Report

SWMU-1 Corrective Measures Preliminary Design

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Prepared for

Hampshire Chemical Corp.

August 2014

CH2MHILL®

Contents

Appendix

Acronyms and Abbreviations

amsl	above mean sea level
bgs	below ground surface
BOD	basis of design
canal	Seneca-Cayuga Canal
CMS	Corrective Measures Study
cm/sec	centimeters per second
COC	constituent of concern
Dow	The Dow Chemical Company
facility	former Hampshire Chemical Corp. facility in Waterloo, New York
HCC	Hampshire Chemical Corp.
NYCRR	New York Codes, Rules, and Regulations
NYSCC	New York State Canal Corporation
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OBG	O'Brien & Gere Engineers, Inc.
RCRA	Resource Conservation and Recovery Act
RFI	Resource Conservation and Recovery Act facility investigation
RTA	Remedial Target Area
SESC	site erosion and sediment control
SWMU	Solid Waste Management Unit

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SECTION 1

Introduction

This basis of design (BOD) report for the former Hampshire Chemical Corp. (HCC) facility Solid Waste Management Unit (SWMU) 1 located in Waterloo, New York (facility), has been prepared pursuant to a Second Amended Order on Consent executed between HCC and the New York State Department of Environmental Conservation (NYSDEC), Index Number 8-20000218-3281, dated August 12, 2011 (NYSDEC 2011), to implement appropriate corrective measures (Appendix A—Design Drawings). This report presents the basis of design for implementation of the corrective measures.

1.1 Purpose and Objectives

The preliminary design is based on the recommended Alternative 3 included within the SWMU 1 Corrective Measures Study (CMS) submitted to NYSDEC in December 2013 (CH2M HILL 2013). This report details the design elements for implementation of the corrective measures of Alternative 3 for SWMU 1.

1.2 Site Description and Background

The facility is located at 228 East Main Street, Waterloo, New York. Waterloo, which is located in the north-central portion of Seneca County, New York, historically has been a rural agricultural area. The facility is bordered to the north by East Main Street, to the east by residential properties, to the west by East Water Street, and to the south by the Cayuga-Seneca Canal. The facility is surrounded by residential properties (north, east, and southwest), commercial businesses (to the west), and the Cayuga-Seneca Canal (to the south). South of the canal are some residences, warehouses, and farther downstream is the Village of Waterloo wastewater treatment plant. Bruno Bock also owns property on the eastern side of Gorham Street, where the employee parking lot for the site is located.

The facility consists of 8.3 acres of industrially developed land containing the following: several interconnected buildings that house offices; a quality control laboratory; manufacturing, maintenance, and shipping/receiving operations; and a wastewater treatment plant. The site also includes outside drum storage areas and several aboveground storage tanks. An undeveloped open area containing a former dump is located near the southwestern boundary of the facility.

SWMU 1 is in the western area of the site. It is bounded to the east by the facility, to the south by the Cayuga-Seneca Canal, to the west by East Water Street, and to the north by the facility raceway.

1.2.1 Site History

The facility was first owned and operated by the Waterloo Woolen Manufacturing Company, which operated a woolen textile mill from before 1839[1] until approximately 1936,

[1] The oldest standing onsite building dates from 1839; however, there are indications that buildings were onsite before then.

when the mill was closed. The facility was later reopened in 1943 by Evans Chemetics and produces divalent organic sulfur chemical intermediates to this day.

The facility was acquired by the W. R. Grace Company in 1979 and remained a part of Grace's Organic Chemical Division until 1992, when HCC completed a management buyout of the Organic Chemical Division. Evans Chemetics was part of the management buyout, and the facility became an operating unit of HCC. In 1995, while HCC remained the owner of the facility, HCC was purchased by and became a wholly owned subsidiary of Sentrachem, Ltd., a South African chemical company. In 1997, Sentrachem was acquired as a wholly owned subsidiary of The Dow Chemical Company (Dow). In 2005, Dow sold the facility (as well as other assets of Evans Chemetics) to Bruno Bock[2], a German manufacturing company. Evans Chemetics LP is now a wholly owned subsidiary of Bruno Bock and operates the site.

The facility has undergone significant changes over time. A number of onsite buildings were constructed in the mid- to late-1800s, but most of them were subsequently demolished. The Cayuga-Seneca Canal and Raceway system was much more extensive in the late 1800s and early 1900s than it is today. Since 1943, many of the old canals and raceways were gradually filled, old buildings demolished, and new buildings constructed.

1.2.2 SWMU 1 History

Before the Village of Waterloo used the SWMU 1 area for a landfill, and based on Sanborn fire insurance maps from 1886 to 1911, the area was used for woolen mill operations (known as the West Mill). The main raceway that supported the West Mill, which ran south of the building, had a lock system. Another smaller raceway appears to have been a waterway connection to the existing raceway, which was likely a waterfall based on the hydraulic head difference between the existing raceway and canal.

Based on an October 1918 Sanborn fire insurance map of the site, an area within the western portion of SWMU 1 is identified as the Village of Waterloo Dump. The Sanborn map also shows that the western portion of the large raceway south of the building was filled. Aerial photographs from 1938 and 1954 also show the western portion of the former raceways as filled and the West Mill present. According to the Resource Conservation and Recovery Act (RCRA) *Facility Assessment Report* (A. T. Kearney 1993), the former Village of Waterloo Dump was probably in operation at the western edge of the site until 1951 (O'Brien & Gere Engineers, Inc. [OBG] 2003). The Village of Waterloo Dump appears to have been closed by 1954 based on the extent of grass and tree vegetation observed on the aerial photographs.

Based on the Sanborn and aerial maps, it appears that the raceways west of the lock were filled in the 1910s to 1920s, and the type of fill material used is unknown. The West Mill was removed between 1954 and 1959, and the remaining raceways were filled by 1963.

1.2.3 SWMU 1 Regulatory Background

The State of New York first established waste management regulations through the New York State Department of Health (NYSDOH) Part 19, Refuse Disposal in 1963 (NYSDOH 1963), and was later included under the NYSDEC, 6 New York Codes, Rules, and

[2] The Evans Chemetics facility is no longer associated with HCC. Dow sold assets of the Evans Chemetics facility to Bruno Bock (CH2M HILL 2006).

Regulations (NYCRR) Part 360, Refuse Disposal in 1973 (NYSDEC 1973). Requirements established for final closure were similar between the NYSDOH Part 19 and 6 NYCRR Part 360 versions, which included a final cover over the refuse area of at least 2 feet of suitable compacted cover material.

Closure and post-closure requirements of landfills depend on the dates of operation of the landfill facility. Landfills that ceased to accept waste before October 9, 1993 (with or without approved closure plans), must meet the NYCRR closure and post-closure requirements in effect when the facility ceased normal operation.

As formerly stated, Sanborn fire insurance maps of the site indicate that the area along the western side of SWMU 1 was identified as the Village of Waterloo Dump as early as 1918 and that the dump was in operation at the western edge of the site until approximately 1951, suggesting an operation period of at least 33 years. The dump was closed by 1954 based on the extent of grass and tree vegetation observed on the aerial photographs. The placement of soil in SWMU 1 in 1999, which did not include SWMU 7 soils, is not waste disposal; therefore, it is not waste disposal after 1973. It did not cause the previously closed landfill to be reopened. Thus, the relevant closure date for determining the applicability or inapplicability of closure requirements is the early 1950s.

The proposed approach for the closed Village of Waterloo Dump is placement of an enhanced cap. The cap is anticipated to be composed of 2 feet of a low-permeability soil cap layer. This approach is consistent with the applicable requirements.

1.3 Report Organization

This BOD is organized into the following sections:

- **Section 1—Introduction:** Briefly describes the regulatory framework, purpose and objectives, site description and background, and report organization.
- **Section 2—Description of Current Conditions:** Summarizes the physical characteristics, hydrogeology, and extent of constituent of concern (COC) impacts, and the potential pathways of site COCs to receptors.
- **Section 3— Preliminary Design:** Describes preliminary design detail of the aspects of the recommended alternative.
- **Section 4—Project Schedule, Permits, and Waste Management:** Provides a schedule that shows milestones for the deliverables, submittal dates, and regulatory review timeframe. This section also discusses permits, notifications, and waste management elements associated with the design.
- **Section 5—References:** Provides the references cited in the report.

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SECTION 2

Description of Current Conditions

2.1 Physical Characteristics

The boundary of the SWMU 1 area shown in the design drawings (Appendix A) is defined as the area known to have accepted waste—the Village of Waterloo Dump—as shown on historical Sanborn maps of the site and based on extent of lateral waste found up to 2008. As Resource Conservation and Recovery Act facility investigations (RFIs) progressed since 2008, the lateral and horizontal extent of the waste- and debris-impacted area at SWMU 1 continued to be delineated. The current boundary identifying the extent of waste and debris is represented on Sheet 3 (Appendix A), which shows the waste and debris extending from the facility property south onto New York State Canal Corporation (NYSCC) property. NYSCC owns the right-of-way extending south of SWMU 1 and parallel to the canal. The total area of waste and debris has an approximate extent of 2.1 acres.

The existing waste and debris at SWMU 1 compose residential and industrial waste generated by the Village of Waterloo and the facility. The waste and debris below the non-native soil cover (fill material) layer include glass and plastic fragments, scrap metal, black ash and coal, ceramics, shoes, brake pads, copper wire, tires, cobbles, bricks, wood, and metal scrap, porcelain, and/or wood fragments. Numerous intact glass bottles containing white and clear liquids were also found in some areas.

A paved access road runs from East Water Street through SWMU 1 and east into the facility. It is used by large-haul trucks for Evans Chemetics product transportation.

The area north of the access road and south of the raceway is gravel-covered. In this area, there is a covered shelter for drum staging and an adjacent area to the east that is also used for drum staging. West of the drum-staging shelter, the gravel-covered area is used for large-haul trucks to pull to the side of the access road and idle before entering the facility, as needed. Large plastic totes that hold liquid are staged on the gravel-covered area south of the access road.

The area south of the access roadway is vegetated, and some of it is wooded. A portion of the southern extent of SWMU 1 where waste and debris have been identified (as determined by soil borings and historical aerials) is on a former residential property now owned by HCC. The former residence has been purchased by HCC and has been demolished. Waste located within this property was removed and disposed of offsite at Seneca Meadows landfill during the construction of the dewatering pad.

2.1.1 Topography

Elevation across the site varies from approximately 453 feet above mean sea level (amsl) at the elevated soil mound area in the center of the site to approximately 436 feet amsl in the southern and southeastern areas of SWMU 1. The elevated soil area is south of the access road as illustrated within the oblong 450-foot-amsl contour line and extends west-east-southeast (Appendix A, Sheet 3). From this mounded area, the ground surface gently slopes down and north toward the raceway and south toward the canal.

