engineering controls required for a site are in-place, and any physical components of the remedy are operated, maintained and monitored to assure their continued effectiveness, developed pursuant to Section 6 (DER10 Technical Guide).

“Site Owner” means the actual owner of a site. If the site has multiple owners of multiple properties with ICs and/or ECs, the Department requires that the owners designate a single representative for IC/EC Certification activities.

PART II

SOIL / FILL MANAGEMENT PLAN

SITE MANAGEMENT PLAN
PART II

SOIL/FILL MANAGEMENT PLAN FOR BROWNFIELD CLEANUP PROGRAM

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

November 2007 0101-002-500

Prepared for:

GLR Holdings, LLC

Prepared by:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

SOIL/FILL MANAGEMENT PLAN

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SOIL/FILL MANAGEMENT PLAN

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1.0 INTRODUCTION

1.1 Background and History

The 7503 Niagara Falls Boulevard Site encompasses approximately 0.89 acres of vacant land along Niagara Falls Boulevard in the City of Niagara Falls, New York (see Figure 1). As shown on Figure 2, the property is generally bounded by Niagara Falls Boulevard to the north, a vacant lot and apartment buildings to the east (i.e., 7543-7555 Niagara Falls Blvd owned by GLR), private residences to the south, and commercial (fast-food restaurant) property to the west (i.e., 7403 Niagara Falls Blvd.).

GLR is redeveloping the 7503 Niagara Falls Boulevard Site and the east adjacent parcel addressed at 7543-7555 Niagara Falls Boulevard as a fast food restaurant. The 7503 Niagara Falls Boulevard Site is subject to the BCP, while 7543-7555 Niagara Falls Blvd is not. For purposes of this Soil/Fill Management Plan (SFMP), reference to the Site from this point forward refers only to the 7503 Niagara Falls Boulevard parcel.

Beginning in the late 1960s and continuing through the mid-1990s, the Site was occupied by several commercial establishments. These included various restaurants, auto parts sales and auto repair facilities. The property has been vacant since approximately 1998.

1.2 Environmental Investigations and Remedial Efforts

The nature and distribution of chemical constituents in soil/fill and groundwater at the Site and adjacent site were described during the following six historic investigations (Refs. 1-6):

- July 2004 Phase I Environmental Site Assessment (ESA) conducted by GZA GeoEnvironmental (GZA).
- September 2004 Subsurface Phase II Environmental Assessment conducted by Nature's Way Environmental Consultants and Contractors (NWEC&C).
- May 2005 Focused Phase II Type Environmental Investigation conducted by NWEC&C.
- August 2005 Downgradient Groundwater Characterization study conducted by Benchmark.

- October 2005 Supplemental Site Characterization Adjacent to Site study conducted by Benchmark.

- October 2006 BCP Remedial Investigation (RI) conducted by Benchmark.

Based on the results of the 2006 RI data and previous investigations, it was determined that groundwater and saturated soils were impacted by chlorinated VOCs (cVOCs) in to two discrete areas (see Figure 3). Although the previous investigations completed by others reported soil/fill exceedances of cVOCs on-site, historic soil samples were collected within the saturated zone. Since these samples did represent unsaturated soil/fill impacts, the impacted soil/fill was addressed via a groundwater remediation approach. As such, an Interim Remedial Measure (IRM) was completed in November 2006 and consisted of injecting Hydrogen Release Compounds (HRC) into the groundwater at those two discrete areas, as described in the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) approved IRM Work Plan, dated October 2006 (Ref. 7). Subsequent to HRC injection, groundwater monitoring was completed at sampling locations MW-14 and MW-19 to monitor the concentrations of cVOCs. Concentrations of cVOCs significantly decreased at both monitoring locations subsequent to HRC injection, as compared to baseline cVOCs concentrations and three subsequent groundwater monitoring events. cVOCs were also detected in soil gas samples collected on-site. As such, an active sub-slab depressurization (ASD) system will be installed in the planned building.

1.3 Purpose and Scope

The purpose of this SFMP is to protect both the environment and human health during redevelopment of the Site and subsequent to completion of Brownfield Cleanup activities.

While assessments of surface and subsurface soil/fill and groundwater at the Site have already been performed, subsurface information is never 100 percent complete or accurate, especially on a site with a long and diverse history. As such, it is not unreasonable to anticipate the possibility that some quantity of impacted subsurface soil/fill may be encountered following completion of the IRM activities. In particular, soil/fill impacts may be encountered during development activities such as infrastructure construction (i.e., roads, waterline, sewers, electric cable, etc.) or foundation excavation and site grading.

Compliance with this SFMP is required to properly manage any impacted subsurface soil/fill encountered during redevelopment activities at the Site. This SFMP was developed with the express purpose of addressing unknown subsurface impacts if and when encountered. The SFMP also facilitates the transfer of responsibilities with property ownership.

This SFMP provides protocols for the proper handling of Site soil/fill during development activities, including:

- Excavation, grading, sampling and handling of Site soils.
- Acceptability of soil/fill from off-site sources for backfill or subgrade fill.
- Erosion and dust control measures.
- Fencing and other access controls.
- Health and safety procedures for subsurface construction work and the protection of the surrounding community.
- Acceptability and placement of final cover.
- Deed restrictions.
- BCP responsibilities.
- Notification and reporting requirements.

1.4 Soil/Fill Management Program Responsibility

As the developer and property owner, GLR Holdings, LLC will be responsible for all monitoring, implementing, and reporting requirements of this Plan. GLR Holdings (or subsequent owners) will not perform, nor contract/permit their employees, agents, or assigns to perform any excavations or disturbance of Site soils, except as delineated in this Plan. The property owner(s) or their agents will be responsible for proper notification and reporting to regulatory agencies (i.e., NYSDEC Region 9, Division of Environmental Remediation and NYS Department of Health) before and after Site redevelopment as described in Section 2.9 of this Plan. As an environmental easement will be in place at the Site, the NYSDEC may provide periodic monitoring of construction activities during Site redevelopment to verify adherence to the requirements of this SFMP.

2.0 SOIL/FILL MANAGEMENT

2.1 Excavation and Handling of On-Site Soil/Fill

Saturated soil/fill at the Site was characterized as impacted with cVOCs. The known and suspected cVOC saturated soil/fill hot spots were addressed with HRC injection as discussed in Section 1.2. If suspect impacted materials are encountered during Site redevelopment by GLR Holdings or during future excavation work on the Site (excluding minor landscaping maintenance), Benchmark Environmental Engineering & Science, PLLC personnel or an environmental professional with experience in environmental site remediation and the NYSDEC will inspect soil/fill excavations or disturbances on behalf of the property owner.

If the suspect soil/fill is visibly stained, discolored, or produces elevated PID readings (i.e., sustained readings of 5 ppm above background or greater), NYSDEC will be contacted and the excavation will be advanced to remove the impacted soils, to the extent feasible. The soil/fill as well as the excavation sidewalls and floor will be inspected for staining or discoloration, and will be field screened for the presence of VOCs with a photoionization detector (PID). A MiniRae 2000 PID equipped with a 10.6 eV lamp, or other appropriate instrument(s), will be calibrated as per the manufacturer's requirements. Benchmark's field operating procedure (FOP) for PID screening is included in Appendix A.

Impacted material, if encountered, will be placed on plastic sheeting in an area away from the primary work activities, and covered to prevent the infiltration of precipitation and wind erosion. The impacted material will be sampled to determine whether it is subject to special disposal/reuse requirements[1]. The on-site storage of stockpiled material will be limited to 90 days due to potential hazardous waste storage requirement concerns.

Sampling and analyses to verify excavation limits and analysis for disposal purposes will be in accordance with the protocols delineated in Section 2.3 of this Plan.

[1] The presence of subsurface construction and demolition debris, such as brick, concrete, wood, miscellaneous metal products, etc. does not necessitate stockpiling in accordance with this SFMP.

2.2 Subgrade Backfill Material

2.2.1 Use Criteria

Subgrade material used to backfill excavations or to increase Site grades or elevations may be comprised of excavated on-site soil/fill or off-site soil/fill. The criteria under which these materials may be used as subgrade backfill are presented below.

- **Excavated, On-Site Soil/Fill:** Soil/fill that is excavated from the Site, including soils excavated for the purpose of accessing impacted soils (e.g., shallow soils overlying deeper impacted soils) may be used on-site as subgrade backfill provided the analytical results meet the NYSDEC Part 375 restricted-commercial Soil Cleanup Objectives (SCOs). On-site soils that exhibit visible or olfactory evidence of contamination, or elevated PID readings (i.e., >5 ppm) shall be staged on plastic sheeting or in roll-off containers covered with plastic sheeting while awaiting analytical results. Soil that does not exhibit evidence of staining, discoloration or elevated PID readings will not require special handling.

- **Off-Site Soil/Fill:** Off-site soil/fill material will be documented as having originated from locations having no evidence of disposal or releases of hazardous, toxic, or radioactive substances, or petroleum products. The soil/fill material must be tested and meet the criteria identified on Table 1. In addition, no off-site materials meeting the definition of a solid waste as defined in 6 NYCRR, Part 360-1.2 (a) shall be used as backfill.

2.2.2 Borrow Source Sampling Requirements

If an off-site soil/fill borrow source is of unknown origin or originates from a commercial, industrial or urban site, then it must be tested to meet the criteria identified on Table 1. A tiered approach based on the volume of borrow source material imported will be used to determine the frequency of characterization sampling. A minimum of one sample will be collected for each 250 cubic yards (CY) up to 1,000 CY of material excavated. If more than 1,000 CY of borrow source material from the same general vicinity is utilized and all samples of the first 1,000 CY meet the criteria listed in Table 1, the sample collection frequency may be reduced to one sample for each additional 1,000 CY of borrow source material from the same general vicinity, up to 5,000 CY. For borrow sources greater than

5,000 CY, sampling frequency may be reduced to one sample per 5,000 CY, provided all earlier samples met Table 1 criteria.

Grab samples will be collected for VOC analysis. For all other analyses, a minimum of four grab samples will be collected per composite sample. Approximately equal aliquots of the grab samples will be composited in the field using a stainless steel trowel and bowl. The trowel and bowl shall be decontaminated with a non-phosphate detergent (i.e., Alconox®) and potable water wash solution followed by a distilled water rinse between sampling locations. The soil/fill samples will be analyzed in accordance with USEPA SW-846 Methodology by a NYSDOH ELAP-certified laboratory.

2.3 Soil/Fill Sampling and Analysis Protocol

Excavated soil/fill that is designated for off-site disposal (i.e., soil/fill that exhibits evidence of staining, discoloration or elevated PID readings as described in Section 2.1 of this plan) shall be sampled in accordance with the requirements of the off-site disposal facility and the appropriate regulatory authorities. In addition, the resulting excavation following removal of impacted soil/fill will require verification sampling and analysis to determine the limits of impact. Both characterization and verification sampling and analysis are discussed in the following sections.

2.3.1 Impacted Soil/Fill Characterization

The following procedure represents a suggested method for determining off-site disposal requirements for impacted soil/fill designated for off-site disposal. The sampling procedures, frequency, and parameter list must be coordinated with the off-site disposal facility before undertaking characterization work.

Excavated soil/fill should be separately stockpiled in 250 CY or smaller piles. A single grab sample will be collected from each stockpile, with the grab biased toward the zone displaying the most elevated field PID reading. If the stockpiles are from a single source area, sampling may be reduced to one sample per 1,000 CY following receipt of data from four 250 CY stockpiles.

The grab samples will be analyzed by a NYSDOH ELAP-certified laboratory for Target Compound List (TCL) VOCs. If the results are below the concentrations in Table 1, the soil can be re-used on-site. If the analysis of the soil/fill samples reveals concentrations

of VOCs greater than the concentrations in Table 1, then a duplicate sample will be analyzed by the Toxicity Characteristic Leaching Procedure (TCLP) method determine the appropriate off-site disposal method. If TCLP hazardous waste characteristic values are exceeded, the soil/fill will be disposed in a permitted hazardous waste disposal facility. If TCLP analytical results are below hazardous waste characteristic values, the soil/fill will be disposed off-site in a permitted sanitary landfill.

2.3.2 Verification Sampling

Verification sampling will be performed on the excavation sidewalls and bottom of the excavation after lateral and vertical excavation limits have been achieved and visibly impacted soil/fill has been removed. Lateral and vertical excavation will continue until NYSDEC Part 375 restricted-commercial SCOs are met, or NYSDEC agrees that no further excavation is required. All field decisions concerning the limits of excavation shall be approved by the NYSDEC site representative. In general, one sidewall sample will be collected on each of the four sides of the excavation and one sample will be collected from the bottom of the excavation. The samples will be collected by retrieving a discrete sample from across the excavation face. The backhoe bucket will be used to assist in sample collection and avoid the need for confined space entry. For excavations having lengths greater than 100 feet, an additional discrete sample will be collected for each additional 100 feet of excavation length. Verification samples will be analyzed for TCL VOCs in accordance with NYSDEC SW-846 Methodology with a 48-hour turnaround time. The laboratory will be required to furnish an equivalent ASP Category B deliverables package to facilitate data evaluation by a third-party validation expert.

2.4 Groundwater Management

Water removed from excavations during redevelopment will be pumped into a holding tank and tested to determine whether treatment is necessary prior to discharge. In general, water removed from excavations will be stored/settled in a portable steel tank (Baker Open/Closed Top Tank or equivalent) and analyzed for TCL VOCs. If elevated concentrations of VOCs are present, the water will be pumped through a bag or cartridge filter prior to treatment using granular activated carbon (GAC). If treatment is required, two GAC vessels will be plumbed in series to allow for organic breakthrough monitoring

between the lead and lag vessels. Upon completion of excavation work, settled solids remaining in the tank and spent filter bags will be containerized for off-site disposal. Spent GAC will be characterized (TCLP VOC testing) and regenerated off-site, or disposed at a permitted TSDF in accordance with applicable federal and state regulations. The tank will be decontaminated via pressure washing. The property owner or general contractor will coordinate with the City of Niagara Falls to obtain any necessary temporary discharge permits.

2.5 Erosion Controls

An important element of soil/fill management on this Site is the mitigation and control of surface erosion from stormwater runoff. For this reason a Master Erosion Control Plan to be used by all owners/developers has been developed and incorporated as Appendix B of this Plan.