2.1.2 Geology and Hydrogeology

The facility lies on the contact between the Lower Devonian-age Manlius Limestone and Rondout Dolostone to the southeast and the Lower to Middle Devonian-age Onondaga limestone to the northeast. These units overlie Silurian-age shales, dolomites, and sandstone. Below the Silurian sequence are the Ordovician-age shales, sandstones, shales, and limestones, which cap the Upper Cambrian dolomites and sandstones, and the Precambrian basement of gneiss, marble, and quartzite at depths of 5,000 feet below ground surface (bgs) (Van Tyne 1974, as summarized in Saroff 1987).

From the ground surface, the unconsolidated material overlying bedrock at SWMU 1 generally consists of non-native soil (fill material) that generally overlies waste and debris mixed with non-native soil. The fill materials are usually underlain by native clay and/or glacial till, which in turn are underlain by limestone bedrock. At some locations, as within the former raceways, non-native material mixed with waste extends to the bedrock surface.

The non-native soil (fill material) consists of mostly silt and clay with some sand and gravel. The non-native material largely overlays the waste materials, although in some cases (on the south portion of SWMU 1), waste and debris have been observed at the ground surface. Laboratory tests of the geotechnical soil samples collected from the soil cover showed that the fill material from 0 to 5 feet bgs has a high percentage of silt and clay-sized material, indicating that this material can be expected to behave more as clay than a sandy soil. Based on the Atterberg limits, the plasticity index varies from 6.8 to 24.2 percent, and the liquid limit varies from 28.2 to 42.4 percent, which indicates the presence of inorganic clays of low to medium plasticity with a low shrink-swell potential. Permeability test results indicate that soil present up to a maximum depth of 5 feet bgs at the SWMU 1 area is of low permeability at 5.52×10^{-07} centimeters per second (cm/sec) (1.56×10^{-03} feet per day) to 9.71E-07 cm/sec (2.75×10^{-03} feet per day), which helps to reduce infiltration where present (CH2M HILL 2012a).

Native material, including clay and/or glacial till, overlies the bedrock. The bedrock material appears to be hard, fresh, fine-grained gray to very dark gray limestone. At the northwestern area of SWMU 1 (BS-09 and BS-14), and at the southwestern area of SWMU 1 (BS-11 and BS-12), the top of bedrock appeared to dip slightly toward the former raceway. The top of bedrock at the eastern side of SWMU 1 appeared to dip in a southeasterly direction toward the canal (CH2M HILL 2012a). The elevation of the top of bedrock encountered by the borings varied from 429.4 feet amsl at BS-11 to 416.4 feet amsl at BS-06.

The water table intersects the non-native soil/waste and debris layer at approximately 9 to 23 feet bgs (CH2M HILL 2012b). The highest groundwater elevation of the 14 soil borings was measured at BS-09 (435.0 feet amsl), north of the former raceways. The lowest groundwater elevations were measured at BS-12 (427.2 feet amsl), southwest of the former raceway, and at BS-01 (427.8 feet amsl), southeast of the former raceways. The groundwater flow direction at SWMU 1 flows south toward the Cayuga–Seneca Canal.

A slope stability evaluation was performed along the slopes of the SWMU 1 area as part of the RFI Addendum (CH2M HILL 2008). As stated in accordance with the summary of the evaluation, there is minimal potential for structural instability within the existing western, eastern, northern, and most of the southern slopes of SWMU 1. The potential exists for future structural instability along the southern slope and near the eastern end of the southern slope, along with erosion potential without the proper measures implemented in the design. The final design will include a detailed slope stability evaluation of the southern side of the landfill and canal bank to demonstrate the long-term stability of SWMU-1 with the changes in grade and loading with implementation of the remedy.

2.2 Summary of RCRA Facility Investigations

Several phases of RFIs have been performed at the site, and the detailed results of the investigations have been discussed in various reports submitted to NYSDEC. Subsection 2.2 summarizes the results of the RFI activities performed at SWMU 1.

Before the investigation at SWMU 1, the raceway boundaries were constructed using historical maps, and a surveyor located and marked out the former raceways and other structures in the field. The RFI sampling visit work plan (OBG 2001) proposed to evaluate the boundaries of the former Village of Waterloo Dump site with test-pit excavations and an investigation as to whether there have been releases from the landfill. The sampling visit work was performed between December 2001 and March 2002 (OBG 2003).

As noted in the OBG sampling visit report (OBG 2003), nine test pits were completed in the SWMU 1 area to locate the former raceways and to describe the fill material encountered. Of these test pits, only one did not encounter the raceway walls or bottom. Intact glass bottles were found in one test pit. Six shallow and one intermediate groundwater monitoring wells were installed during the field activities. Groundwater sampling also was conducted at the monitoring wells and reported in the sampling visit report (OBG 2003).

In April and May 2004, CH2M HILL performed the RFI activities, which included excavating three test pits at SWMU 1. Approximately 7 cubic yards of fill material containing glass bottles and associated soil were removed from the excavations. Additional RFI work was performed by CH2M HILL in December 2005 that included the installation of five temporary piezometers. Groundwater sampling also was conducted at the site monitoring wells and temporary piezometers and documented in the RFI report (CH2M HILL 2006).

In December 2009, 14 test pits were excavated and visually assessed on property owned by the NYSCC, which is located along the southern side of the former HCC facility. Native material within the investigation area was overlain by a silty sand fill material, intermixed with ash, rocks, bottleware, and glassware, including small bottles, as well as construction debris (including concrete and brick). The area where bottles were observed that may be associated with facility operations also contained municipal waste and construction debris, which is not believed to be site related. Within the test pits completed during this field event, no stained soils, elevated photoionization detector readings, or indications of discharges were observed.

Additional investigations for waste delineation near the former residence and subsurface methane survey were completed at SWMU 1 and reported in 2013. Waste located on the residential property was removed during the house demolition and canal dewatering pad construction and disposed of offsite at an approved landfill.

2.3 Identification and Extent of Waste

In 2001, test pits were excavated within SWMU 1 to identify fill material and locate the former raceways (OBG 2003). Cover and fill material was placed over the native deposits across most of the site. The fill material on the eastern, northern, and southern areas of the SWMU generally consists of silt, sand, and gravel with varying amounts of brick fragments, filter fabric material, cinder, ash, ceramic, scrap metal, glass and plastic bottles, wood, shoes, copper wires, and tires. This fill presumably was placed during development of the property to raise low-lying areas and fill in raceway structures to facilitate construction. Test pits completed on the western side of SWMU 1 (TP-6 and TP-7) indicate that the fill thickness ranges from approximately 10 to 20 feet. Fill material on the western side of the SWMU consists of cobbles, bricks, concrete, wood, and scrap metal, with smaller pockets of ashes, coal, and glass fragments. The thickest fill deposits are on the western portion of the site.

Intact bottles were identified in TP-9, located on the eastern side of SWMU 1. Some of the bottleware identified in TP-9 contained a thick, white-colored liquid. The liquid material from three bottles was sampled and sent to a laboratory for analyses. Acetone was the only organic compound reported in the liquid samples at a concentration of 90,000 micrograms per liter, in addition to the metals zinc, sodium, and lead.

Information from soil and well boring logs indicate that the fill material extends to the east along the southern side of the manufacturing area and the edge of the canal. It appears that a limited amount (less than 3 feet) of fill was placed on the northeastern side of the facility, which is consistent with the location of some of the original buildings.

Additional test pits were completed in 2009 south of SWMU 1 and within the NYSCC right-of-way. Native material was overlain by a silty sand fill material approximately 2 to 7.5 feet thick, intermixed with ash, rocks, bottleware, and glassware, including the small bottles that are consistent with those observed during the April 2008 field event, as well as construction debris (including concrete and brick). The area where bottles were observed that may be associated with facility operations also is impacted with municipal waste and construction debris, which is not believed to be site related. In the test pits completed during this field event, no stained soils, elevated photoionization detector readings, or indications of discharges were observed.

Based on visual observations, all 14 test pits exhibited a heterogeneous mixture of municipal waste and construction debris over an average depth of 5.5 feet bgs (debris depths ranged from 2 to 7.5 feet bgs), which represents an approximate volume of 2,175 cubic yards of soil impacted with debris of this nature within the investigation area.

Bottles consistent with those observed during the April 2008 field event were identified in 11 of the test pits (TP-01, TP-02, TP-04, TP-05, TP-06, TP-07, TP-08, TP-09, TP-10, TP-11, and TP-13), and although at varying percentages, the bottles were intermixed with municipal waste and construction debris. An approximate volume of 1,500 cubic yards (1,177 cubic yards associated with Bottle Area 11 and 333 cubic yards associated with Bottle Area 12) of debris is impacted with the small bottles previously observed during the April 2008 field event.

Construction debris and cut stone blocks along the southeastern slope and toe of the landfill provide additional stability to the slope and reduce erosion. Waste, including debris, bottles, and other trash, has been identified along the canal bank near the southeastern end of the landfill where the landfill toe is estimated to be approximately 20 feet from the canal bank. In addition, bottleware and metal waste were identified on the ground surface within the NYSCC right-of-way.

2.4 Identification and Extent of COCs Impact

The remedial target area (RTA), the area where waste and debris are present, covers approximately 2.1 acres. Based upon the waste materials observed in the test pits, monitoring well boring logs, and soil boring logs at SWMU 1, it is estimated that the depth of waste and debris composes the upper 5- to 15-feet bgs interval. In addition, based on these observations, the volume of SWMU 1 being addressed by corrective measures is approximately 50,000 cubic yards.

2.4.1 Soil

Human health and ecological risk assessments were performed as part of the RFI addendum in 2007 and concluded that there are no potential ecological and/or human health direct-contact risks based on the SWMU 1 soil sample results (CH2M HILL 2008).

2.4.2 Groundwater

As indicated by the analytical results of the annual sitewide sampling events, the concentrations of constituents in site groundwater appear to be stable or generally trending lower over time (CH2M HILL 2008, 2012b, 2013). In general, concentrations of metals in groundwater at SWMU 1 appear to be consistent with background concentrations.

2.4.3 Soil Vapor and Methane Gas

In October and November 2012, a methane gas survey was conducted at SWMU 1 to evaluate conditions within the subsurface. The survey used six existing shallow groundwater monitoring wells at SWMU 1 retrofitted with a cap/labcock valve. It was concluded that the current methane, oxygen, and carbon dioxide levels measured at each of the SWMU 1 sampling locations appear to indicate more aerobic conditions that would not favor the production of methane gas. In addition, since the methane levels in all six monitoring locations were not higher than 0.1 percent (by volume), significantly lower than the lower explosive limit (5 percent by volume), and the duration of time that the waste has been buried at SWMU 1 (more than 60 years) is significantly beyond the peak of landfill gas production (generally 5 to 7 years after burial), the presence of methane gas in the subsurface due to waste decomposition would not be expected. Low levels of methane at SWMU 1 would not present a concern for offsite vapor intrusion.

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SECTION 3

Basis of Design

This section provides a summary of the preliminary design elements of the recommended Alternative 3 from the CMS. A final design will be submitted to NYSDEC in late 2014 during the procurement process for its concurrent review, in order to complete the scheduled implementation in the spring of 2015. The recommended alternative includes the existing asphalt cap, extended asphalt cap, implementation of a low-permeability soil cap, and stormwater improvements.

3.1 Cap Limits

The recommended alternative includes capping using the existing asphalt access road as a cap, an extension of the asphalt cap, and a low-permeability soil cap. The proposed soil cap and asphalt cap limits are shown in the preliminary design drawings (Appendix A). The soil cap will be approximately 1.4 acres in area. The existing asphalt cap is approximately 28,000 square feet with an approximately 11,000-square-foot asphalt cap extension.

3.2 Cover System

The proposed soil cap will be no less than 24 inches of a low-permeability soil, with a permeability of no greater than 1×10^{-7} cm/sec overlain by 6 inches of topsoil. The soil cap will be compacted to no less than 95 percent compaction of a standard Proctor (D698). The topsoil layer will be suitable for sustaining vegetative growth and will be seeded with native grasses.

3.2.1 Subgrade

Clearing of trees occurred in March 2014, leaving grubbing activities to occur during subgrade preparation. The subgrade surface will be proof-rolled by a smooth drum roller to prepare the subgrade for the soil cap installation and for preparation of the extend asphalt cap base gravel course. Subgrade fill is expected to consist of soil and waste from within the SWMU 1 area primarily from the cut areas, which are necessary for placement of the asphalt base gravel and the perimeter swale (Appendix A). Slopes of the soil cap area will be graded generally to 4:1. The asphalt cap extension will have a slight grade towards the raceway to the north.

Subgrade soil fill will be compacted to achieve 95 percent of a standard Proctor, and asphalt sub-base gravel will be compacted to 98 percent of a standard Proctor. Cap subgrade soils will be placed in maximum 6-inch compacted lifts with gravel sub-base placed in one 8-inch lift. For areas known to contain bottle waste, thicker lifts of subgrade soil will be used to prevent breakage of bottles to the extent possible.

3.2.2 Demarcation Layer

The demarcation layer will consist of orange temporary fencing that will be laid on top of the subgrade under both the asphalt extension and soil cap area. The layer will be continuous beneath the asphalt and soil cap limits.

3.2.3 Low-permeability Soil Cap Layer

After placement of the subgrade fill material and demarcation layer, cap soil will be placed from soil provided by an offsite clean borrow source. The cap soil will be installed and compacted to achieve a minimum density of 95 percent as determined by a standard Proctor (ASTM D698).

Clay Cap Layer Borrow Source Characterization/Pre-qualification

The following tests shall be conducted on representative samples of each material taken from each borrow source:

- One sieve analysis (ASTM D422)
- One moisture content test (ASTM D2216)
- One Atterberg limits test (ASTM D4318)
- One Standard Proctor test (ASTM D698)
- One flexible wall permeability test (ASTM D5084)

Cap Soil Placement

During placement of the cap soil, in-place moisture and density testing will be required as specified below. Tests must achieve a minimum 95 percent compaction as determined by a standard Proctor. Additionally, in-place permeability will be tested for each lift of cap soil by taking Shelby tube samples of placed cap soil.

Test	ASTM Designation	Frequency
In-place Density—Nuclear Gage	ASTM D2922	1 test per lift per 5,000 square feet
In-place Moisture—Nuclear Gage	ASTM D3017	1 test per lift per 5,000 square feet
In-Place Permeability—Shelby Tube	ASTM D5084	1 test per lift of Cap Soil (4 minimum)

3.2.4 Topsoil

The topsoil layer (soil capable of supporting vegetation) will consist of at least 6 inches of soil with pH in the range of 6.0 to 7.5. The topsoil layer will be placed with low ground-pressure equipment and compacted lightly, as required for access and stability and to support vegetation. The uppermost 2 inches of the layer will be scarified to provide a base for seeding and treated with lime and fertilizer as needed. Erosion protection (such as turf matting) is required along the perimeter swales due to the steeper nature and expected flows associated with the swales.

The topsoil layer will be suitable for sustaining vegetative growth and will be installed and seeded with native grasses of the local area.

3.2.5 Asphalt Cap Extension

The asphalt cap extension will be placed on top of the prepared subgrade and demarcation layer. An 8-inch-thick dense-graded gravel will be used as the base layer for the asphalt extension. A 4-inch-thick asphalt is proposed for the cap extension, which will be further defined in the final design.

3.2.6 Vegetation and Seeding

Permanent vegetative cover will be used on the final at-grade soil surfaces. Soil will be seeded with a native seed mixture, depending on the temperature at time of planting.

3.2.7 Surface Water Management

Drainage system requirements will be minimal, with stormwater from the soil cap and asphalt cap extension area generally handled by sheet flow. The asphalt cap extension will drain to the north raceway with the soil cap draining via a new perimeter swale towards the canal and entering the canal through two rip rap-lined drainage channels. A detailed analysis will be included with the final design.

3.2.8 Volumetric Analysis

The fill required to achieve the anticipated subgrade elevations will consist of relocated waste and soil from within the SWMU 1 boundary, except for within areas known to contain glass bottleware containing liquids. To achieve subgrade elevations and future design features, the following estimated quantities of material are required:

- 3,300 cubic yards of subgrade cut
- 3,300 cubic yards of subgrade fill
- 4,630 cubic yards of cap soil
- 1,158 cubic yards of topsoil for the 6-inch-thick layer
- 242 cubic yards of 8-inch-thick asphalt sub-base gravel
- 130 cubic yards of 4-inch-thick asphalt extension

3.2.9 Slope Stability and Settlement

Slope stability and settlement computations are not provided with this deliverable. Adequate cap slopes in the proposed design along with proper quality control during placement will limit the settlement susceptibility. A slope stability evaluation of the canal bank will be provided with the final design.

3.3 Construction Stormwater and Erosion and Sediment Control Management

Stormwater and erosion quality measures will be implemented in accordance with local erosion and sediment control best management practices.

3.3.1 Silt Fences

Silt fences will be used to impede the flow of sediment and provide for solids removal to reduce the transport of sediment. These controls will be placed along the contours on long slopes and at the limits of construction. Silt fences will be primarily located along the canal bank.

3.3.2 Turbidity Barrier

A turbidity barrier will be placed in the canal along the length of disturbance to trap additional sediments that may breach the silt fence during a heavy rainfall event. It is estimated that a barrier of 250 feet in length is needed.

3.3.3 Check Dams

Check dams will be placed in the excavated perimeter swale and be used to remove sediments until vegetation is established in the perimeter swale.

3.3.4 Dust Control

Water will be available onsite for dust control, as necessary, during construction and will be performed in accordance with the SWMU-1 Community Air Monitoring Plan, which will be submitted as part of the final design.

3.3.5 Erosion Control Matting

Erosion control matting will be required along the perimeter swale and southern slope of the cap along the canal bank. Details of type and placement will be further evaluated during the final design.

3.3.6 Erosion and Sediment Control Maintenance during Construction

Site erosion and sediment control (SESC) measures will be maintained in working order to minimize the potential for erosion. Required maintenance identified in inspection reports will be completed as soon as practicable. Sediment barriers, such as silt fences and check dams, will be replaced as needed or as identified in weekly inspection reports. If results of an inspection completed during construction indicate that erosion controls are insufficient, additional controls will be installed. Indications that controls are insufficient may include, but are not limited to, observations of sediment accumulation or water turbidity downstream (where applicable) of control structures, recurrence of ground surface damage, appearance of eroded surfaces, or damage to controls.

3.3.7 Erosion and Sediment Control Inspections during Construction

During construction, SESC measures will be inspected weekly and within 24 hours of a storm of 0.5 inch of rain in a 24-hour period. An inspection report will document the following: the names and titles of personnel making the inspection, date of inspection, scope of the inspection, observations relating to the effectiveness of controls, procedures to fix deficiencies, and dates that repairs were completed.

3.4 Site Perimeter Fence

After the caps are complete, the existing access gate and fencing will need to be re-installed. As shown on sheet 8 of the design drawings, the gate and associated light and power is to be relocated further to the east than the existing gate location, which will also require additional fencing to accomplish. Site security will be maintained throughout construction.

3.5 Design Drawings and Technical Specifications

Preliminary design drawings are included as Appendix A, and associated technical specifications will be included with the final design.

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SECTION 4

Project Schedule, Permits, and Waste Management

The field implementation schedule is dependent on approval by NYSDEC of the CMS and concurrence with this preliminary design.

4.1 Schedule

Mobilization is proposed to occur in spring 2015. The final design as anticipated to be submitted to NYSDEC by November 2014. The construction effort is estimated to take approximately 10 to 12 weeks in the field. Procurement of subcontractors and construction planning will occur throughout the winter and concurrent with NYSDEC's review due to schedule constraints.

4.2 Notifications

Notification of work will be made to stakeholders at least 2 weeks before starting fieldwork.

4.3 Permits

A general stormwater permit is required from NYSDEC, along with submittal of the project stormwater pollution prevention plan. CH2M HILL will coordinate receipt of this plan during construction planning. No permit is required for the 100-year flood plain.

4.4 Waste Management

Section 4.4 identifies the waste management and disposal procedures that will be followed during the corrective measures. Waste will be managed in accordance with the revised waste management plan that is prepared during the construction planning and the project-specific health and safety plan. The waste streams that are anticipated include decontamination water, and personal protective equipment.

Decontamination water will be stored in 55-gallon Department of Transportation-approved drums. Other liquid waste may be generated from surface runoff, rainfall, snowmelt, or groundwater infiltration into the area recommended for grading and soil covering during the construction phase. This liquid will be pumped out of the construction area and will be stored in 55-gallon Department of Transportation-approved drums, a frac tank, or other approved storage container, before disposal at an approved licensed facility.