2.6 Dust Controls

Particulate monitoring will be performed continuously at downwind locations of the Site if excavation and handling of impacted soil/fill is necessary. If required, such monitoring activities will be conducted in accordance with the generic Community Air Monitoring Plan, presented as Appendix C. Dust suppression techniques will be employed as necessary to mitigate fugitive dust from unvegetated or disturbed soil/fill during post-remediation construction and redevelopment. Techniques to be used include one or more of the following:

- Applying water on haul roads.
- Wetting equipment and excavation faces.
- Spraying water on buckets during excavation and dumping.
- Hauling materials in properly tarped containers or vehicles.
- Restricting vehicle speeds on-site.
- Covering excavated areas and materials after excavation activity ceases.
- Reducing the excavation size and/or number of excavations.

All reasonable attempts will be made to keep visible and/or fugitive dust to a minimum.

2.7 Fencing, Access Control, and Signage

Temporary fencing shall be erected and maintained as necessary by the property owner as remediation/redevelopment proceeds to control access to open excavations and construction areas. Temporary fencing will be relocated by the property owner(s) as necessary as development proceeds. Construction fencing and warning symbols (i.e., construction cones and flags) and signage will be erected around the site to alert the general public to the on-going remediation activities.

2.8 Property Use Limitations

Requirements for surface coverage over the Site (building, asphalt or criteria of Table 1) and limitations placed on the type of buildings to be constructed will be enforced through the issuance of building permits by the City of Niagara Falls. The City has zoned the Site for commercial, office, and light industrial use. Commercial use includes retail and wholesale establishments (e.g., shoe stores, gasoline service stations, food stores, etc.) while light industrial use includes manufacturing, warehousing, storing, etc. The zoning specifically prohibits residential use. An environmental easement restricting the use of and contact with Site groundwater and soil will be recorded with the county. The environmental easement will be binding for the current property owner and all subsequent property owners and occupants.

2.9 Notification and Reporting Requirements

The NYSDEC and NYSDOH will be notified that subgrade activities are being initiated a minimum of 5 working days in advance of construction. A NY State Licensed P.E. or his designated representative shall inspect all subsurface excavation work for conformance with this SFMP.

The site Owner shall complete and submit to the NYSDEC an annual report by January 15 of each year. Such annual report shall contain certification that: the institutional and/or engineering controls put in place are still in place, have not been altered and are still effective; the remedy and protective cover have been maintained; and the conditions at the site are fully protective of public health and the environment. If sub-grade excavation activities are completed during the year covered by the Annual Report, the owner shall include a certification that all work was performed in conformance with the SFMP.

3.0 HEALTH AND SAFETY PROCEDURES

During redevelopment activities, the developer shall be responsible for implementing suitable procedures to prevent both site construction workers and the community from adverse exposure to residual parameters of concern and other potential hazards posed by the redevelopment work. This will be accomplished through adherence to a written, parcel-specific worker Health and Safety Plan (HASP), prepared in accordance with the regulations contained in OSHA 29CFR 1910.120 and the NYSDOH Generic CAMP (see Appendix C).

Although Brownfield Cleanup remedial measures are anticipated to reduce the potential for encountering parameters of concern above SCOs, the redevelopment activities governed by this SFMP are a required element of the BCA for the Site. Thus, 29 CFR 1910.120(a)(1)(iii) indicates that these activities are subject to OSHA's hazardous waste operations and emergency response (Hazwopper) standard. This includes the requirement for preparation and implementation of a site-specific worker Health and Safety Plan addressing the following items:

- A safety and health or hazard analysis for each site task and operation.
- Employee training requirements.
- Personal protective equipment (PPE) to be used by employees for the site tasks.
- Medical surveillance requirements.
- Frequency and type of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of equipment.
- Site control measures.
- Decontamination procedures.
- An emergency response plan.
- Confined space entry procedures.
- A spill containment program.

As an integral component of the worker HASP, the developer or site owner will be responsible for implementing a CAMP designed to prevent the surrounding community from adverse exposures due to potential release/migration of airborne particulates or vapors. The community as referenced herein includes potential receptors located off-site (e.g., neighboring residents or businesses) as well as on-site receptors not directly involved in redevelopment activities (e.g., contractors occupying the site prior to final redevelopment). The CAMP will be implemented during redevelopment work involving disturbance or handling of impacted soil/fill (see Appendix C).

4.0 REFERENCES

1. *Phase I Environmental Site Assessment (ESA),* prepared by GZA GeoEnvironmental (GZA) July, 2004.

2. *Subsurface Phase II Environmental Assessment at Vacant Property located at 7503 Niagara Falls Boulevard, Niagara Falls, New York*, prepared by Nature's Way Environmental Consultants & Contractors, Inc., September 20, 2004.

3. *Focused Phase II Type Environmental Investigation of Vacant Property located at 7503-75555 Niagara Falls Boulevard, Niagara Falls, New York*, prepared by Nature's Way Environmental Consultants & Contractors, Inc., May 18, 2005.

4. *Downgradient Groundwater Characterization Letter Report at 7503 Niagara Falls Boulevard, Niagara Falls, New York*, prepared by Benchmark Environmental Engineering & Science, PLLC, August 11, 2005.

5. *Supplemental Site Characterization Adjacent to Site Study, Niagara Falls, New York,* prepared by Benchmark Environmental Engineering & Science, PLLC, October, 2005.

6. *Remedial Investigation (RI) Report, 7503 Niagara Falls Boulevard Site*, *Niagara Falls, New York*, prepared by Benchmark Environmental Engineering & Science, PLLC, October, 2006.

7. *Interim Remedial Measures (IRM) Work Plan for Brownfield Cleanup Program, 7503 Niagara Falls Boulevard Site*, *Niagara Falls, New York*, prepared by Benchmark Environmental Engineering & Science, PLLC, October, 2006.

TABLES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

CRITERIA FOR USE OF OFF-SITE SOIL

Soil/Fill Management Plan
7503 Niagara Falls Boulevard Site
Niagara Falls, New York

Parameter	TRACK 2 Restricted-Commercial or Industrial SCOs
Volatile Organic Compounds (mg/kg)	
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethene	0.33
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02
1,2-Dichloroethene(cis)	0.25
1,2-Dichloroethene(trans)	0.19
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane	0.1
Acetone	0.05
Benzene	0.06
Butylbenzene	12
Carbon tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
Ethylbenzene	1
Hexachlorobenzene	3.2
Methyl ethyl ketone	0.12
Methyl tert-butyl ether	0.93
Methylene chloride	0.05
Propylbenzene-n	3.9
Sec-Butylbenzene	11
Tert-Butylbenzene	5.9
Tetrachloroethene	1.3
Toluene	0.7
Trichloroethene	0.47

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

CRITERIA FOR USE OF OFF-SITE SOIL

Soil/Fill Management Plan
7503 Niagara Falls Boulevard Site
Niagara Falls, New York

Parameter	TRACK 2 Restricted-Commercial or Industrial SCOs
Volatile Organic Compounds (mg/kg)	
Trimethylbenzene-1,2,4	3.6
Trimethylbenzene-1,3,5	8.4
Vinyl chloride	0.02
Xylene (mixed)	1.6
Semi-Volatile Organic Compounds (mg/kg)	
Acenaphthene	98
Acenaphthylene	107
Anthracene	500
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1.7
Benzo(g,h,i)perylene	500
Benzo(k)fluoranthene	1.7
Chrysene	1
Dibenz(a,h)anthracene	0.56
Fluoranthene	500
Fluorene	386
Indeno(1,2,3-cd)pyrene	5.6
m-Cresol(s)	0.33
Naphthalene	12
o-Cresol(s)	0.33
p-Cresol(s)	0.33
Pentachlorophenol	0.8
Phenanthrene	500
Phenol	0.33
Pyrene	500

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

CRITERIA FOR USE OF OFF-SITE SOIL

Soil/Fill Management Plan
7503 Niagara Falls Boulevard Site
Niagara Falls, New York

Parameter	TRACK 2 Restricted-Commercial or Industrial SCOs
Metals (mg/kg)	
Arsenic	16
Barium	400
Beryllium	47
Cadmium	7.5
Chromium, Hexavalent[1]	19
Chromium, Trivalent[1]	1500
Copper	270
Cyanide	27
Lead	450
Manganese	2000
Mercury (total)	0.73
Nickel	130
Selenium	4
Silver	8.3
Zinc	2480
PCBs/Pesticides (mg/kg)	
2,4,5-TP Acid (Silvex)	3.8
4,4'-DDE	17
4,4'-DDT	47
4,4'-DDD	14
Aldrin	0.19
Alpha-BHC	0.02
Beta-BHC	0.09
Chlordane (alpha)	2.9
Delta-BHC	0.25
Dibenzofuran	210
Dieldrin	0.1
Endosulfan I	102

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

CRITERIA FOR USE OF OFF-SITE SOIL

Soil/Fill Management Plan
7503 Niagara Falls Boulevard Site
Niagara Falls, New York

Parameter	TRACK 2 Restricted-Commercial or Industrial SCOs
PCBs/Pesticides (mg/kg)	
Endosulfan II	102
Endosulfan sulfate	200
Endrin	0.06
Heptachlor	0.38
Lindane	0.1
Polychlorinated biphenyls	1

Notes:

1. The SCO for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the specific SCO for Hexavalent Chromium.

FIGURES

FIGURE 1

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0101-002-500

DATE: OCTOBER 2007

DRAFTED BY: AJZ

SITE LOCATION AND VICINITY MAP

SOIL / FILL MANAGEMENT PLAN

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

PREPARED FOR
GLR HOLDINGS, LLC

FILEPATH=F:\CAD\Benchmark\GLR Holdings - Wendy's\Final Engineering Report\Soil-Fill Management Plan\figure 1; site location and vicinity map.dwg

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BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0101-002-500

DATE: OCTOBER 2007

DRAFTED BY: AJZ

FILEPATH:

SITE MAP

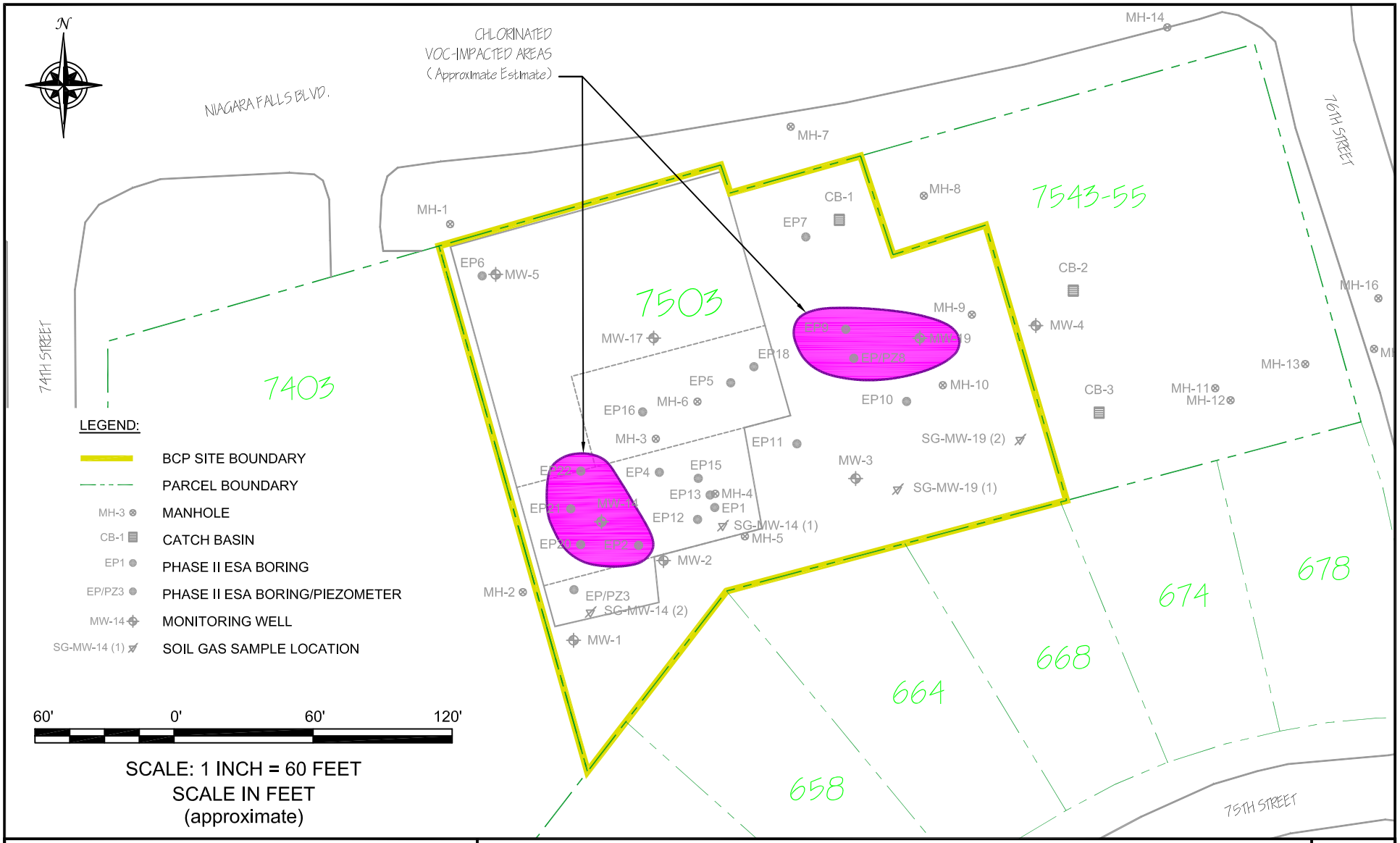
SOIL / FILL MANAGEMENT PLAN

7503 - 7555 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

PREPARED FOR
GLR HOLDINGS, LLC

FIGURE 2

F:\CAD\Benchmark\GLR Holdings - Wendy's\Final Engineering Report\Soil-Fill Management Plan\Figure 3; Site Plan.dwg, 10/29/2007 3:20:14 PM



BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0101-002-500

DATE: OCTOBER 2007

DRAFTED BY: AJZ

CHLORINATED VOC IMPACTED AREAS

SOIL / FILL MANAGEMENT PLAN

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

PREPARED FOR
GLR HOLDINGS, LLC

FIGURE 3

APPENDIX A

FIELD OPERATING PROCEDURES

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

FIELD OPERATING PROCEDURES

Screening of Soil Samples for Organic Vapors During Impacted Soil Removal Activities

FOP 048.0

SCREENING OF SOIL SAMPLES FOR ORGANIC VAPORS DURING IMPACTED SOIL REMOVAL ACTIVITIES

PURPOSE

This procedure is used to screen soil samples for the presence of volatile organic constituents (VOCs) using a field organic vapor meter. The field meter should either be a photoionization detector (PID) or flame-ionization detector (FID) type. This type of screening is generally performed during underground storage tank (UST) and/or impacted soil removal activities as a procedure for ensuring the health and safety of the community and personnel at the site as well as to identify potential VOC-impacted soil samples for laboratory analysis (i.e., confirmatory or verification samples). Soil samples are also screened in the field to provide assessment criteria to determine horizontal and vertical extents of VOC-impacts in order to ensure soils that may have been impacted by volatile organic substances are removed.