Waste containers will be staged in a secured area (that is, fenced and locked). The construction supervisor will be responsible for inspecting investigation-derived waste containers daily. Post-construction inspection will be conducted at a predetermined frequency until investigation-derived waste containers are properly disposed.

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SECTION 5

Cost Estimate

A cost estimate for the preliminary design was prepared and is included as Appendix B. The information in the cost estimate is based on the project information described in this BOD and as shown in the design drawings. Changes in the cost elements are likely to occur because of refinement of the corrective measures during the final design. The final design cost estimate will be a CH2M HILL Class 2 order-of-magnitude cost estimate that is expected to be within +15 to -10 percent of the actual project costs. The preliminary design estimate is currently shown as a +30 to -20 percent of the actual project costs.

The cost estimate, along with resulting conclusions on project financial or economic feasibility or funding requirements, will be prepared for guidance in project evaluation and implementation from the information available at the time the cost estimate was prepared. The final costs of the project will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, and other variable factors. As a result, the final project costs will vary from the cost estimates presented. Because of these factors, project funding needs must be carefully reviewed before specific financial decisions are made or project budgets are established to help ensure project evaluation and adequate funding.

Cost estimates will only be available to the owner and owner's designee.

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SECTION 6

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O'Brien & Gere Engineers, Inc. (OBG). 2003. *Sampling Visit Report, RCRA Facility Assessment, Hampshire Chemical Corporation Facility, Waterloo, New York.* September.

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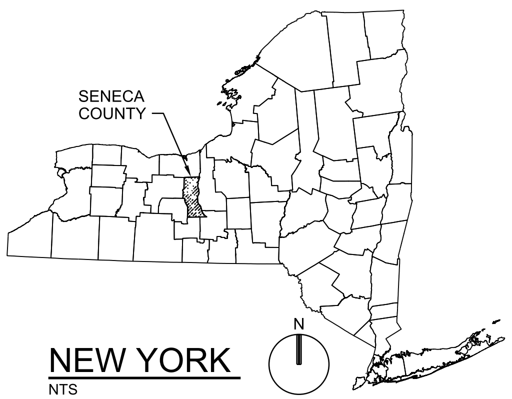
Appendix A
Preliminary Design Drawings

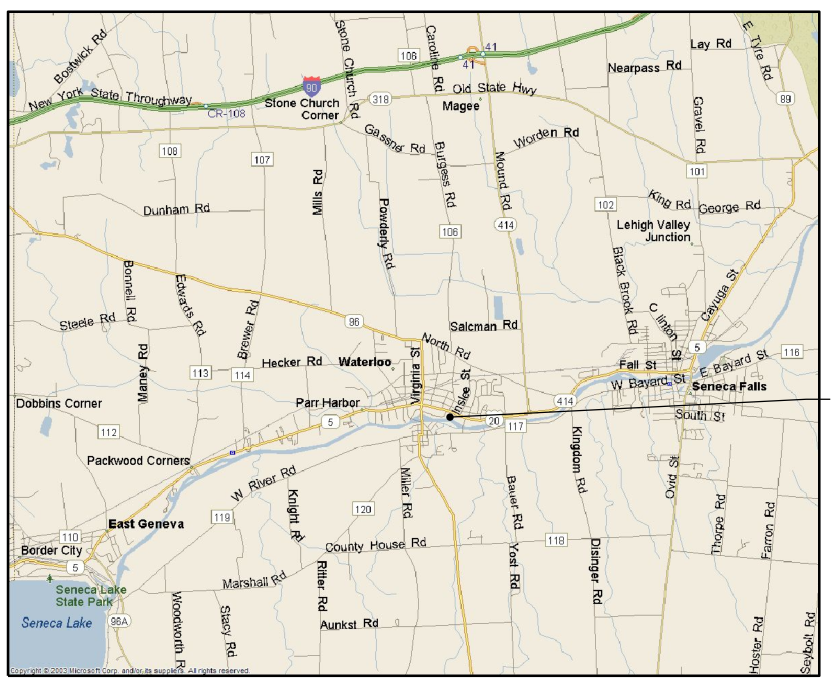
SWMU 1 CORRECTIVE MEASURES PRELIMINARY DESIGN FORMER HAMPSHIRE CHEMICAL CORP. SITE

WATERLOO, NEW YORK

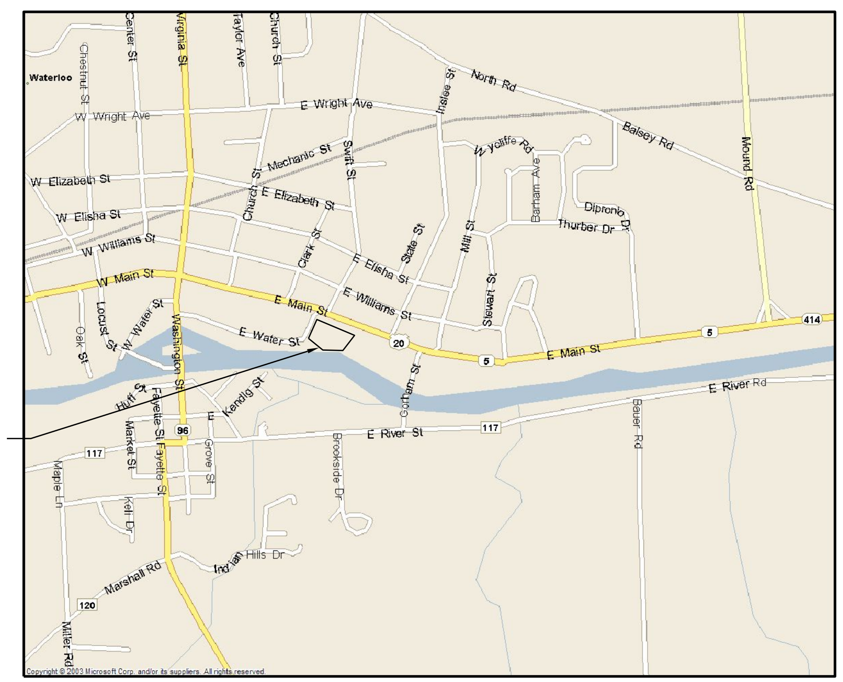
JULY 2014



NEW YORK
NTS



PROJECT LOCATION



VICINITY MAP
NTS

LOCATION MAP
NTS

INDEX TO DRAWINGS

SHEET NO.	DRAWING NO.	TITLE
GENERAL		
1	G-001	TITLE SHEET, VICINITY AND LOCATION MAPS, AND INDEX TO DRAWINGS
2	G-002	CIVIL LEGEND AND DESIGNATION LEGENDS
CIVIL		
3	C-201	EXISTING SITE PLAN & INITIAL SESC PLAN
4	C-202	SUBGRADE PLAN
5	C-203	TOP OF CAP SOIL AND ASPHALT BASE GRAVEL PLAN
6	C-204	TOP OF TOPSOIL AND ASPHALT CAP PLAN
7	C-205	CROSS SECTIONS
8	C-206	FINAL RESTORATION PLAN
9	C-207	SURVEY CONTROL
10	C-208	DETAILS
11	C-209	STANDARD DETAILS

PRELIMINARY DESIGN

NO.	DATE	REVISION	BY	APVD

DSGN A MORAN | DR D CORBETT | CHK B ANDRAE | APVD B CARLING

CH2MHILL®

SWMU 1 CORRECTIVE MEASURES
FORMER HAMPSHIRE CHEMICAL CORP. SITE
WATERLOO, NEW YORK

GENERAL

TITLE SHEET, VICINITY AND LOCATION MAPS AND INDEX TO DRAWINGS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JULY 2014
PROJ	479856
DWG	G-001
SHEET	1 of 11

CIVIL LEGEND

EXISTING	THIS CONTRACT	
157.7	158.5	SPOT ELEVATION
155	155	CONTOUR LINE
	3:1	EMBANKMENT AND SLOPE
		DRAINAGEWAY OR DITCH
	CB OR CB	CATCH BASIN OR INLET
	OR	SIGN
	D OR S	MANHOLE
E	E	ELECTRICAL MANHOLE
H	H	ELECTRIC HANDHOLE
		POST OR GUARD POST
		GUY ANCHOR
		FIRE HYDRANT
		UTILITY POLE
		LIGHT POLE
W	W	MONITORING WELL
		SOIL BORING
	BM	BENCH MARK
		SURVEY CONTROL POINT OR POINT OF INTERSECTION
		BRUSH/TREE LINE
		TREE
		PROPERTY LINE
		CENTER LINE, BUILDING, ROAD, ETC.
		SWMU 1 AREA
		EXTENT OF WASTE/DEBRIS AREA
		SOIL CAP LIMITS
		ASPHALT CAP LIMITS
		STAGING OR WORK AREA LIMITS
OR	OR	DEMOLITION OR TREE CLEARING
OR	OR	STRUCTURE, BUILDING OR FACILITY
		ASPHALT CONCRETE PAVEMENT
		GRAVEL SURFACING
		CONCRETE PAVEMENT
		CURB
		CURB AND GUTTER
		SINGLE SWING GATE
		DOUBLE SWING GATE
X	X	TEMP CHAIN LINK FENCE
		CHAIN LINK FENCE
		CULVERT
SD	SD	STORM SEWER
SS	SS	SANITARY SEWER
G	G	NATURAL GAS
UE	UE	UNDERGROUND ELECTRIC
E-OVH	E-OVH	OVERHEAD ELECTRIC
	301	CONTROL POINT

EROSION CONTROL LEGEND

COVER PRACTICES	SYMBOL
TEMPORARY SEEDING	TS
MULCHING AND MATTING	MU
CLEAR PLASTIC COVERING	CPC
BUFFER ZONES	BZ
PERMANENT SEEDING AND PLANTING	PS
CONSTRUCTION ENTRANCE	
INTERCEPTOR DIKE	ID
INTERCEPTOR SWALE	IS
CHECK DAMS	
OUTLET PROTECTION / RIPRAP	
SILT/SEDIMENT FENCE	///
STRAW BALE BARRIER (BIOFILTER)	
SEDIMENT TRAP (OR SUMP)	

GENERAL SITE NOTES:

1. SOURCE OF TOPOGRAPHY SHOWN ON THE CIVIL PLANS ARE BASE MAPS DEVELOPED FROM:
   A. SURVEY DRAWING NUMBER DWET613P.DWG BOUNDARY AND TOPOGRAPHIC SURVEY EVANS CHEMETICS SITE, DATED MARCH 22,2013
   B. SURVEY PROVIDED BY: RICHARD M. RYBINSKI, L.S. N.Y.S. LICENSE NO. 49779 8236 INDIAN HILL ROAD MALIUS, NEW YORK 13104, MARCH 2013. EXISTING CONDITIONS MAY VARY FROM THOSE SHOWN ON THESE PLANS. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND ADJUST WORK ACCORDINGLY PRIOR TO BEGINNING CONSTRUCTION.
2. EXISTING TOPOGRAPHY, STRUCTURES, AND SITE FEATURES ARE SHOWN SCREENED AND/OR LIGHT-LINED. NEW FINISH GRADE, STRUCTURES, AND SITE FEATURES ARE SHOWN HEAVY-LINED.
3. HORIZONTAL DATUM: NORTH AMERICAN DATUM (NAD) 83 NEW YORK STATE PLANE CENTRAL ZONE.
4. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM (NAVD) 88.
5. MAINTAIN, RELOCATE, OR REPLACE EXISTING SURVEY MONUMENTS, CONTROL POINTS, AND STAKES WHICH ARE DISTURBED OR DESTROYED. PERFORM THE WORK TO PRODUCE THE SAME LEVEL OF ACCURACY AS THE ORIGINAL MONUMENT(S) IN A TIMELY MANNER, AND AT THE DREDGING CONTRACTOR'S EXPENSE.
6. STAGING AREA SHALL BE FOR PARKING, OFFICE TRAILERS, AND ON-SITE STORAGE OF MATERIALS.
7. PROVIDE TEMPORARY FENCING AROUND THE STAGING AREA AS NECESSARY TO MAINTAIN SECURITY AT ALL TIMES.
8. ELEVATIONS GIVEN ARE TO FINISH GRADE UNLESS OTHERWISE SHOWN.
9. SLOPE UNIFORMLY BETWEEN CONTOURS AND SPOT ELEVATIONS SHOWN.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING EROSION CONTROL DEVICES DURING CONSTRUCTION.
11. CONTRACTOR SHALL PREVENT EROSION MATERIALS FROM LEAVING THE SITE.

GENERAL UTILITIES NOTES:

1. EXISTING UNDERGROUND UTILITIES OBTAINED FROM AS-BUILTS AND FROM FIELD SURVEY. CONTRACTOR SHALL FIELD VERIFY DEPTH AND LOCATION OF UTILITIES AND PROTECT ALL EXISTING UTILITIES DURING CONSTRUCTION.
2. EXISTING PIPING AND EQUIPMENT ARE SHOWN SCREENED AND/OR LIGHT-LINED. NEW PIPING AND EQUIPMENT ARE SHOWN HEAVY-LINED.
3. UNDERGROUND UTILITIES MAY EXIST THAT ARE NOT SHOWN. CALL DIG SAFELY NEW YORK (1-800-962-7962) BEFORE EXCAVATING.

Dig Safely. New York
Call 811 before you dig

SECTION / DETAIL DESIGNATIONS LEGEND

ON DRAWING WHERE DETAIL IS CALLED OUT: 4 / C-301 — DETAIL NUMBER; DRAWING NUMBER WHERE DETAIL IS SHOWN

ON DRAWING WHERE SECTION IS SHOWN: SECTION (LETTERS) A **SECTION** SCALE

ON DRAWING WHERE DETAIL IS SHOWN: DETAIL (NUMBERS) 1 **DETAIL** SCALE

ON DRAWING WHERE ONLY A TITLE IS REQUIRED WITH NO REFERENCE (eg: ELEVATIONS) **DRAWING TITLE** SCALE

ON DRAWING WHERE SECTION CALLOUT CUT EXTENDS TO A FIXED LIMIT: A / C-203 — SECTION LETTER; DRAWING NUMBER WHERE SECTION IS SHOWN

ON DRAWING WHERE SECTION CALLOUT CUT EXTENDS THROUGHOUT ENTIRE SHEET: B / C-203 B / C-203

1 KEYNOTES

1 REVISION NUMBER

N NORTH ARROW; CAN BE MODIFIED TO INCLUDE MAGNETIC NORTH ALONG WITH PROJECT NORTH

DRAWING NUMBERING DESIGNATION LEGEND

C-202 — INDICATES DRAWING NUMBER; INDICATES DISCIPLINE(S) OR CATEGORY:

C = CIVIL
G = GENERAL

ABBREVIATIONS / ACRONYMS

BM	=	BENCHMARK
CONC	=	CONCRETE
CONT.	=	CONTINUED
CMP	=	CORRUGATED METAL PIPE
Ø	=	DIAMETER
DIA	=	DIAMETER
DWG	=	DRAWING
E	=	EAST
ELEV / EL	=	ELEVATION
GALV	=	GALVANIZED
H	=	HEIGHT
HDPE	=	HIGH DENSITY POLYETHYLENE
HW	=	HEADWALL
HP	=	HIGH POINT
IE	=	INVERT ELEVATION
IN	=	INCHES
LT	=	LEFT
LF	=	LINEAR FOOT
MAX	=	MAXIMUM
MIL	=	MILLIMETER
MIN	=	MINIMUM
MW	=	MONITORING WELL
N	=	NORTH
NTS	=	NOT TO SCALE
NO. / #	=	NUMBER
RCP	=	REINFORCED CONCRETE PIPE
RT	=	RIGHT
SB	=	SOIL BORING
SESC	=	SOIL EROSION AND SEDIMENT CONTROL
SHT	=	SHEET
TE	=	TOP ELEVATION
TOB	=	TOP OF BANK
TW	=	TOP WIDTH
TYP	=	TYPICAL
W	=	WEST
W/	=	WITH

PRELIMINARY DESIGN

NO.	DATE	REVISION	BY	APVD

DSGN A MORAN | DR D CORBETT | CHK B ANDRAE | APVD B CARLING

SWMU 1 CORRECTIVE MEASURES
FORMER HAMPSHIRE CHEMICAL CORP. SITE
WATERLOO, NEW YORK

CH2MHILL®

GENERAL

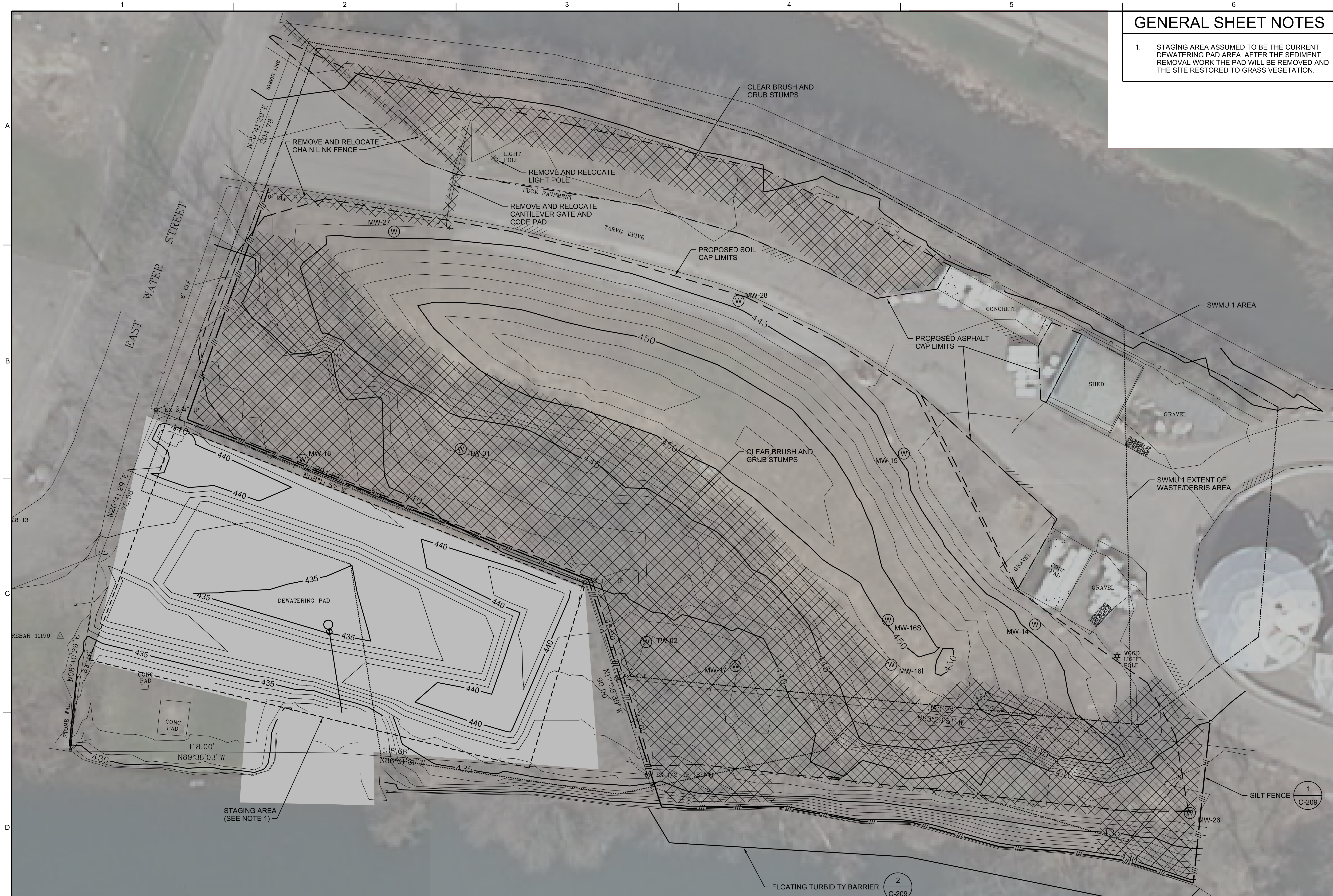
CIVIL LEGEND AND DESIGNATION LEGENDS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JULY 2014
PROJ	479856
DWG	G-002
SHEET	2 of 11

GENERAL SHEET NOTES

1. STAGING AREA ASSUMED TO BE THE CURRENT DEWATERING PAD AREA. AFTER THE SEDIMENT REMOVAL WORK THE PAD WILL BE REMOVED AND THE SITE RESTORED TO GRASS VEGETATION.