PROCEDURE

1. Calibrate air-monitoring equipment in accordance with the appropriate Benchmark's Field Operating Procedures or manufacturers recommendations for calibration of field meters.

2. Perform community air monitoring in accordance with the Project Work Plan and/or Benchmark's FOP: Real-Time Air Monitoring During Intrusive Activities.

3. Upon proper removal of any identified UST in accordance with NYSDEC Division of Environmental Remediation, Spill Response Unit or Bulk Storage Unit guidelines and/or Benchmark's FOP: Underground Storage Tank Removal Procedures; examine the four sidewalls and bottom of the excavation for visually impacted (i.e., stained) soils.

4. If visually impacted soils are identified, direct the excavating equipment operator to scrape the impacted area (i.e., sidewall or bottom of the excavation) and present the scraped soil for evaluation. NOTE: Under no circumstances should anyone enter an excavation greater than 4 feet in depth, unless absolutely necessary. Excavation entry may only occur under strict confined space entry procedures following implementation of specific engineering controls (i.e., continuous air monitoring, excavation shoring, trench box installation, benching).

5. Visually inspect and perform an open air PID/FID scan of the scraped soil sample noting stratification, visible staining, or other evidence of impact (i.e., presence of non-aqueous phase liquid, NAPL).

6. Collect a representative sample (approximately 100 milligrams (mg)) of soil using a decontaminated or dedicated stainless steel sampling tool (i.e., spoon, spatula, scoop, or approved equivalent), for field headspace determination of VOC-impact. Place the representative soil sample into a labeled wide-mouth glass jar approximately ½ to ¾ full and seal with aluminum foil and a screw top cap. Alternatively, the soil sample may be placed into a clean, re-sealable plastic bag and sealed. Be sure to leave adequate headspace above the soil sample within either sealed container.

7. Place the field screening sample (i.e., jar or bag) in a location where the ambient temperature is at least 70^{o} Fahrenheit for at least 15 minutes, but no more than 60 minutes.

8. Carefully remove the screw top cap from the jar and slowly insert the tip of the organic vapor meter (PID or FID) through the aluminum foil seal making the smallest hole possible. Alternatively, unseal a portion of the plastic bag just big enough to insert the probe of a calibrated PID.

9. Record the depth, sample location (i.e., sidewall, bottom) and <u>maximum</u> reading in parts per million by volume (ppmv) in the Project Field Book and Impacted Soil Excavation Log (sample attached), at the depth interval corresponding to the depth of sample collection.

10. The representative soil samples collected from the excavation will be used to assess the vertical and horizontal limits of VOC-impact and guide the impacted soil removal activities in accordance with project requirements (i.e., PID scans less than 20 ppm will not require removal unless laboratory analytical results exceed regulatory limits).

11. Collect verification/confirmation samples in accordance with NYSDEC Division of Environmental Remediation, Spill Response Unit or Bulk Storage Unit guidelines and/or Benchmark's FOP: Surface and Subsurface Soil Sampling Procedures.

ATTACHMENTS

Impacted Soil Excavation Log (sample)

REFERENCES

Benchmark FOPs:

010 *Calibration and Maintenance of Portable Flame Ionization Detector*
011 *Calibration and Maintenance of Portable Photoionization Detector*
063 *Surface and Subsurface Soil Sampling Procedures*
073 *Real-Time Air Monitoring During Intrusive Activities*
074 *Underground Storage Tank Removal Procedures*

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

IMPACTED SOIL EXCAVATION LOG

Project:	EXCAVATION I.D.:
Project No.:	Excavation Date:
Client:	Excavation Method:
Location:	CQA Observer:

Excavation Location: *NOT TO SCALE* *(approximate)*	Excavation Cross Section: Grade - 0', 2', 4', 6', 8', 10', 12', 14', 16', 18', 20'

TIME		
Start:	Length:	(approx.)
End:	Width:	(approx.)
	Depth:	(approx.)

Verification Sample I.D.	Depth (fbgs)	Location Within Excavation (sidewall/bottom)	PID Scan (ppm)	PID Headspace (ppm)	Photos Y / N	

COMMENTS:

UST ENCOUNTERED:	☐ yes	☐ no	If yes, Describe (type, material, size, capacity etc.):
GROUNDWATER ENCOUNTERED:	☐ yes	☐ no	If yes, depth to GW:
VISUAL IMPACTS:	☐ yes	☐ no	Describe:
OLFACTORY OBSERVATIONS:	☐ yes	☐ no	Describe:
NON-NATIVE FILL ENCOUNTERED:	☐ yes	☐ no	
OTHER OBSERVATIONS:	☐ yes	☐ no	Describe:
QUANTITY OF IMPACTED SOIL REMOVED:			
FINAL DESTINATION OF IMPACTED SOIL:			
TYPE OF BACKFILL:			
SURFACE COMPLETION:			

SAMPLE

APPENDIX B

MASTER EROSION CONTROL PLAN (MECP)

SOIL/FILL MANAGEMENT PLAN
APPENDIX B

MASTER EROSION CONTROL PLAN (MECP)

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

SITE NO. C932126

November 2007 0101-002-500

Prepared for:

GLR Holdings, LLC

Prepared by:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

MASTER EROSION CONTROL PLAN

TABLE OF CONTENTS

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 Background and History

The 7503 Niagara Falls Boulevard Site encompasses approximately 0.89 acres of vacant land along Niagara Falls Boulevard in the City of Niagara Falls, New York (see Figure 1 of the SFMP). As shown on Figure 2 of the SFMP, the property is generally bounded by Niagara Falls Boulevard to the north, a vacant lot to the east (i.e., 7543-7555 Niagara Falls Blvd owned by GLR), private residences to the south, and commercial (fast-food restaurant) property to the west (i.e., 7403 Niagara Falls Blvd.). A concrete slab remnant from a former building foundation is present across the majority of the western portion of the property. The remainder of the Site is generally covered by asphalt.

GLR is redeveloping the 7503 Niagara Falls Boulevard Site and the east adjacent parcel addressed at 7543-7555 Niagara Falls Boulevard as a fast food restaurant. The 7503 Niagara Falls Boulevard Site is subject to the BCP, while 7543-7555 Niagara Falls Blvd is not. For purposes of this Soil/Fill Management Plan (SFMP) reference to the Site from this point forward refers only to 7503 Niagara Falls Boulevard parcel.

Beginning in the late 1960s and continuing through the mid-1990s, the Site was occupied by several commercial establishments. These included various restaurants, auto parts sales and auto repair facilities. The property has been vacant since approximately 1998.

1.2 Purpose and Scope

The Soil/Fill Management Plan (SFMP) describes protocols for the proper handling of Site soil/fill during redevelopment activities. The property owner at the time of development will be responsible for all monitoring, implementing, and reporting requirements of the SFMP.

Since erosion control will be a critical component of preventing the potential migration of contaminants onto developed property or off-site during development of the Site, this Master Erosion Control Plan (MECP) was prepared to provide guidance to developers during build-out activities on the property. This MECP is a critical component

of the SFMP. This document is generic in nature and provides minimum erosion control practices to be used by site owners and/or developers.

2.0 GENERAL PERMIT REQUIREMENTS

Redevelopment of the Site will be in accordance with the SFMP and Brownfield Cleanup Agreement (BCA). Since development activities at the Site will not disturb more than five acres of land, the Federal Water Pollution Control Act (as amended, 33 U.S.C. 1251 et. seq.) and the New York State Environmental Conservation Law (Article 17, Titles 7 and 8, and Article 70) do not apply.

3.0 POTENTIAL EROSION CONTROL CONCERNS

Potential areas and items of concern during Site redevelopment activities include the following:

- Remediated areas or off-site properties adjacent to unremediated parcels need protection so they do not become impacted by Site operations.
- Storm water inlets will require protective measures to limit sediment transfer to storm sewers.
- Runoff from soil stockpiles will require erosion controls.
- Surface slopes need to be minimized as much as practical to control sediment transfer.
- Soil/fill excavated during development will require proper handling and disposal.

4.0 EROSION CONTROL MEASURES

4.1 Background

Standard soil conservation practices need to be incorporated into the construction and development plans to mitigate soil erosion damage, off-site sediment migration, and water pollution from erosion. These practices combine vegetative and structural measures, many of which will be permanent in nature and become part of the completed project (i.e., drainage channels and grading). Other measures will be temporary and serve only during the construction stage. Selected erosion and sediment control measures will meet the following criteria:

- Minimize erosion through project design (max. slopes, phased construction, etc.).
- Incorporate temporary and permanent erosion control measures.
- Remove sediment from sediment-laden storm water before it leaves the Site.

4.2 Temporary Measures

Temporary erosion and sedimentation control measures and facilities will be used during construction. They will be installed by the site developer and will be maintained until they are either no longer needed or until such time as permanent measures are installed and become effective. Erosion and sediment controls shall be installed in accordance with the standards and specifications presented in Appendix B-1. At a minimum, the following temporary measures will be used:

- Silt fencing
- Straw/hay bales
- Temporary vegetation/mulching
- Temporary sedimentation basins
- Cautious placement, compaction and grading of stockpiles

4.2.1 Silt Fencing

Construction and regrading activities will result in surface water flow to drainage ditches and swales, storm sewers, and adjacent properties. Silt fencing will be the primary sediment control measure used in these areas. Prior to extensive soil excavation or grading

activities, silt fences will be installed along the perimeter of all construction areas. The orientation of the fencing will be adjusted as necessary as the work proceeds to accommodate changing Site conditions.

Intermediate fencing will be used upgradient of the perimeter fencing to help lower surface water runoff velocities and reduce the volume of sediment to perimeter fencing. Stockpiles (if any) will also be surrounded with silt fencing.

As sediment collects, the silt fences will be cleaned as necessary to maintain their integrity. Removed sediment will be used elsewhere on-site as general fill. All perimeter silt fences will remain in place until construction activities in an area are completed and vegetative cover has been established.

4.2.2 Straw and/or Hay Bales

Straw and/or hay bales will be used to intercept sediment laden storm water runoff in drainage channels during construction. The use of either hay or straw will be based on the availability of materials at the time of construction.

Bales will be placed in swales and ditches where the anticipated flow velocity is not expected to be greater than 5 feet/second (fps). Intermediate bales will be placed upgradient of the final barrier to reduce flow velocities and sediment loadings where higher velocities are anticipated.

As with silt fencing, sediment will be removed as necessary from behind the bales and disposed of on-site. Bales that have become laden with sediment or that have lost their structural integrity or effectiveness due to the weather will be replaced.

4.2.3 Cautious Placement of Stockpiles

As development occurs, excavation activities may produce stockpiles of soil and subgrade soil/fill materials. Careful placement and construction of stockpiles will be required to control erosion. Stockpiles will be placed no closer than fifty feet from storm water inlets and parcel boundaries, if feasible. Additionally, stockpiles will be graded and compacted as necessary for positive surface water runoff and dust control. Impacted stockpiles will be underlain and covered with secured polyethylene tarpaulin until proper disposal has been secured.

4.3 Permanent Control Measures During Site Redevelopment

Permanent erosion and sedimentation control measures and structures will be installed as soon as practical during construction for long-term erosion protection. Since the detailed development approach for the site has not been determined, specific design features are yet to be selected. Examples of permanent erosion control measures could include:

- Using maximum slopes in erosion prone areas to limit erosion.
- Minimizing the potential contact with, and migration of, impacted subsurface soil/fill through the placement of a "clean" soil in all areas not covered with structures, roads, parking areas, sidewalks, etc.
- Planting and maintaining vegetation.
- Limiting runoff flow velocities to the extent practical.
- Lining collection channels with riprap, erosion control fabric, vegetation, or similar materials.

5.0 CONSTRUCTION MANAGEMENT PRACTICES

5.1 General

The following general construction practices should be evaluated for erosion and sedimentation control purposes during site development activities:

- Clearing and grading only as much area as is necessary to accommodate the construction needs to minimize disturbance of areas subject to erosion (i.e. phasing the work).
- Covering exposed or disturbed areas of the site as quickly as practical.
- Installing erosion and sediment control measures before disturbing the site subgrade.
- Minimizing on-site and off-site tracking of soil by vehicles using routine entry/ exit routes.

5.2 Monitoring, Inspection, and Maintenance Plan

All erosion and sedimentation controls described in this Plan will be inspected by a qualified representative of the site developer within 24 hours of a heavy rainfall event and repaired or modified as necessary to effectively control erosion of turbidity problems. Inspections should include areas under construction, stockpile areas, erosion control devices (i.e., silt fences, hay bales, etc.) and locations where vehicles enter and leave the site. Routine inspections of the entire site should also be made on a monthly basis during development.

If inspections indicate problems, corrective measures should be implemented within 24 hours. A report summarizing the scope of the inspection, name of the inspector, date, observations made, and a description of the corrective actions taken should be completed. Examples of inspection forms to be completed are included in Appendix B-2.

APPENDIX B-1

EROSION CONTROL DETAILS

- *Temporary Critical Area Plantings*
- *Mulching*
- *Temporary Swale*
- *Perimeter Dike/Swale*
- *Straw Bale Dike*
- *Silt Fence*
- *Sediment Trap*

New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

New York State Standards and Specifications for Erosion and Sediment Control

August 2005

New York State
Department of Environmental Conservation

George E. Pataki, Governor

STANDARD AND SPECIFICATIONS FOR TEMPORARY CRITICAL AREA PLANTINGS

Definition

Providing erosion control protection to a critical area for an interim period. A critical area is any disturbed, denuded slope subject to erosion.

Purpose

To provide temporary erosion and sediment control. Temporary control is achieved by covering all bare ground areas that exist as a result of construction or a natural event.

Conditions Where Practice Applies

Temporary seedings may be necessary on construction sites to protect an area, or section, where final grading is complete, when preparing for winter work shutdown, or to provide cover when permanent seedings are likely to fail due to mid-summer heat and drought. The intent is to provide temporary protective cover during temporary shutdown of construction and/or while waiting for optimal planting time.