EXISTING SITE PLAN

1"=20'

N

0 20 40 80

1"=20'

PRELIMINARY DESIGN

NO.	DATE	REVISION	BY	APVD

DSGN A MORAN | DR D CORBETT | CHK B ANDRAE | APVD B CARLING

SWMU 1 CORRECTIVE MEASURES
FORMER HAMPSHIRE CHEMICAL CORP. SITE
WATERLOO, NEW YORK

CH2MHILL®

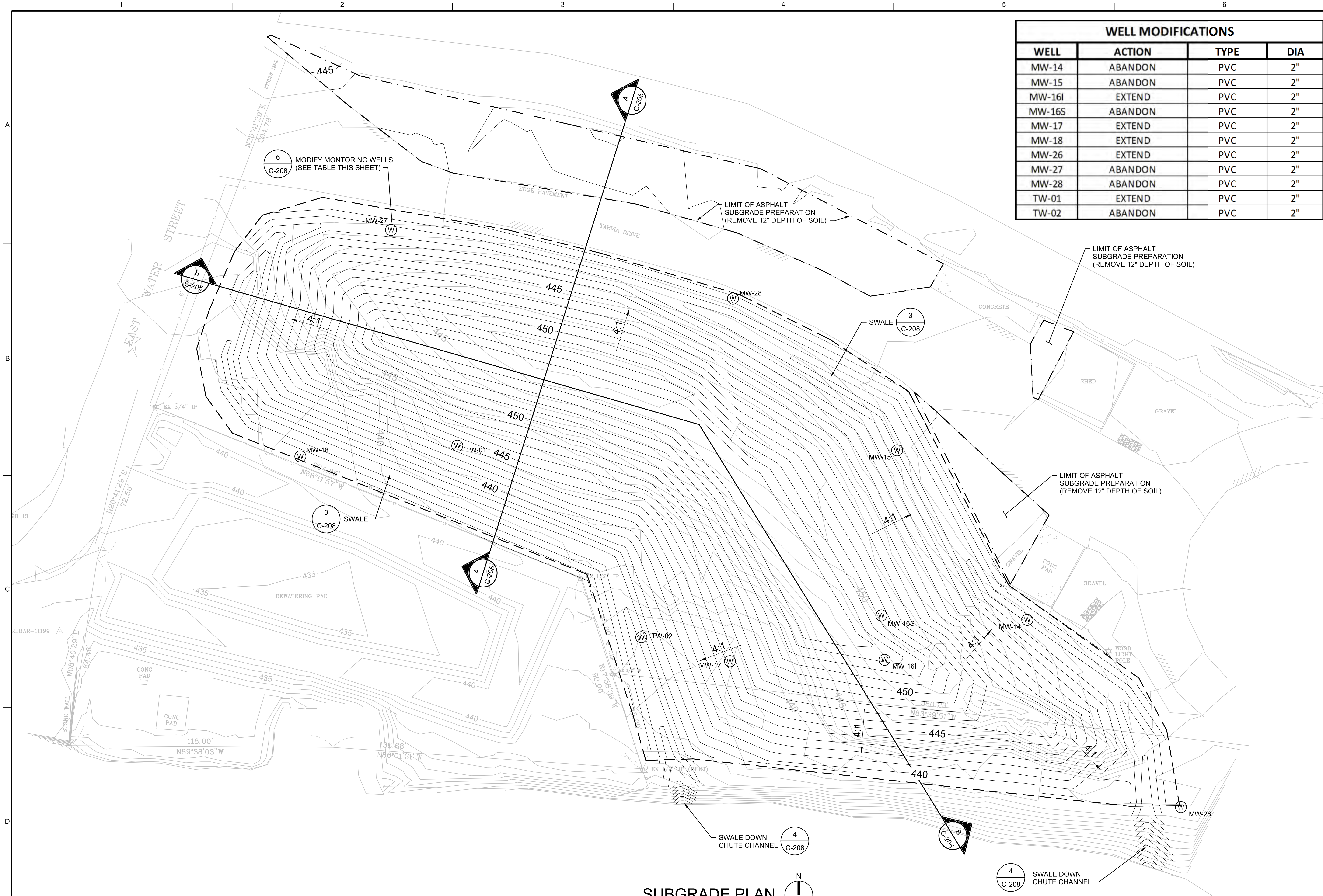
CIVIL

EXISTING SITE PLAN AND INITIAL SESC PLAN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JULY 2014
PROJ	479856
DWG	C-201
SHEET	3 of 11

WELL MODIFICATIONS			
WELL	ACTION	TYPE	DIA
MW-14	ABANDON	PVC	2"
MW-15	ABANDON	PVC	2"
MW-16I	EXTEND	PVC	2"
MW-16S	ABANDON	PVC	2"
MW-17	EXTEND	PVC	2"
MW-18	EXTEND	PVC	2"
MW-26	EXTEND	PVC	2"
MW-27	ABANDON	PVC	2"
MW-28	ABANDON	PVC	2"
TW-01	EXTEND	PVC	2"
TW-02	ABANDON	PVC	2"



SUBGRADE PLAN

1"=20'

N

0 20 40 80

1"=20'

PRELIMINARY DESIGN

SWMU 1 CORRECTIVE MEASURES
FORMER HAMPSHIRE CHEMICAL CORP. SITE
WATERLOO, NEW YORK

CIVIL

SUBGRADE PLAN

NO.	DATE	REVISION	BY	APVD

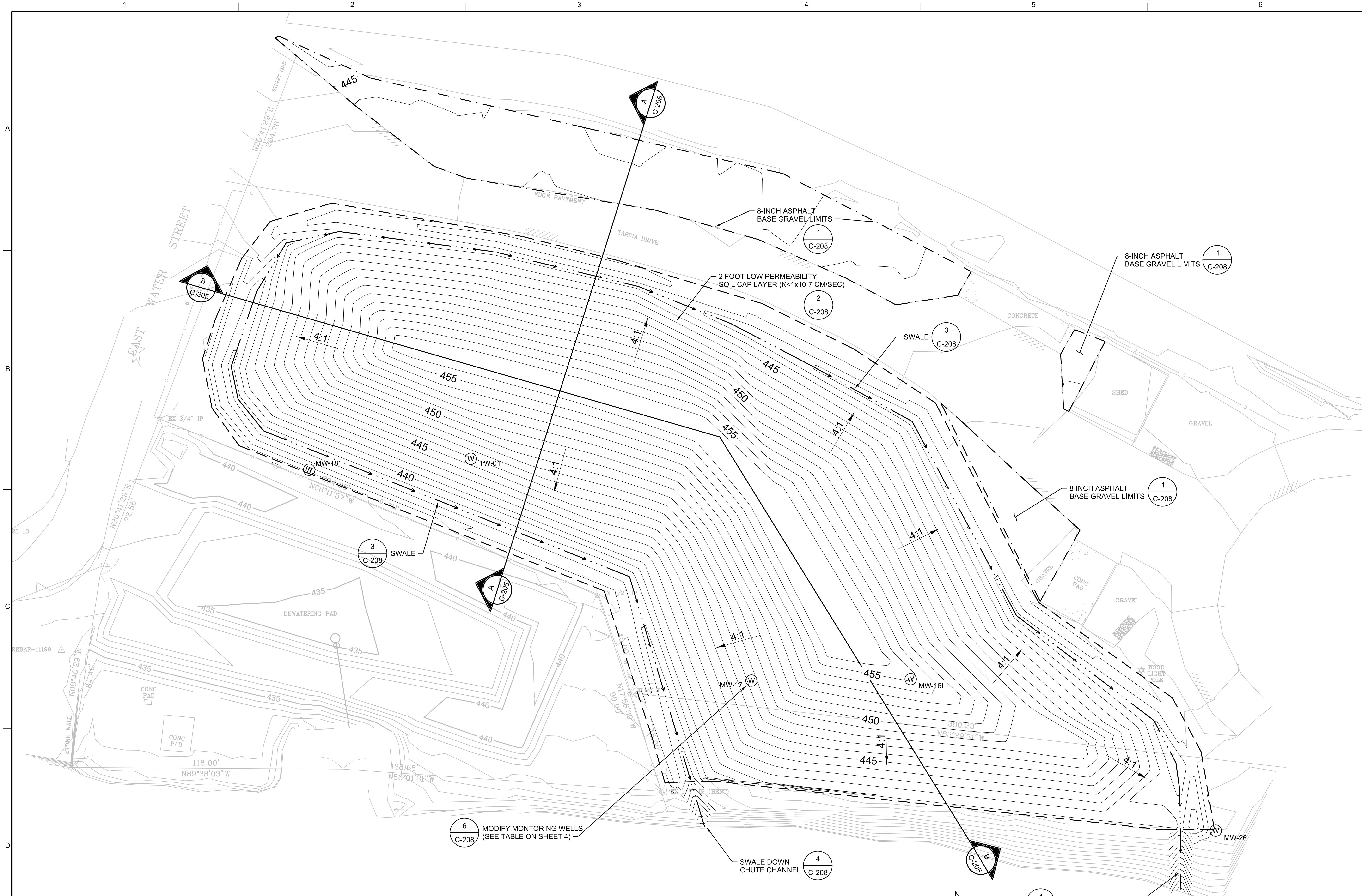
DSGN D CORBETT | DR A MORAN | CHK B ANDRAE | APVD B CARLING

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING.

0 1"

DATE	JULY 2014
PROJ	479856
DWG	C-202
SHEET	4 of 11



TOP OF CAP SOIL AND ASPHALT BASE GRAVEL PLAN

1"=20'

N

0 20 40 80

1"=20'