Criteria

Water management practices must be installed as appropriate for site conditions. The area must be rough graded and slopes physically stable. Large debris and rocks are usually removed. Seedbed must be seeded within 24 hours of disturbance or scarification of the soil surface will be necessary prior to seeding.

Fertilizer or lime are not typically used for temporary seedings.

IF: Spring or summer or early fall, then seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb./1000 sq. ft. or use 1 lb./1000 sq. ft.).
IF: Late fall or early winter, then seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs./1000 sq. ft.).

Any seeding method may be used that will provide uniform application of seed to the area and result in relatively good soil to seed contact.

Mulch the area with hay or straw at 2 tons/acre (approx. 90 lbs./1000 sq. ft. or 2 bales). Quality of hay or straw mulch allowable will be determined based on long term use and visual concerns. Mulch anchoring will be required where wind or areas of concentrated water are of concern. Wood fiber hydromulch or other sprayable products approved for erosion control (nylon web or mesh) may be used if applied according to manufacturers' specification. Caution is advised when using nylon or other synthetic products. They may be difficult to remove prior to final seeding.

STANDARD AND SPECIFICATIONS FOR MULCHING

Definition

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface.

Purpose

The primary purpose is to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch is also used alone for temporary stabilization in non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/ acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Table 3.7
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7”	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2”	9 cu. yds.	405 cu. yds.	3”	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/ yd. 60-90 lbs./roll	48” x 50 yds. or 48” x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	8” x 100” 2-sided plastic, 48” x 180” 1-sided plastic	—	—	Use without additional mulch. Excellent for seeding establishment. Tie down as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Compost	Up to 3” pieces, moderately to highly stable	3-9 cu. yds.	134-402 cu. yds.	1-3”	Coarser textured mulches may be more effective in reducing weed growth and wind erosion.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 3.8
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR TEMPORARY SWALE

Definition

A temporary excavated drainage way.

Purpose

The purpose of a temporary swale is to prevent runoff from entering disturbed areas by intercepting and diverting it to a stabilized outlet or to intercept sediment laden water and divert it to a sediment trapping device.

Conditions Where Practice Applies

Temporary swales are constructed:

1. to divert flows from entering a disturbed area.

2. intermittently across disturbed areas to shorten overland flow distances.

3. to direct sediment laden water along the base of slopes to a trapping device.

4. to transport offsite flows across disturbed areas such as rights-of-way.

Swales collecting runoff from disturbed areas shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.2 on page 5A.5 for details.

	Swale A	Swale B
Drainage Area	<5 Ac	5-10 Ac
Bottom Width of Flow Channel	4 ft	6 ft
Depth of Flow Channel	1 ft	1 ft
Side Slopes	2:1 or flatter	2:1 or flatter
Grade	0.5% Min. 20% Max.	0.5% Min. 20% Max.

For drainage areas larger than 10 acres, refer to the Standard and Specification for Waterways on page 5B.11.

Stabilization

Stabilization of the swale shall be completed within 7 days of installation in accordance with the appropriate standard and specifications for vegetative stabilization or stabilization with mulch as determined by the time of year. The flow channel shall be stabilized as per the following criteria:

Type of Treatment	Channel Grade[1]	Flow Channel A (<5 Ac.)	Flow Channel B (5-10 Ac)
1	0.5-3.0%	Seed & Straw Mulch	Seed & Straw Mulch
2	3.1-5.0%	Seed & Straw Mulch	Seed and cover with RECP, Sod, or lined with plastic or 2 in. stone
3	5.1-8.0%	Seed and cover with RECP, Sod, or line with plastic or 2 in. stone	Line with 4-8 in. or stone or Recycled Concrete Equivalent[2] or geotextile
4	8.1-20%	Line with 4-8 in. stone or Recycled Concrete Equivalent[2] or geotextile	Site Specific Engineering Design

[1] In highly erodible soils, as defined by the local approving agency, refer to the next higher slope grade for type of stabilization.
[2] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

Outlet

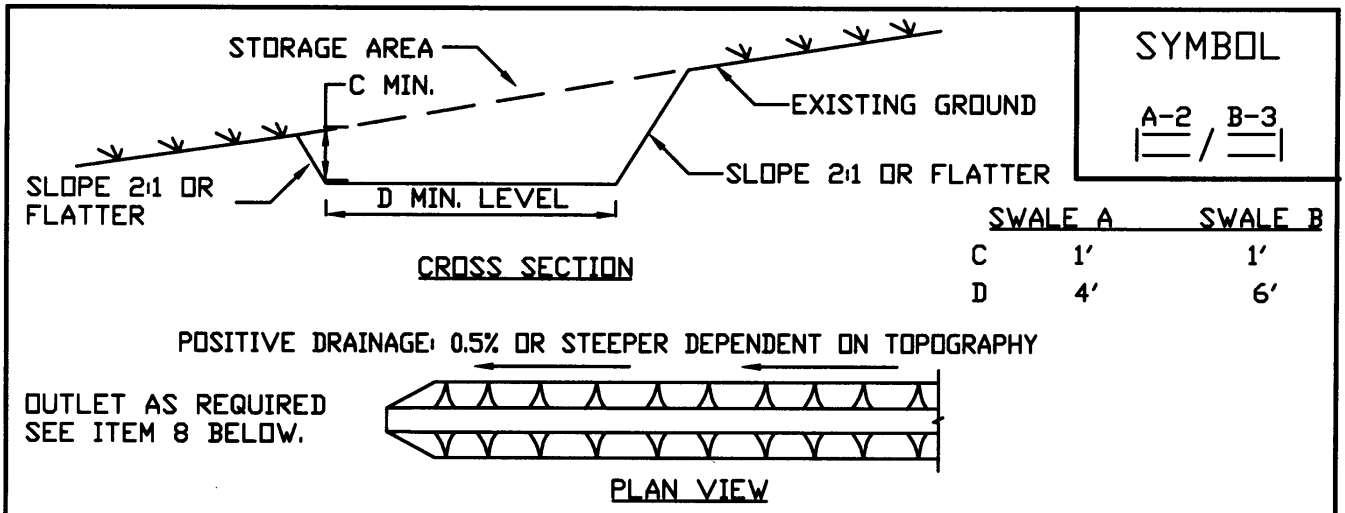
Swale shall have an outlet that functions with a minimum of erosion, and dissipates runoff velocity prior to discharge off the site.

Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin until the drainage area above the swale is adequately stabilized.

The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet condition.

If a swale is used to divert clean water flows from entering a disturbed area, a sediment trapping device may not be needed.

Figure 5A.2
Temporary Swale



CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED FOR CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE FLOW CHANNEL STABILIZATION CHART BELOW:

TYPE OF TREATMENT	CHANNEL GRADE	A(5 AC. OR LESS)	B(5 AC -10AC)
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED AND COVER USING RECP
3	5.1-8.0%	SEED AND COVER WITH RECP	LINED WITH 4-8" RIP-RAP OR GEOTEXTILE
4	8.1-20.%	LINED WITH 4-8" RIP-RAP OR GEOTEXTILE	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

TEMPORARY SWALE

STANDARD AND SPECIFICATIONS FOR PERIMETER DIKE/SWALE

Definition

A temporary ridge of soil excavated from an adjoining swale located along the perimeter of the site or disturbed area.

Purpose

The purpose of a perimeter dike/swale is to prevent off site storm runoff from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area.

Conditions Where Practice Applies

Perimeter dike/swale is constructed to divert flows from entering a disturbed area, or along tops of slopes to prevent flows from eroding the slope, or along base of slopes to direct sediment laden flows to a trapping device.

The perimeter dike/swale shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.3 on page 5A.8 for details.

The perimeter dike/swale shall not be constructed outside the property lines without obtaining legal easements from affected adjacent property owners. A design is not required for perimeter dike/swale. The following criteria shall be used:

Drainage area – Less than 2 acres (for drainage areas larger than 2 acres but less than 10 acres, see earth dike or temporary swale; for drainage areas larger than 10 acres, see standard and specifications for diversion).

Height – 18 inches minimum from bottom of swale to top of dike evenly divided between dike height and swale depth.

Bottom width of dike – 2 feet minimum.

Width of swale – 2 feet minimum.

Grade – Dependent upon topography, but shall have positive drainage (sufficient grade to drain) to an adequate outlet. Maximum allowable grade not to exceed 8 percent.

Stabilization – The disturbed area of the dike and swale shall be stabilized within 7 days of installation, in accordance with the standard and specifications for temporary swales.

Outlet

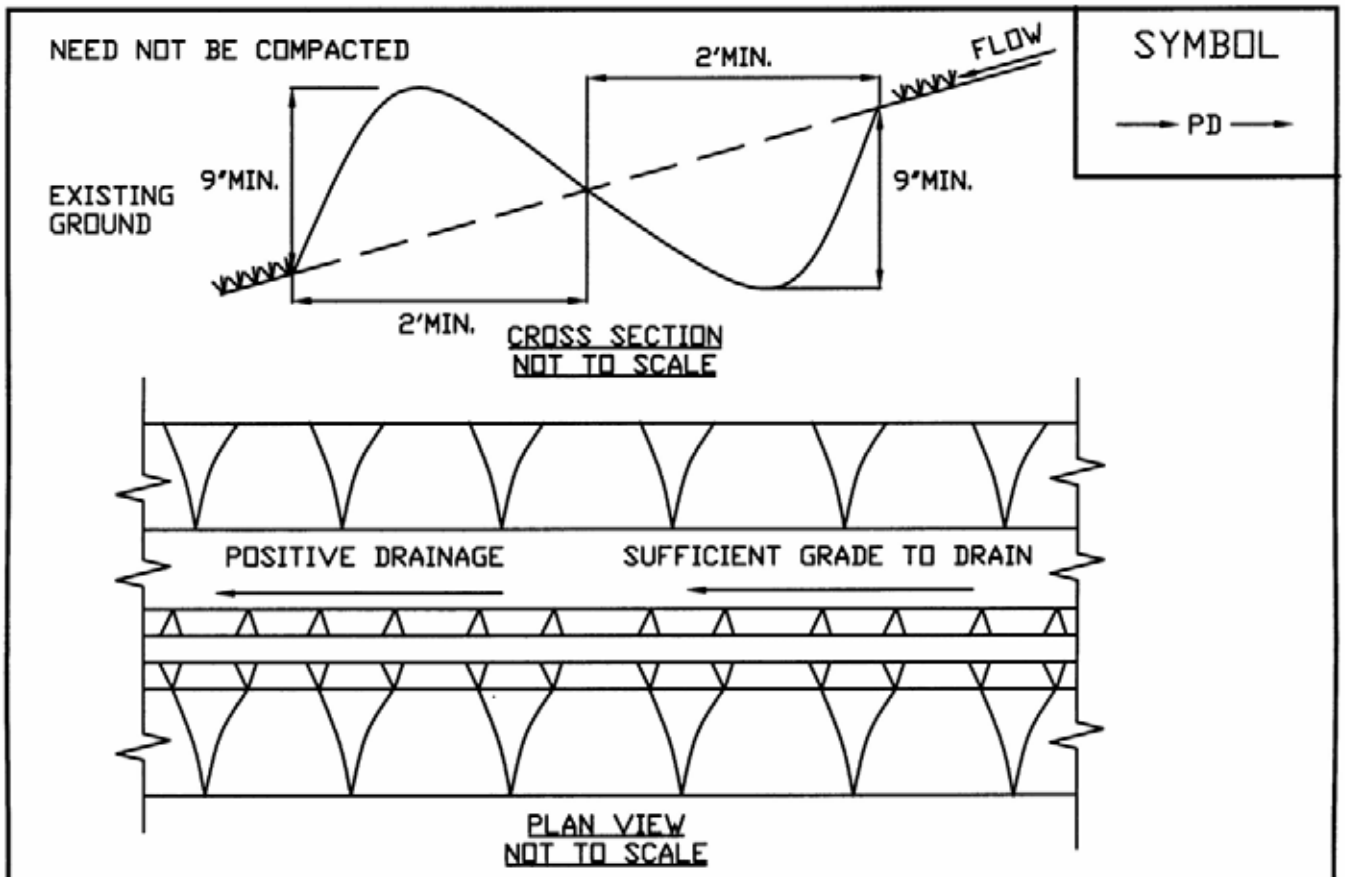
1. Perimeter dike/swale shall have a stabilized outlet.

2. Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.

3. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment trap, sediment basin, or to an area protected by any of these practices.

4. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

Figure 5A.3
Perimeter Dike/Swale



CONSTRUCTION SPECIFICATIONS

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSION VELOCITY.
4. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE STANDARD.
5. STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATIONS FOR TEMPORARY SEEDING AND MULCHING, AND SHALL BE DONE WITHIN 10 DAYS.
6. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

MAX. DRAINAGE AREA LIMIT: 2 ACRES

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

PERIMETER DIKE OR SWALE

STANDARD AND SPECIFICATIONS FOR STRAW BALE DIKE

Definition

A temporary barrier of straw, or similar material, used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a bale dike is to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes have an estimated design life of three (3) months.

Conditions Where Practice Applies

The straw bale dike is used where:

1. No other practice is feasible.
2. There is no concentration of water in a channel or other drainage way above the barrier.
3. Erosion would occur in the form of sheet erosion.
4. Length of slope above the straw bale dike does not exceed these limits.

Constructed Slope	Percent Slope	Slope Length (ft.)
2:1	50	25
3:1	33	50
4:1	25	75

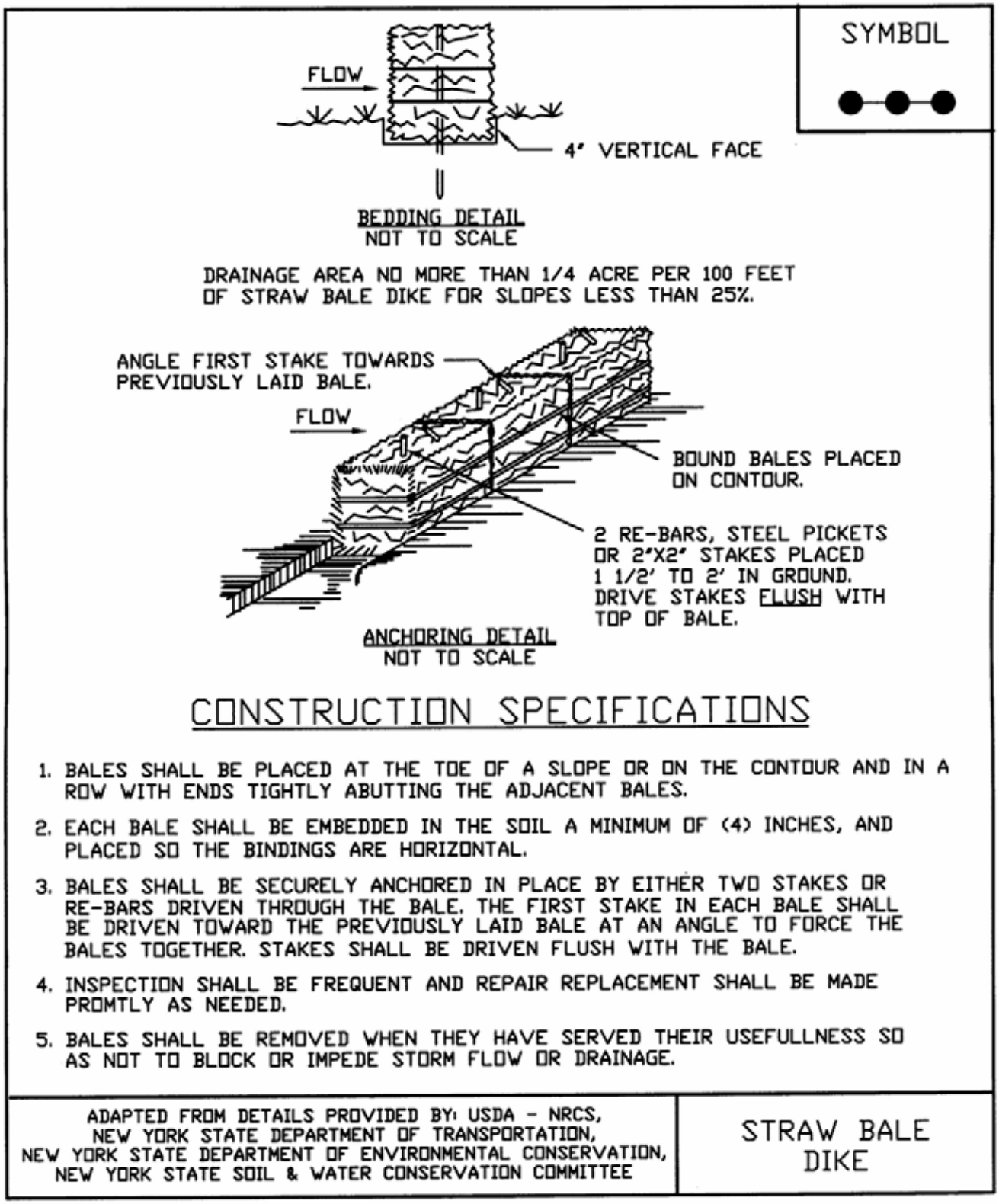
Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage areas in this instance shall be less than one quarter of an acre per 100 feet of fence and the length of slope above the dike shall be less than 200 feet.

Design Criteria

The above table is adequate, in general, for a one-inch rainfall event. Larger storms could cause failure of this practice. Use of this practice in sensitive areas for longer than one month should be specifically designed to store expected runoff. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 5A.7 on page 5A.18 or details.

Figure 5A.7
Straw Bale Dike



STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence placed on a slope are:

Slope Steepness	Maximum Length (ft.)
2:1	25
3:1	50
4:1	75
5:1 or flatter	100

2. Maximum drainage area for overland flow to a silt fence shall not exceed ¼ acre per 100 feet of fence, with maximum ponding depth of 1.5 feet behind the fence; and

3. Erosion would occur in the form of sheet erosion; and

4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff. All silt fences shall be placed as close to the areas as possible, but at least 10 feet from the toe of a slope to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.

Sensitive areas to be protected by silt fence may need to be reinforced by using heavy wire fencing for added support to prevent collapse.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. A detail of the silt fence shall be shown on the plan. See Figure 5A.8 on page 5A.21 for details.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682

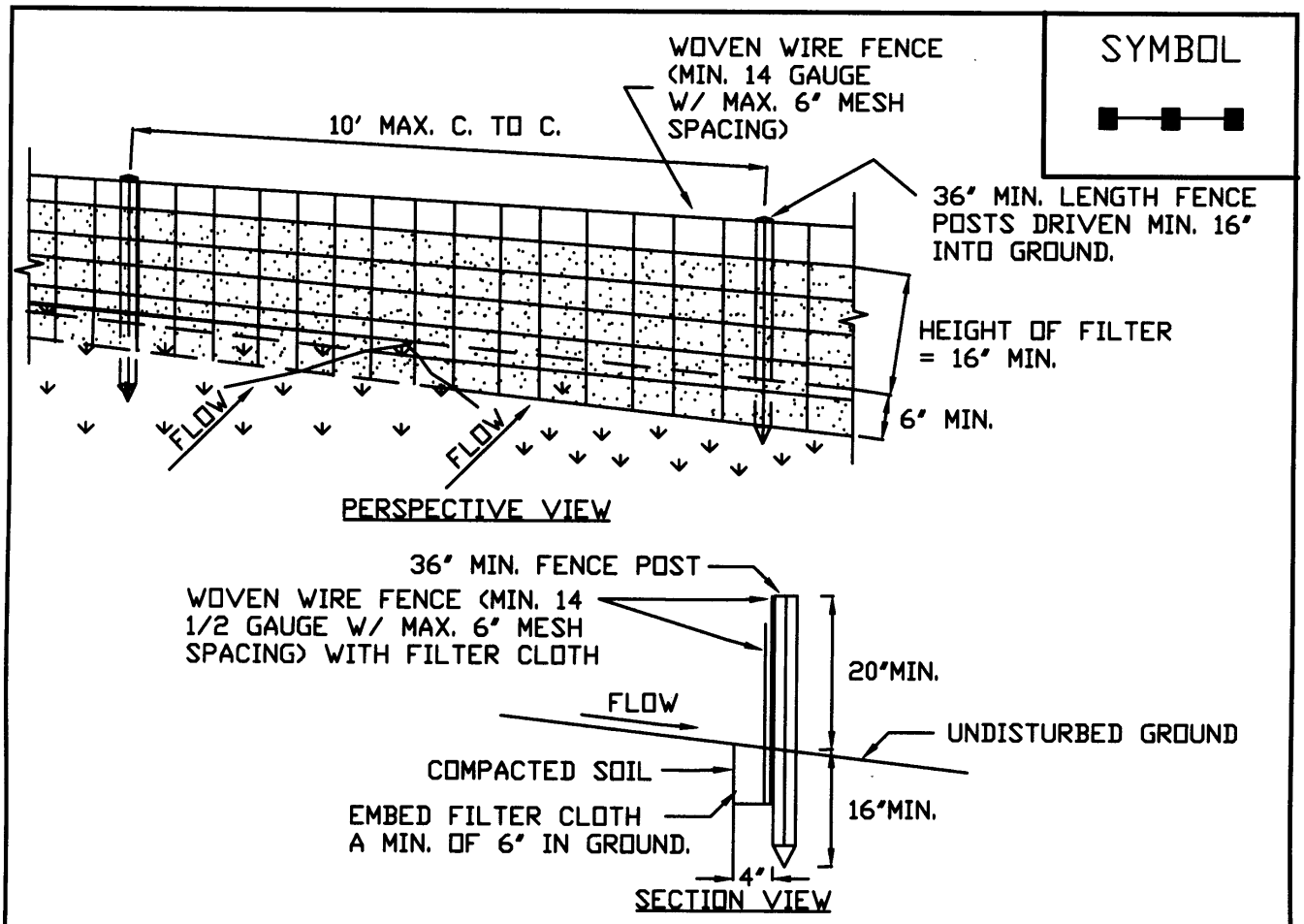
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.

3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated Units: Envirofence, Geofab, or approved equal, may be used in lieu of the above method providing the unit is installed per details shown in Figure 5A.8.

Figure 5A.8
Silt Fence



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	SILT FENCE

STANDARD AND SPECIFICATIONS FOR SEDIMENT TRAP

Definition

A temporary sediment control device formed by excavation and/or embankment to intercept sediment laden runoff and retain the sediment.

Purpose

The purpose of the structure is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties, and rights-of-way below the sediment trap from sedimentation.

Conditions Where Practice Applies

A sediment trap is usually installed in a drainage way, at a storm drain inlet, or other points of collection from a disturbed area.

Sediment traps should be used to artificially break up the natural drainage area into smaller sections where a larger device (sediment basin) would be less effective.

Design Criteria

If any of the design criteria presented here cannot be met, see Standard and Specification for Sediment Basin on page 5A.49.

Drainage Area

The drainage area for sediment traps shall be in accordance with the specific type of sediment trap used (Type I through V).

Location

Sediment traps shall be located so that they can be installed prior to grading or filling in the drainage area they are to protect. Traps must not be located any closer than 20 feet from a proposed building foundation if the trap is to function during building construction. Locate traps to obtain maximum storage benefit from the terrain and for ease of cleanout and disposal of the trapped sediment.

Trap Size

The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 3,600 cubic feet per acre of drainage area. The volume of a constructed trap shall be calculated using standard mathematical procedures. The volume of a natural sediment trap may be approximated by the equation: Volume (cu.ft.) = 0.4 x surface area (sq.ft.) x maximum depth (ft.).

Trap Cleanout

Sediment shall be removed and the trap restored to the original dimensions when the sediment has accumulated to ½ of the design depth of the trap. Sediment removed from the trap shall be deposited in a protected area and in such a manner that it will not erode.

Embankment

All embankments for sediment traps shall not exceed five (5) feet in height as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have a minimum four (4) foot wide top and side slopes of 2:1 or flatter. The embankment shall be compacted by traversing with equipment while it is being constructed. The embankment shall be stabilized with seed and mulch as soon as it is completed

The elevation of the top of any dike directing water to any sediment trap will equal or exceed the maximum height of the outlet structure along the entire length of the trap.

Excavation

All excavation operations shall be carried out in such a manner that erosion and water pollution shall be minimal. Excavated portions of sediment traps shall have 1:1 or flatter slopes.

Outlet

The outlet shall be designed, constructed, and maintained in such a manner that sediment does not leave the trap and that erosion at or below the outlet does not occur.

Sediment traps must outlet onto stabilized (preferable undisturbed) ground, into a watercourse, stabilized channel, or into a storm drain system. Distance between inlet and outlet should be maximized to the longest length practicable.

Trap Details Needed on Erosion and Sediment Control Plans

Each trap shall be delineated on the plans in such a manner that it will not be confused with any other features. Each trap on a plan shall indicate all the information necessary to properly construct and maintain the structure. If the drawings are such that this information cannot be delineated on the drawings, then a table shall be developed. If a table is developed, then each trap on a plan shall have a number and the numbers shall be consecutive.

The following information shall be shown for each trap in a summary table format on the plans.

1. Trap number
2. Type of trap
3. Drainage area
4. Storage required
5. Storage provided (if applicable)
6. Outlet length or pipe sizes
7. Storage depth below outlet or cleanout elevation
8. Embankment height and elevation (if applicable)

Type of Sediment Traps

There are five (5) specific types of sediment traps which vary according to their function, location, or drainage area.

I. Pipe Outlet Sediment Trap
II. Grass Outlet Sediment Trap
III. Catch Basin Sediment Trap
IV. Stone Outlet Sediment Trap
V. Riprap Outlet Sediment Trap

I. Pipe Outlet Sediment Trap

A Pipe Outlet Sediment Trap consists of a trap formed by embankment or excavation. The outlet for the trap is through a perforated riser and a pipe through the embankment. The outlet pipe and riser shall be made of steel, corrugated metal or other suitable material. The top of the embankment shall be at least 1 ½ feet above the crest of the riser. The top 2/3 of the riser shall be perforated with one (1) inch nominal diameter holes or slits spaced six (6) inches vertically and horizontally placed in the concave portion of the corrugated pipe.

No holes or slits will be allowed within six (6) inches of the top of the horizontal barrel. All pipe connections shall be watertight. The riser shall be wrapped with ½ to ¼ inch hardware cloth wire then wrapped with filter cloth with a sieve size between #40-80 and secured with strapping or connecting band at the top and bottom of the cloth. The cloth shall cover an area at least six (6) inches above the highest hole and six (6) inches below the lowest hole. The top of the riser pipe shall not be covered with filter cloth. The riser shall have a base with sufficient weight to prevent flotation of the riser. Two approved bases are:

1. A concrete base 12 in. thick with the riser embedded 9 in. into the concrete base, or

2. One quarter inch, minimum, thick steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or earth placed on it to prevent flotation. In either case, each side of the square base measurement shall be the riser diameter plus 24 inches.

Pipe outlet sediment traps shall be limited to a five (5) acre maximum drainage area. Pipe outlet sediment traps may be interchangeable in the field with stone outlet or riprap sediment traps provided that these sediment traps are constructed in accordance with the detail and specifications for that trap.

Select pipe diameter from the following table:

Minimum Sizes

Barrel Diameter[1] (in.)	Riser Diameter[1] (in.)	Maximum Drainage Area (ac.)
12	15	1
15	18	2
18	21	3
21	24	4
21	27	5

[1] Barrel diameter may be same size as riser diameter.

See details for Pipe Outlet Sediment Trap ST-I in Figure 5A.16 (1) and 5A.16 (2) on pages 5A.38 and 5A.39.

II. Grass Outlet Sediment Trap

A Grass Outlet Sediment Trap consists of a trap formed by excavating the earth to create a holding area. The trap has a discharge point over natural existing grass. The outlet crest width (feet) shall be equal to four (4) times the drainage area (acres) with a minimum width of four (4) feet. The outlet shall be free of any restrictions to flow. The outlet lip must remain undisturbed and level. The volume of this trap shall be computed at the elevation of the crest of the outlet. Grass outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Grass Outlet Sediment Trap ST-II in Figure 5A.17 on page 5A.40.

III. Catch Basin Sediment Trap

A Catch Basin Sediment Trap consists of a basin formed by excavation on natural ground that discharges through an opening in a storm drain inlet structure. This opening can either be the inlet opening or a temporary opening made by omitting bricks or blocks in the inlet.