PRELIMINARY DESIGN

NO.	DATE	REVISION	BY	APVD
DSGN	DR	CHK	APVD	
A MORAN	D CORBETT	B ANDRAE	B CARLING	

SWMU 1 CORRECTIVE MEASURES
FORMER HAMPSHIRE CHEMICAL CORP. SITE
WATERLOO, NEW YORK

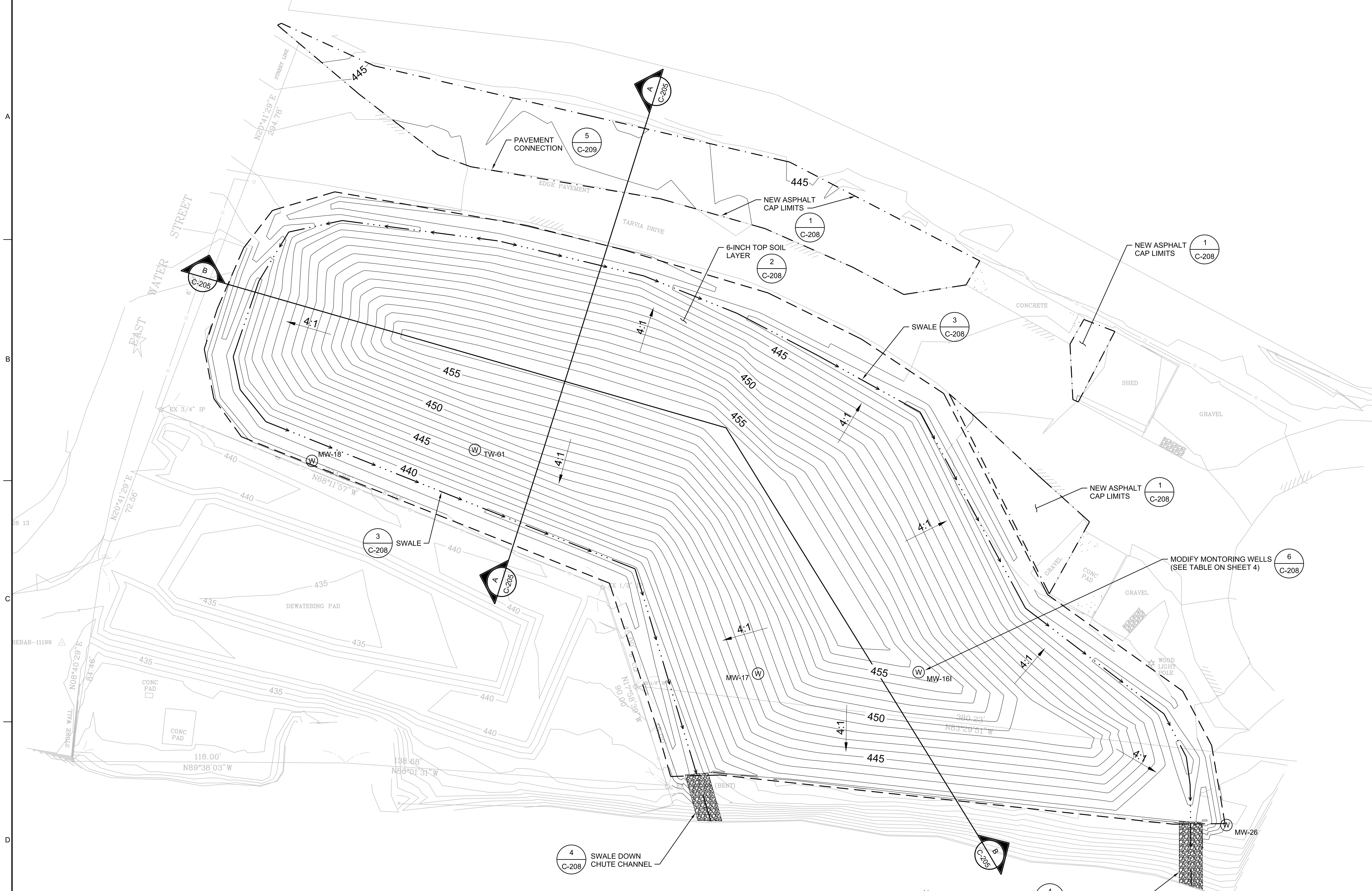
CH2MHILL®

CIVIL

TOP OF CAP SOIL LAYER AND ASPHALT BASE GRADING PLAN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JULY 2014
PROJ	479856
DWG	C-203
SHEET	5 of 11



TOP OF TOP SOIL AND ASPHALT CAP PLAN

1"=20'

PRELIMINARY DESIGN

NO.	DATE	REVISION	BY	APVD

DSGN A MORAN | DR D CORBETT | CHK B ANDRAE | APVD B CARLING

SWMU 1 CORRECTIVE MEASURES
FORMER HAMPSHIRE CHEMICAL CORP. SITE
WATERLOO, NEW YORK

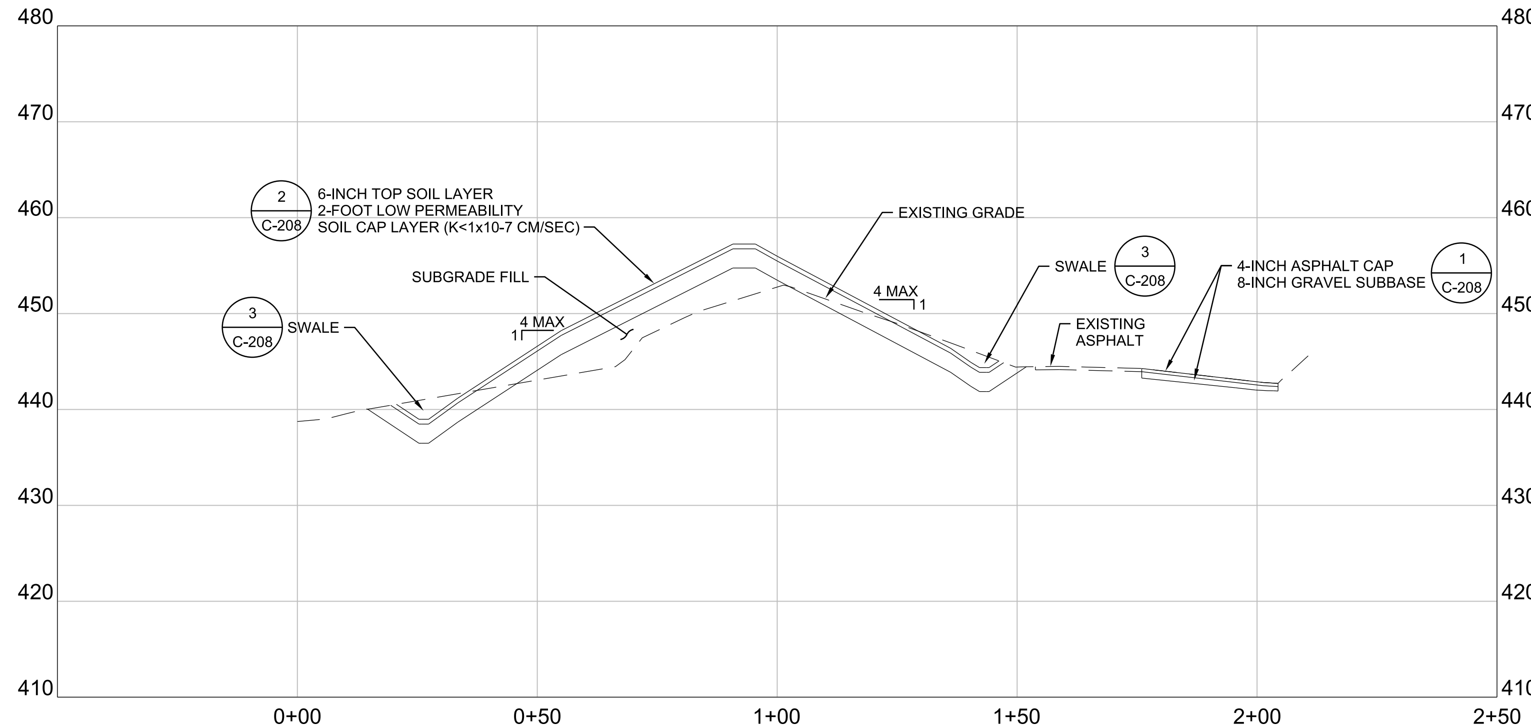
CH2MHILL®

CIVIL

TOP OF TOP SOIL AND ASPHALT CAP PLAN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

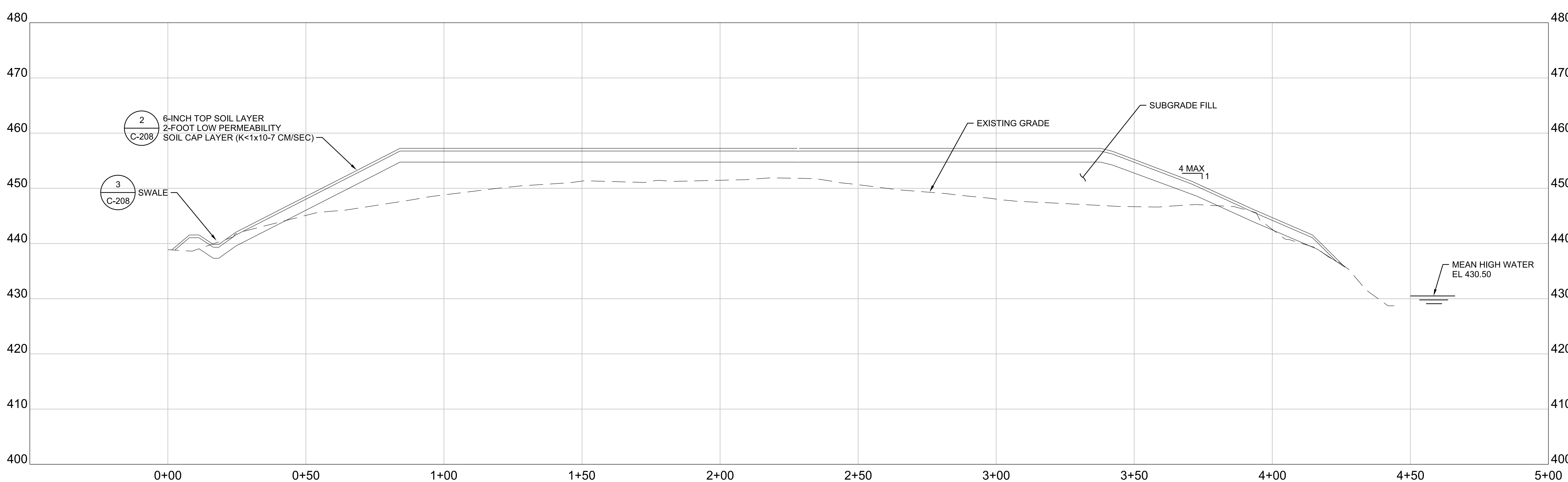
DATE	JULY 2014
PROJ	479856
DWG	C-204
SHEET	6 of 11



A CROSS SECTION

1"=20'

C-202



B CROSS SECTION

1"=20'

C-202

0 20 40 80

1"=20'