A yard drain inlet or an inlet in the median strip of a dual highway could use the inlet opening for the type outlet. The trap should be out of the roadway so as not to interfere with future compaction or construction. Placing the trap on the opposite side of the opening and diverting water from the roadway to the trap is one means of doing this. Catch basin sediment traps shall be limited to a three (3) acre maximum drainage area. The volume of this trap is measured at the elevation of the crest of the outlet (invert of the inlet opening).

See details for Catch Basin Sediment Trap ST-III in Figure 5A.18 on page 5A.41.

IV. Stone Outlet Sediment Trap

A Stone Outlet Sediment Trap consists of a trap formed by an embankment or excavation. The outlet of this trap is over a stone section placed on level ground. The minimum length (feet) of the outlet shall be equal to four (4) times the drainage area (acres).

Required storage shall be 3,600 cubic feet per acre of drainage area.

The outlet crest (top of stone in weir section) shall be level, at least one (1) foot below top of embankment and no more than one (1) foot above ground beneath the outlet. Stone used in the outlet shall be small riprap (4 in. x 8 in.). To provide more efficient trapping effect, a layer of filter cloth should be embedded one (1) foot back into the upstream face of the outlet stone or a one (1) foot thick layer of two (2) inch or finer aggregate shall be placed on the upstream face of the outlet.

Stone Outlet Sediment Traps may be interchangeable in the field with pipe or riprap outlet sediment traps provided they are constructed in accordance with the detail and specifications for those traps. Stone outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Stone Outlet Sediment Trap ST-IV in Figure 5A.19 on page 5A.42.

V. Riprap Outlet Sediment Trap

A Riprap Outlet Sediment Trap consists of a trap formed by an excavation and embankment. The outlet for this trap shall be through a partially excavated channel lined with riprap. This outlet channel shall discharge onto a stabilized area or to a stable watercourse. The riprap outlet sediment trap may be used for drainage areas of up to a maximum of 15 acres.

Design Criteria for Riprap Outlet Sediment Trap

1. The total contributing drainage area (disturbed or undisturbed either on or off the developing property) shall not exceed 15 acres.
2. The storage needs for this trap shall be computed using 3600 cubic feet of required storage for each acre of drainage area. The storage volume provided can be figured by computing the volume of storage area available behind the outlet structure up to an elevation of one (1) foot below the level weir crest.
3. The maximum height of embankment shall not exceed five (5) feet.
4. The elevation of the top of any dike directing water to a riprap outlet sediment trap will equal or exceed the minimum elevation of the embankment along the entire length of this trap.

Riprap Outlet Sediment Trap ST-V
(for Stone Lined Channel)

Contributing Drainage Area (ac.)	Depth of Channel (a) (ft.)	Length of Weir (b) (ft.)
1	1.5	4.0
2	1.5	5.0
3	1.5	6.0
4	1.5	10.0
5	1.5	12.0
6	1.5	14.0
7	1.5	16.0
8	2.0	10.0
9	2.0	10.0
10	2.0	12.0
11	2.0	14.0
12	2.0	14.0
13	2.0	16.0
14	2.0	16.0
15	2.0	18.0

See details for Riprap Outlet Sediment Trap ST-V on Figures 5A.20(1) and 5A.20(2) on pages 5A.43 and 5A.44.

Optional Dewatering Methods

Optional dewatering devices may be designed for use with sediment traps. Included are two methods, which may be used. See Figure 5A.21 on page 5A.45 for details.

Figure 5A.16(1)
Pipe Outlet Sediment Trap: ST-I

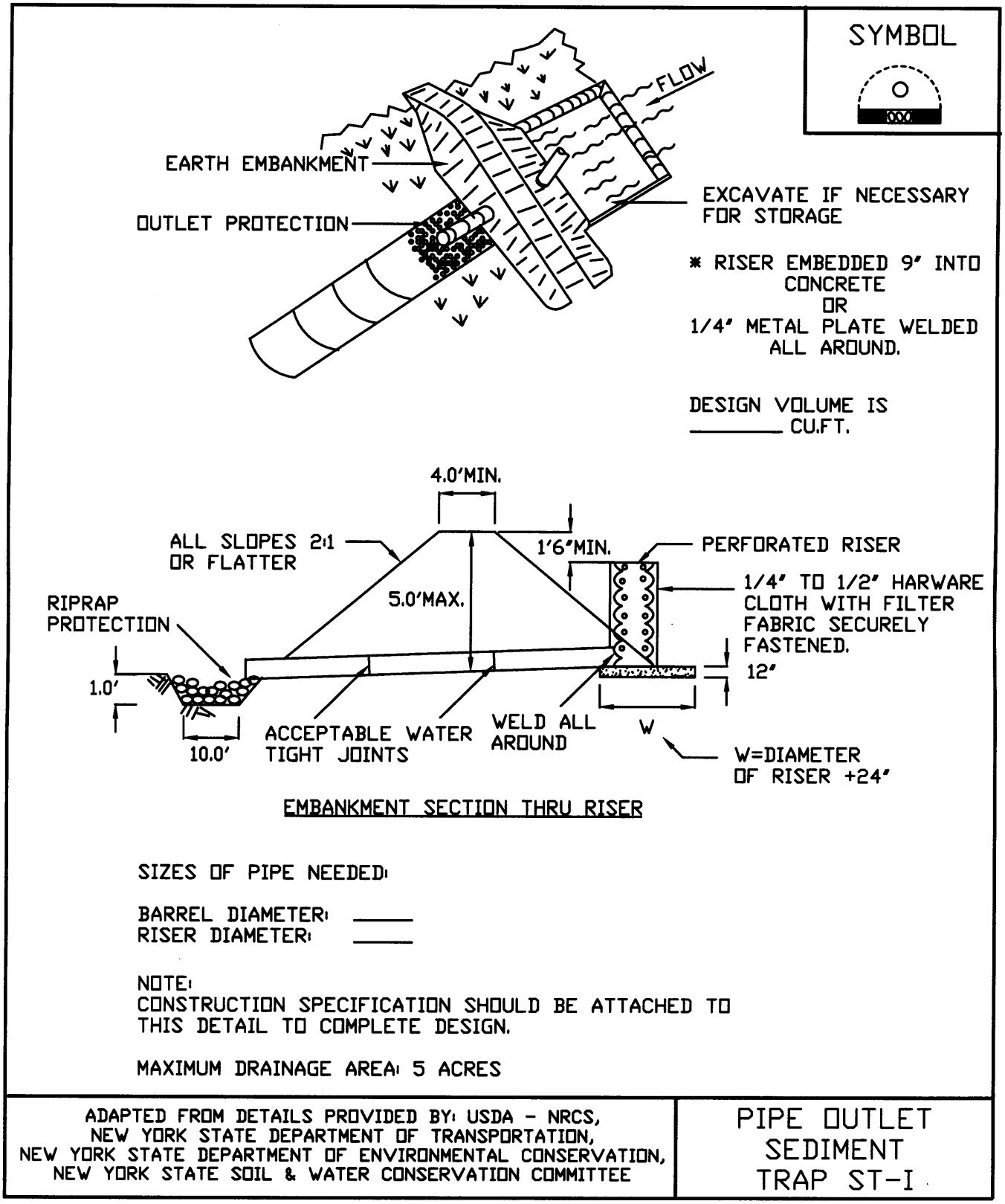


Figure 5A.16(2)
Pipe Outlet Sediment Trap: ST-I—Construction Specifications

SYMBOL

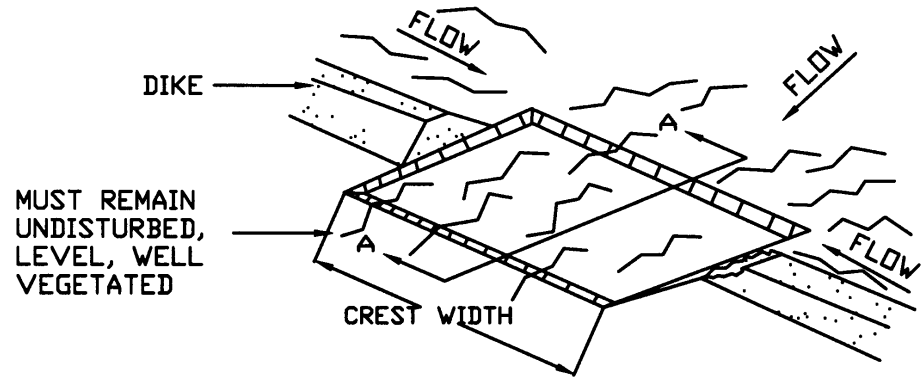
CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
4. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
5. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
6. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
7. THE STRUCTURE SHALL BE REMOVED AND AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
8. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER; CUT SLOPES 1:1 OR FLATTER.
9. ALL PIPE CONNECTIONS SHALL BE WATERTIGHT.
10. THE TOP 2/3 OF THE RISER SHALL BE PERFORATED WITH ONE (1) INCH DIAMETER HOLES OR SLITS SPACED SIX (6) INCHES VERTICALLY AND HORIZONTALLY AND PLACED IN THE CONCAVE PORTION OF PIPE. NO HOLES WILL BE ALLOWED WITHIN SIX (6) INCHES OF THE HORIZONTAL BARREL.
11. THE RISER SHALL BE WRAPPED WITH 1/4 TO 1/2 INCH HARDWARE CLOTH WIRE THEN WRAPPED WITH FILTER CLOTH (HAVING AN EQUIVALENT SIEVE SIZE OF 40-80). THE FILTER CLOTH SHALL EXTEND SIX (6) INCHES ABOVE THE HIGHEST HOLE AND SIX (6) INCHES BELOW THE LOWEST HOLE. WHERE ENDS OF THE FILTER CLOTH COME TOGETHER, THEY SHALL BE OVER-LAPPED, FOLDED AND STAPLED TO PREVENT BYPASS.
12. STRAPS OR CONNECTING BANDS SHALL BE USED TO HOLD THE FILTER CLOTH AND WIRE FABRIC IN PLACE. THEY SHALL BE PLACED AT THE TOP AND BOTTOM OF THE CLOTH.
13. FILL MATERIAL AROUND THE PIPE SPILLWAY SHALL BE HAND COMPACTED IN FOUR (4) INCH LAYERS. A MINIMUM OF TWO (2) FEET OF HAND COMPACTED BACKFILL SHALL BE PLACED OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.
14. THE RISER SHALL BE ANCHORED WITH EITHER A CONCRETE BASE OR STEEL PLATE BASE TO PREVENT FLOTATION. FOR CONCRETE BASED THE DEPTH SHALL BE TWELVE (12) INCHES WITH THE RISER EMBEDDED NINE (9) INCHES. A 1/4 INCH MINIMUM THICKNESS STEEL PLATE SHALL BE ATTACHED TO THE RISER BY A CONTINUOUS WELD AROUND THE BOTTOM TO FORM A WATERTIGHT CONNECTION AND THEN PLACE TWO (2) FEET OF STONE, GRAVEL, OR TAMPED EARTH ON THE PLATE.

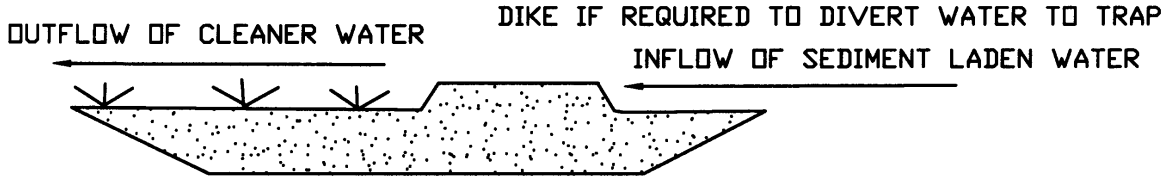
ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

PIPE OUTLET
SEDIMENT TRAP
ST-I

Figure 5A.17
Grass Outlet Sediment Trap: ST-II



SYMBOL



CREST WIDTH (FT)=4xDRAINAGE AREA (ACRES)

SECTION A - A
EXCAVATED GRASS OUTLET SEDIMENT TRAP

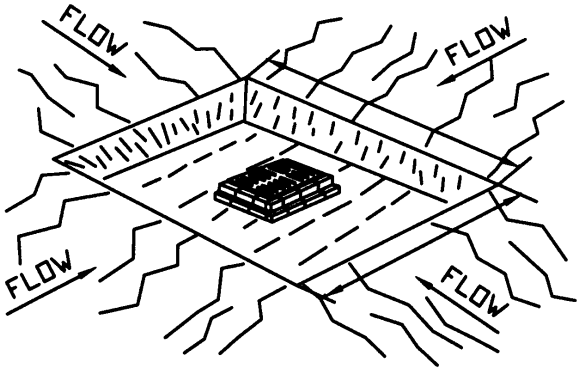
CONSTRUCTION SPECIFICATIONS

1. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE AREA.
2. MINIMUM CREST WIDTH SHALL BE 4 x DRAINAGE AREA
3. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
4. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
5. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
6. THE SEDIMENT TRAP SHALL BE REMOVED AND AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
7. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

MAXIMUM DRAINAGE AREA: 5 ACRES

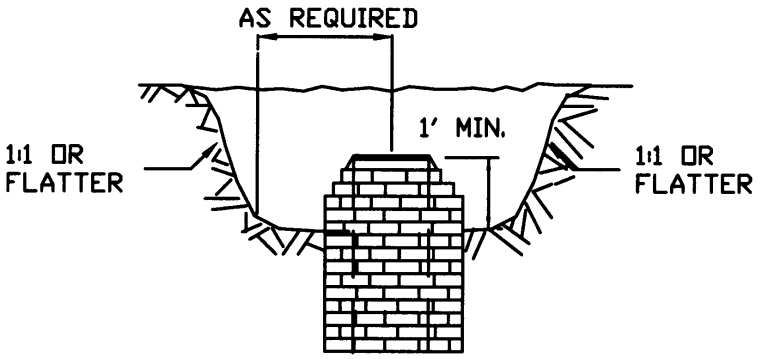
ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	GRASS OUTLET SEDIMENT TRAP ST-II

Figure 5A.18
Catch Basin Sediment Trap: ST-III



SYMBOL

YARD DRAIN



CROSS SECTION

CONSTRUCTION SPECIFICATIONS

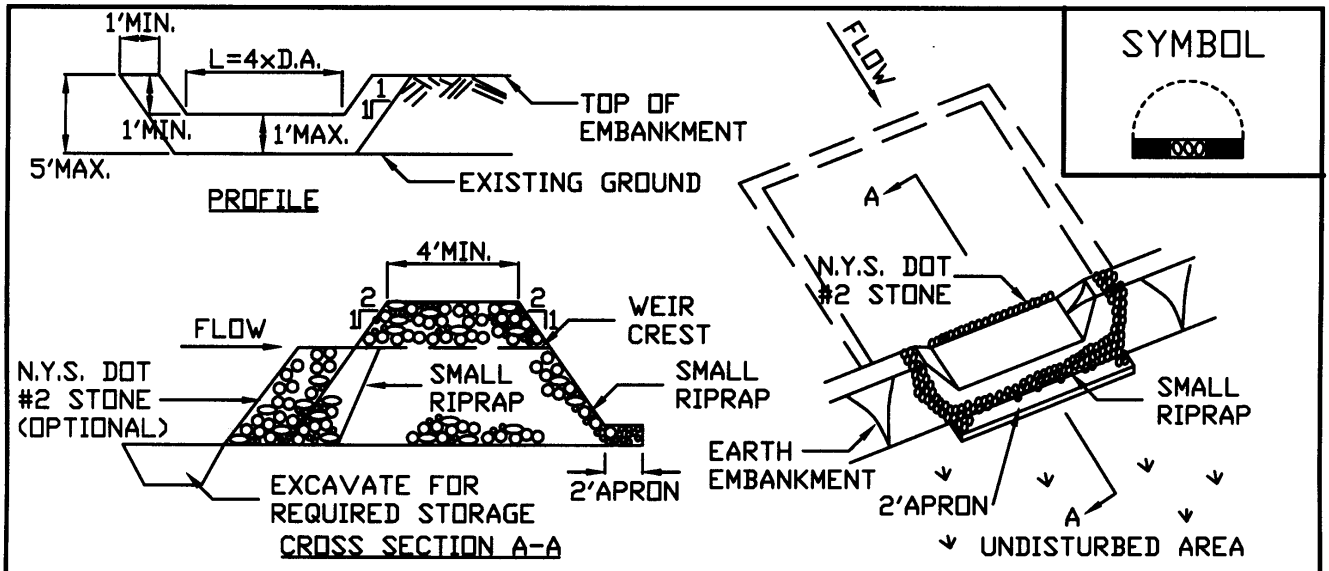
1. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
2. THE VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
3. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
5. THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE CONSTRUCTED DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
6. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

MAXIMUM DRAINAGE AREA: 3 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

CATCH BASIN
SEDIMENT TRAP
ST-III

Figure 5A.19
Stone Outlet Sediment Trap: ST-IV



OPTION: A ONE FOOT LAYER OF N.Y.S. DOT #2 STONE MAY BE PLACED ON THE UPSTREAM SIDE OF THE RIPRAP INPLACE OF THE EMBEDDED FILTER CLOTH.

CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS AND OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.
4. THE STONE USED IN THE OUTLET SHALL BE SMALL RIPRAP 4"-8" ALONG WITH A 1' THICKNESS OF 2" AGGREGATE PLACED ON THE UP-GRADE SIDE ON THE SMALL RIPRAP OR EMBEDDED FILTER CLOTH IN THE RIPRAP.
5. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. IT SHALL BE PLACED ON SITE AND STABILIZED.
6. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
8. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

MAXIMUM DRAINAGE AREA 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE OUTLET SEDIMENT TRAP ST-IV

Figure 5A.20(1)
Riprap Outlet Sediment Trap: ST-V

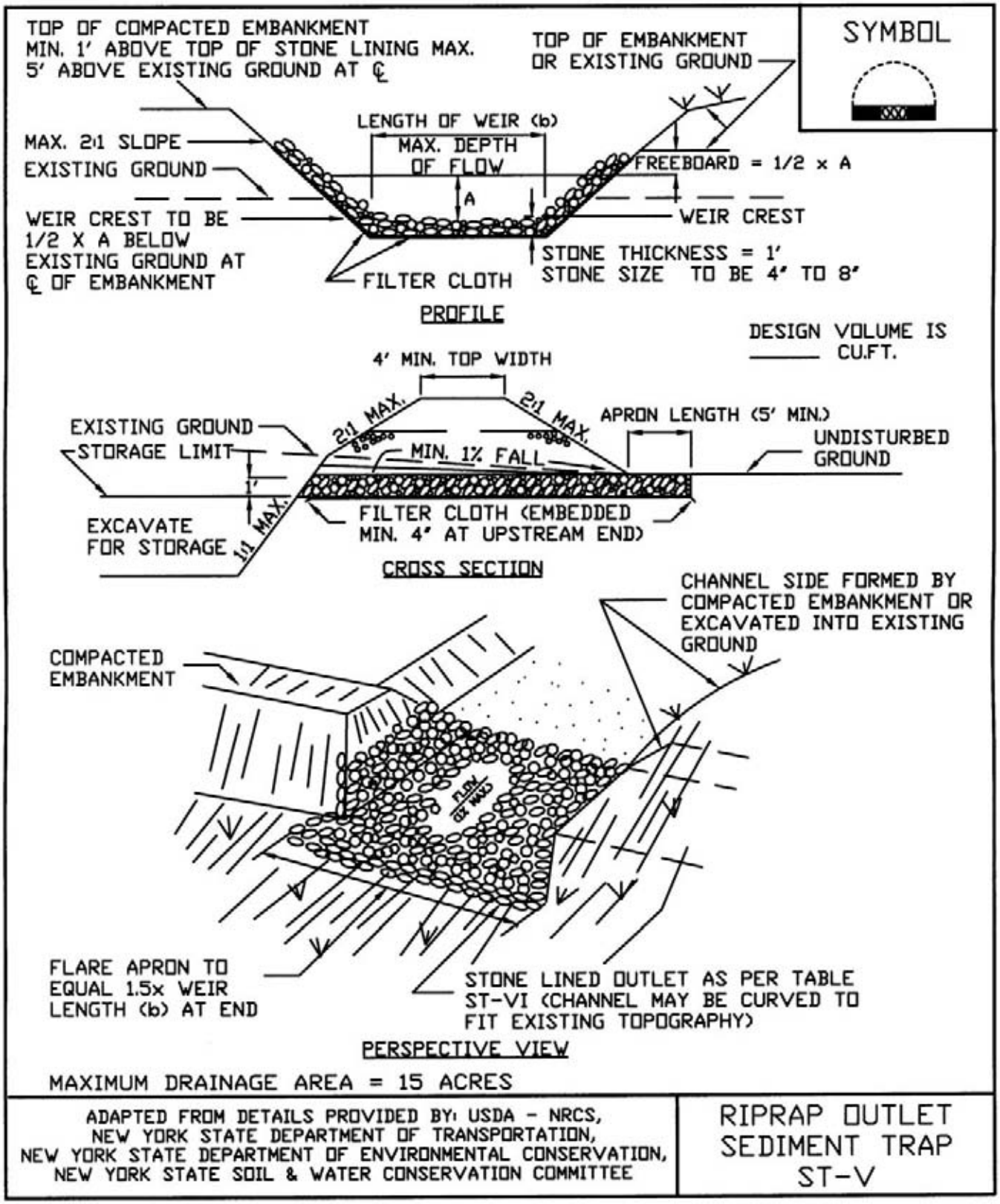


Figure 5A.202)
Riprap Outlet Sediment Trap: ST-V—Construction Specifications

SYMBOL

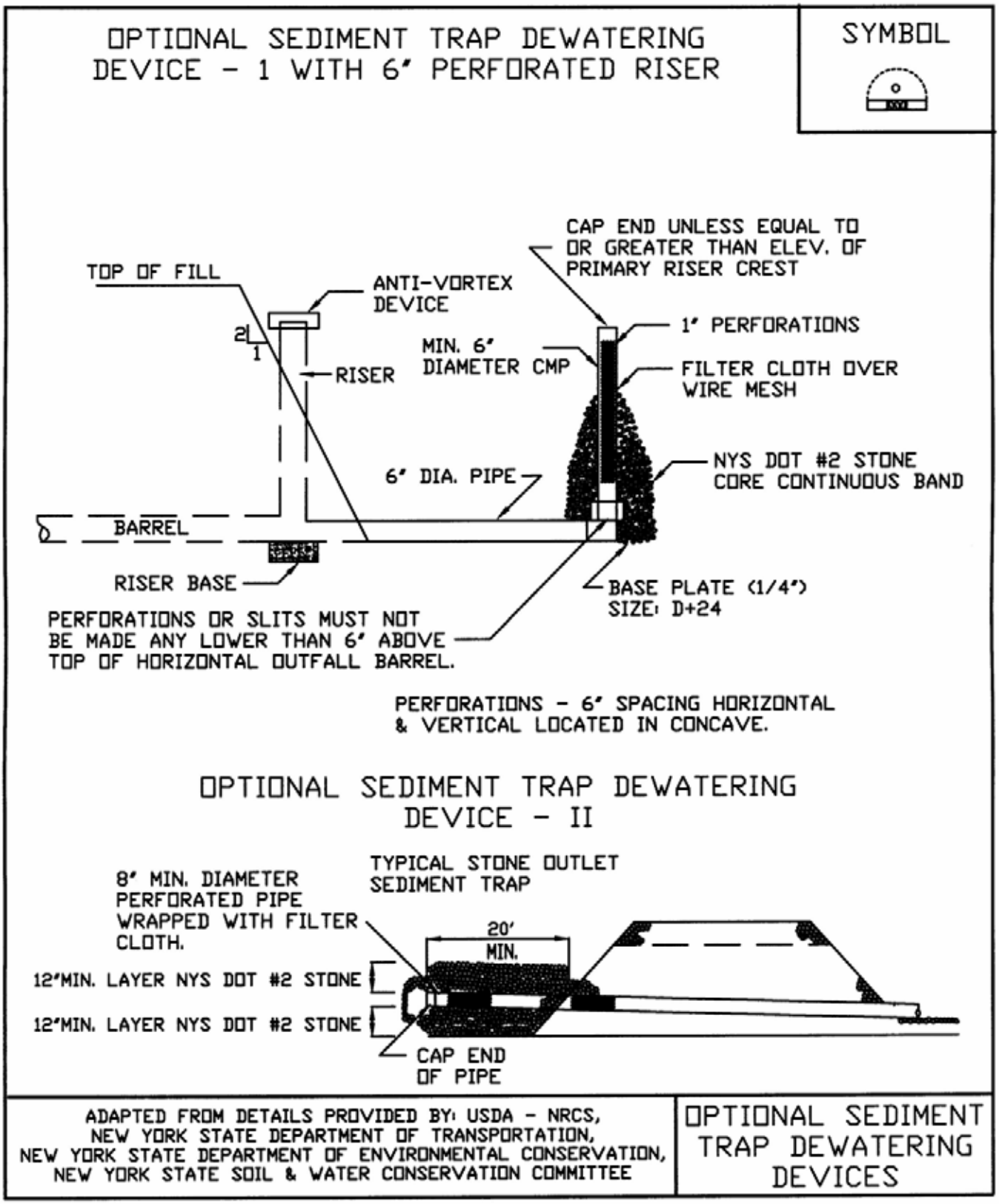
CONSTRUCTION SPECIFICATIONS

1. THE AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED. MAXIMUM HEIGHT OF OF EMBANKMENT SHALL BE FIVE (5) FEET, MEASURED AT CENTERLINE OF EMBANKMENT.
3. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER, CUT SLOPES 1:1 OR FLATTER.
4. ELEVATION OF THE TOP OF ANY DIKE DIRECTING WATER INTO TRAP MUST EQUAL OR EXCEED THE HEIGHT OF EMBANKMENT.
5. STORAGE AREA PROVIDED SHALL BE FIGURED BY COMPUTING THE VOLUME AVAILABLE BEHIND THE OUTLET CHANNEL UP TO AN ELEVATION OF ONE (1) FOOT BELOW THE LEVEL WEIR CREST.
6. FILTER CLOTH SHALL BE PLACED OVER THE BOTTOM AND SIDES OF THE OUTLET CHANNEL PRIOR TO PLACEMENT OF STONE. SECTIONS OF FABRIC MUST OVERLAP AT LEAST ONE (1) FOOT WITH SECTION NEAREST THE ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OUTLET CHANNEL.
7. STONE USED IN THE OUTLET CHANNEL SHALL BE FOUR (4) TO EIGHT (8) INCH RIPRAP. TO PROVIDE A FILTERING EFFECT, A LAYER OF FILTER CLOTH SHALL BE EMBEDDED ONE (1) FOOT WITH SECTION NEAREST ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OF OUTLET CHANNEL.
8. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
9. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRED AS NEEDED.
10. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE MINIMIZED.
11. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
12. DRAINAGE AREA FOR THIS PRACTICE IS LIMITED TO 15 ACRES OR LESS.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

RIPRAP OUTLET
SEDIMENT TRAP
ST-V

Figure 5A.21
Optional Sediment Trap Dewatering Devices



APPENDIX B-2

INSPECTION AND MAINTENANCE REPORT FORM

Inspection and Maintenance Report Form

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more

Regular Inspector:_____Rainfall Event Inspector:_____Rainfall (inches):_____

Contractor Activities	OK	NO	N/A	Notes
Are construction onsite traffic routes, parking, and storage of equipment and supplies restricted to areas specifically designated for those uses?				
Are locations of temporary soil stock piles of construction materials in approved areas?				
Is there any evidence of spills and resulting cleanup procedures?				
General Erosion & Sediment Controls				
Are sediment and erosion BMPs installed in the proper location and according to the specifications set out in the SWM & ECP?				
Are all operational storm drain inlets protected from sediment inflow?				
Do any seeded or landscaped areas require maintenance, irrigation, fertilization, seeding or mulching?				
Is there any evidence that sediment is leaving the site?				
Is there any evidence of erosion or cut fill slopes?				
Perimeter Road Use				
Does much sediment get tracked on to the perimeter road? Is the gravel clean or is it filled with sediment? Does all traffic use the perimeter road to leave the site? Is maintenance or repair required for the perimeter road?				

_____ _____

Inspected by (Signature) Date

Inspection and Maintenance Report Form

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more

Inspector:_____

STABILIZATION MEASURES					
Area	Date Since Last Disturbed	Date of Next Disturbance	Stabilized? Yes/No	Stabilized with	Condition

Stabilization Required: _____

_____

_____

_____

_____

_____

To be performed by: _____ On or before: _____

APPENDIX C

NYSDOH GENERIC COMMUNITY AIR MONITORING PLAN

APPENDIX C

New York State Department of Health
Generic Community Air Monitoring Plan [1]

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

[1] Taken from Appendix 1A of the Draft DER-10 Technical Guidance for Site Investigation and Remediation, December 2002.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring

particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

PART III

ENVIRONMENTAL EASEMENTS

SITE MANAGEMENT PLAN
PART III

ENVIRONMENTAL EASEMENTS

7503 NIAGARA FALLS BOULEVARD SITE
NIAGARA FALLS, NEW YORK

November 2007 0101-002-500

Prepared for:

GLR Holdings, LLC

Prepared by:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

DO NOT DETACH - THIS IS PAGE 1 OF RECORDED DOCUMENT

BOOK 3424 PAGE 0410

NIAGARA COUNTY CLERK RECORDING PAGE

OFFICE OF THE CLERK COUNTY OF NIAGARA
WAYNE F. JAGOW, COUNTY CLERK
County Courthouse, 175 Hawley Street, P.O. Box 461, Lockport, NY 14095
Phone (716) 439-7027 Fax (716) 439-7066

INSTRUMENT DATE _____

DOCUMENT TYPE EAS

11

Parties: (Print Names In Full)
1st Part GLR HOLDINGS LLC
2nd Part NYSDEC
Town/City N. FALLS

Return To:
ROBERT TEAMERSON ESQ.
220 BASKET RD
WEBSTER NY 14580

THIS SPACE RESERVED FOR COUNTY CLERK

MORTGAGE# _____

MORTGAGE AMOUNT
$ _____

( )One\two family ( )Other

[ ] Check if to be apportioned

DOCUMENT # 1011444
BOOK 3424 PAGE 410 DEEDS
NUMBER OF PAGES 11
RECORDED 12/26/2007 10:42:25 A.M.
RECEIPT # 32131 DOCUMENT TOTAL: $68.00
PAID - COUNTY CLERK
WAYNE F. JAGOW

RECORDING TAX RECEIPT

BASIC	$ _____
ADDITIONAL	$ _____
SPECIAL	$ _____
TOTAL	$ _____

State of New York) ss
County of Niagara)
I do hereby certify that I have Received on the within Mortgage, being the amount of the Recording Tax Imposed thereon & paid at recording.

#3146
REAL ESTATE TRANSFER TAX
$ 0
12/26/07
NIAGARA COUNTY

Dated _____, 20___

Mortgage Tax Clerk of Niagara County

This sheet constitutes the Clerk's endorsement required by section 319 of the Real Property Law of the State of New York
DO NOT DETACH

County: Niagara Site No: C932126 Brownfield Cleanup Agreement No. B9-0714-06-04

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 18th day of December, 2007, between Owner GLR Holdings, LLC, a New York State limited liability company, having an office at 20 North Union Street, Rochester, New York (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and of ensuring the potential restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and;

WHEREAS, Grantor is the owner of real property located at the address of 7503 Niagara Falls Boulevard, in the City of Niagara Falls, Niagara County, New York, known and designated on the tax map of the of the City of Niagara Falls as tax map parcel number 160.12-2-5 being the same as that property conveyed to Grantor by deed on January 13, 2006, and recorded in the Land Records of the Niagara County Clerk at Page 590, Liber 3345 of Deeds, comprised of approximately .89 acres, and hereinafter more fully described in Schedule A (legal description) and Schedule B (map) attached hereto and made a part hereof (the " Controlled Property"); and;

WHEREAS, the Commissioner does hereby acknowledge that the Department accepts this Environmental Easement in order to ensure the protection of human health and the environment and to achieve the requirements for remediation established at this Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36;and

NOW THEREFORE, in consideration of the covenants and mutual promises contained herein and the terms and conditions of Brownfield Cleanup Agreement Number B9-0714-06-04, Grantor grants, conveys and releases to Grantee a permanent Environmental Easement pursuant

County: Niagara Site No: C932126 Brownfield Cleanup Agreement No. B9-0714-06-04

to Article 71, Title 36 of the ECL in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the potential restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The following controls apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees, and any person using the Controlled Property:

A. The Controlled Property may be used for commercial or industrial use as long as the following long-term engineering controls are employed:

1. Site surfaces will be constructed and maintained appropriately to prevent contact with potentially contaminated soils or groundwater. Various site cover materials (stone, concrete, asphalt pavement, vegetated soil, landscaping, etc) may function as a barrier to prevent human contact with contaminated site soils or groundwater.

2. Excavations below site cover materials must be performed in accordance with applicable provisions of the Soil/Fill Management section(s) of the 7503 Niagara Falls Blvd. Site Management Plan, dated October 2007 ("SMP") (or subsequent revisions thereof). Soil and fill below the cover materials must be handled and disposed in accordance with the SMP. Soil and fill material from off-site sources which is proposed for use as backfill must meet applicable provisions of the SMP.

3. An active sub-slab depressurization (ASD) system under the building floor is one of the engineering controls to prevent potential releases of contaminated soil vapors into the building indoor air. This ASD system will be tested, and as long as the building is occupied (or as otherwise directed by the New York State Departments of Environmental Conservation and Health), will be continuously operated and maintained in accordance with the provisions of the SMP.

4. Site groundwater quality will be periodically monitored according to the provisions of the Groundwater Monitoring Program section(s) of the SMP. The groundwater monitoring well(s) will be maintained and sampled, and the data reported in accordance with the provisions of the SMP.

The Grantor hereby acknowledges receipt of a copy of the NYSDEC-approved SMP dated

Record & Return to:
Robert L. Tamberson Esq
820 Basket Rd
Webster, NY 14580

October 2007. The SMP describes obligations that Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system on the Controlled Property, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. Upon notice of not less than thirty (30) days the Department in exercise of its discretion and consistent with applicable law may revise the SMP. This notice shall be a final agency determination. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Regional Remediation Engineer
Region 9
NYSDEC
270 Michigan Avenue
Buffalo, NY 14203-2999

or

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

B. The Controlled Property may not be used for a higher level of use such as unrestricted, residential, or restricted residential use and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an environmental easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

D. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

E. Grantor covenants and agrees that it shall annually, or such time as NYSDEC may allow, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury that the controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls employed at the Controlled Property were approved by the NYSDEC, and that nothing has occurred that would impair the ability of such control to protect the public health and environment or constitute a violation or failure to comply with any Site Management Plan for such controls and giving access to such Controlled Property to evaluate continued maintenance of such controls.

3. <u>Right to Enter and Inspect.</u> Grantee, its agents, employees, or other representatives of the

State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Controlled Property, including:

1. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

2. The right to give, sell, assign, or otherwise transfer the underlying fee interest to the Controlled Property by operation of law, by deed, or by indenture, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person intentionally violates this Environmental Easement, the Grantee may revoke the Certificate of Completion provided under ECL Article 27, Title 14, or Article 56, Title 5 with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach. Grantor shall then have a reasonable amount of time from receipt of such notice to cure. At the expiration of said second period, Grantee may commence any proceedings and take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement in accordance with applicable law to require compliance with the terms of this Environmental Easement.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar its enforcement rights in the event of a subsequent breach of or noncompliance with any of the terms of this Environmental Easement.

6. Notice. Whenever notice to the State (other than the annual certification) or approval from the State is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County: Niagara Site No: C932126 Brownfield Cleanup Agreement No. B9-0714-06-04

County, NYSDEC Site Number, NYSDEC Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to: Environmental Easement Attorney
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

Such correspondence shall be delivered by hand, or by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. This Environmental Easement may be amended only by an amendment executed by the Commissioner of the New York State Department of Environmental Conservation and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Grantor's Name: GLR Holdings LLC

By: Richard C. Fox

Title: MANAGING MEMBER Date: 12/17/07

County: Niagara Site No: C932126 Brownfield Cleanup Agreement No. B9-0714-06-04

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF MONROE)

On the 18th day of Dec., in the year 2007, before me, the undersigned, personally appeared Richard C. Fea, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ capacity(~~ies~~), and that by his/~~her/their~~ signature(~~s~~) on the instrument, the individual(~~s~~), or the person upon behalf of which the individual(~~s~~) acted, executed the instrument.

Notary Public - State of New York

GARY L. STUTZMAN
Notary Public, State of New York
Qualified in Monroe County
Commission Expires November 30, 2009

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation

by: _____
Alexander B. Grannis, Commissioner

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 20 day of December, in the year 2007, before me, the undersigned, personally appeared ALEXANDER B. GRANNIS, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity as Commissioner of the State of New York Department of Environmental Conservation, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____

SCOTT OWENS
Notary Public, State of New York
No. 02OW6103092
Qualified in Albany County
Commission Expires April 12, 2008

County: Niagara Site No: C932126 Brownfield Cleanup Agreement No. B9-0714-06-04

Notary Public - State of New York

EDMS # 287077

County: Niagara Site No: C932126 . Brownfield Cleanup Agreement No. B9-0714-06-04

SCHEDULE A

LEGAL DESCRIPTION OF PROPERTY

ALL THAT TRACT OR PARCEL OF LAND; situate in the City of Niagara Falls, County of Niagara and State of New York, being part of Lot 54 of the Mile Reserve, bounded and described as follows;

BEGINNING at a point in the south line of Pine Avenue (Niagara Falls Boulevard) 5.69 feet from the west line of Subdivision Map made by John H. Keller, filed September 18, 1941 in Book 36 of Maps at pages 927 and 928, now in Book 27 of Microfilmed Maps at pages 2653 and 2654;

THENCE easterly along the south line of Pine Avenue, a distance of 123.25 feet to the northwest corner of lands appropriated for the widening of Pine Avenue, (Parcel No. 74, Map No. 72), by Notice of Appropriation recorded July 13, 1966 in Liber 1453 of Deeds at page 462;

THENCE southerly at right angles and along the west line of lands so appropriated, a distance of 12 feet to the south line of lands so appropriated;

THNECE easterly at right angles and along the south line of lands so appropriated, a distance of 59.33 feet;

THENCE southerly at right angles, a distance of 41.50 feet;

THENCE easterly at right angles, a distance of 43 feet;

THENCE southerly at right angles, a distance of 121.50 feet;

THENCE westerly at right angles, a distance of 148.57 feet;

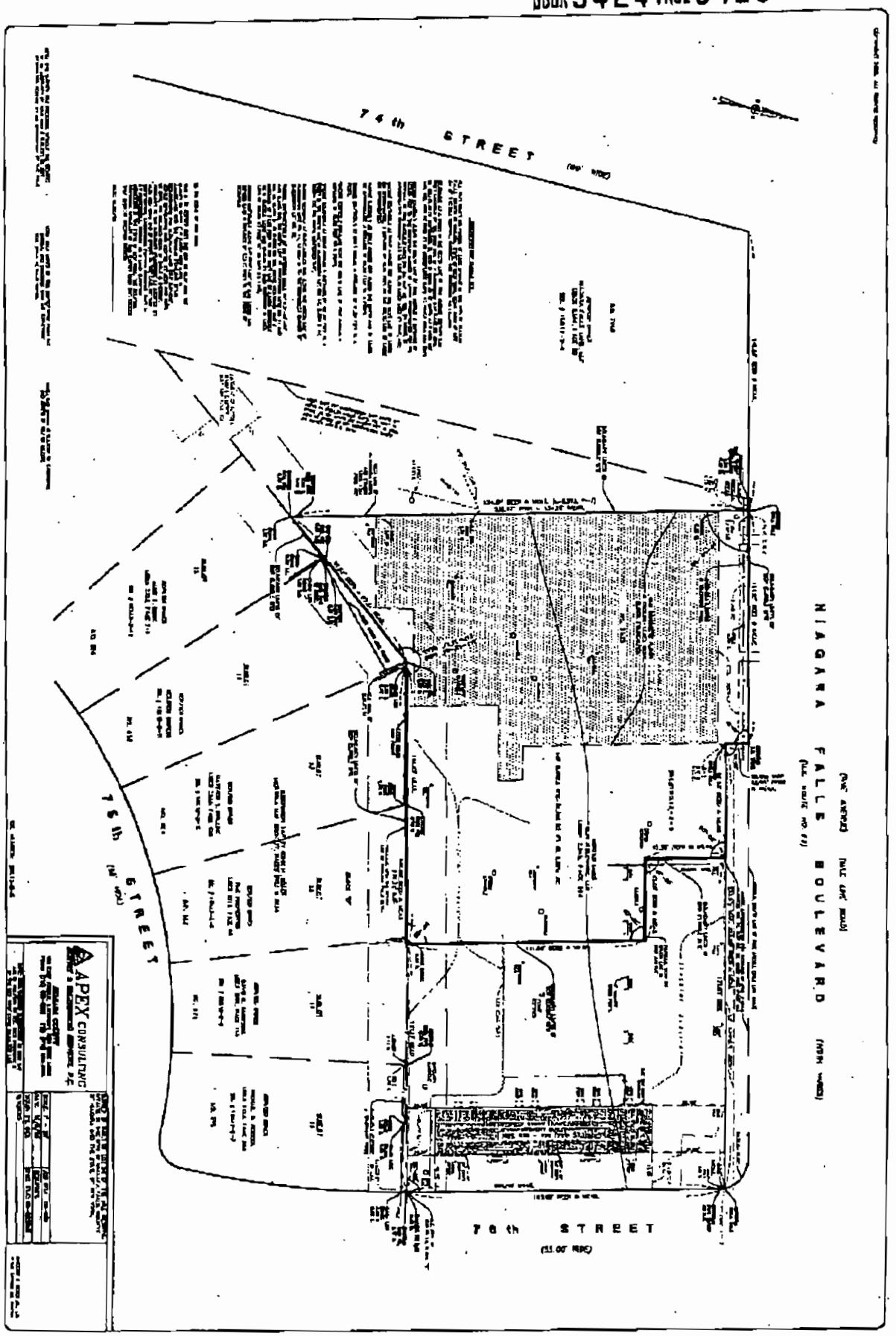
THENCE southwesterly at an interior angle of 217 degrees 12' 05" and along the north line of Lots Nos. 11 and 10, Block "D", as shown on the above mentioned map, a distance of 97.53 feet to the west line of land conveyed to A. Russell Leone and others by deed recorded in Liber 1394 of Deeds at page 107, on May 24, 1962;

THENCE northerly along the west line of said Leone and others land, a distance of 233.97 feet to the point or place of beginning.

County: Niagara Site No: C932126 Brownfield Cleanup Agreement No. B9-0714-06-04

SCHEDULE B

MAP OF CONTROLLED PROPERTY


74th STREET
NIAGARA FALLS BOULEVARD
76th STREET
76th STREET
APEX CONSULTING