PRELIMINARY DESIGN

NO.	DATE	REVISION	BY	APVD

DSGN A MORAN | DR D CORBETT | CHK B ANDRAE | APVD B CARLING

SWMU 1 CORRECTIVE MEASURES
FORMER HAMPSHIRE CHEMICAL
CORP. SITE
WATERLOO, NEW YORK

CH2MHILL®

CIVIL

CROSS SECTIONS

VERIFY SCALE

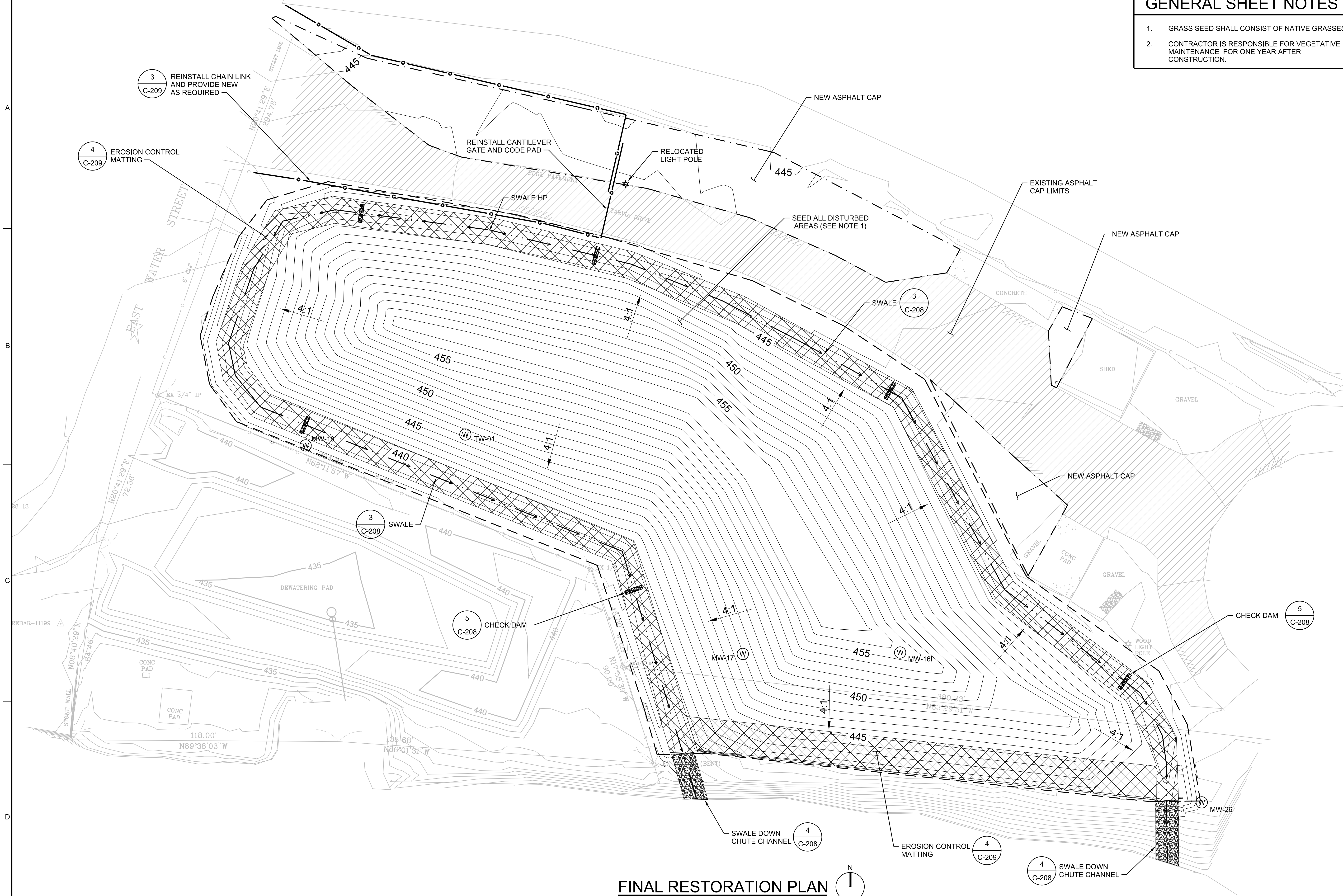
BAR IS ONE INCH ON ORIGINAL DRAWING.

0 1"

DATE	JULY 2014
PROJ	479856
DWG	C-205
SHEET	7 of 11

GENERAL SHEET NOTES

1. GRASS SEED SHALL CONSIST OF NATIVE GRASSES.
2. CONTRACTOR IS RESPONSIBLE FOR VEGETATIVE MAINTENANCE FOR ONE YEAR AFTER CONSTRUCTION.



FINAL RESTORATION PLAN

1"=20'

0 20 40 80
1"=20'

PRELIMINARY DESIGN

NO.	DATE	REVISION	BY	APVD

DSGN A MORAN | DR D CORBETT | CHK B ANDRAE | APVD B CARLING

SWMU 1 CORRECTIVE MEASURES
FORMER HAMPSHIRE CHEMICAL CORP. SITE
WATERLOO, NEW YORK

CH2MHILL®

CIVIL

FINAL RESTORATION PLAN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JULY 2014
PROJ	479856
DWG	C-206
SHEET	8 of 11

TO BE DETERMINED DURING THE FINAL DESIGN

PRELIMINARY DESIGN

CH2MHILL®

CIVIL

SURVEY CONTROL

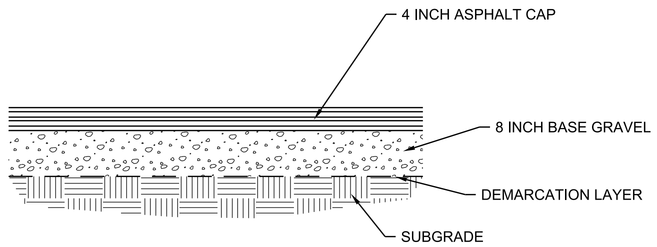
SWMU 1 CORRECTIVE MEASURES
FORMER HAMPSHIRE CHEMICAL
CORP. SITE
WATERLOO, NEW YORK

NO.	DATE	REVISION	BY	APVD

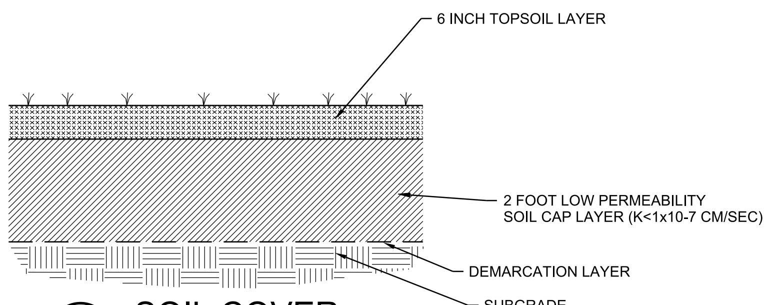
DSGN A MORAN | DR D CORBETT | CHK B. ANDRAE | APVD B. CARLING

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

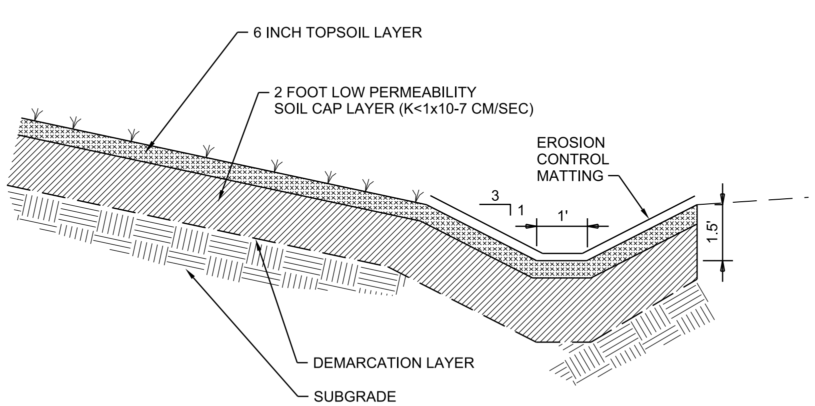
DATE	JULY 2014
PROJ	479856
DWG	C-207
SHEET	9 of 11



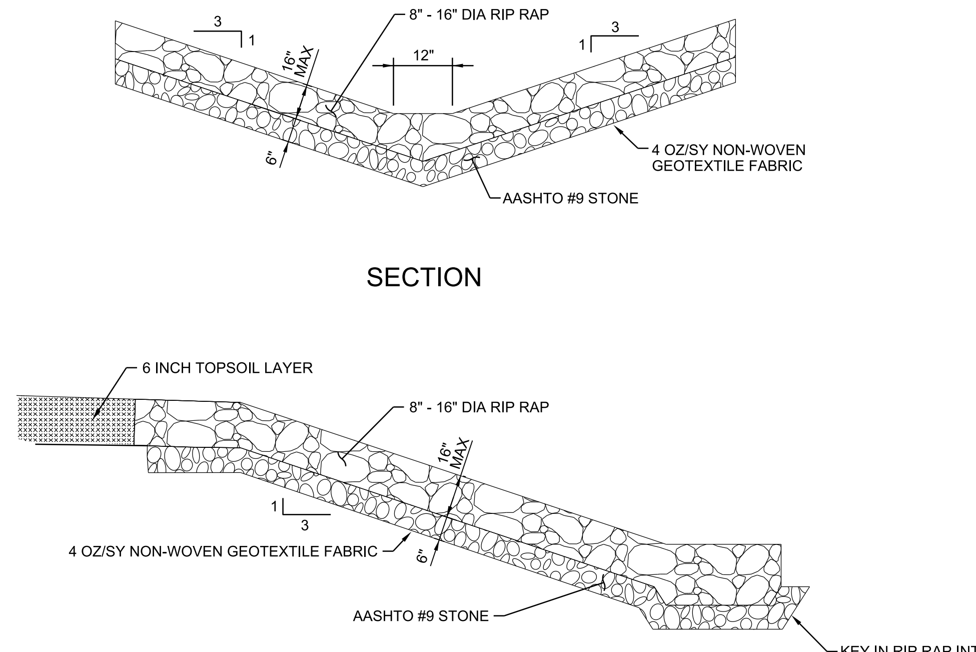
1 ASPHALT CAP
NTS



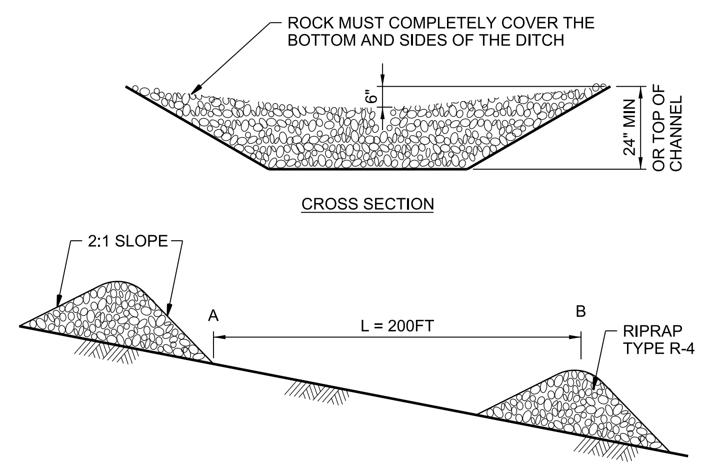
2 SOIL COVER
NTS



3 SWALE
NTS



4 SWALE DOWN CHUTE CHANNEL
1/2"=1'-0"

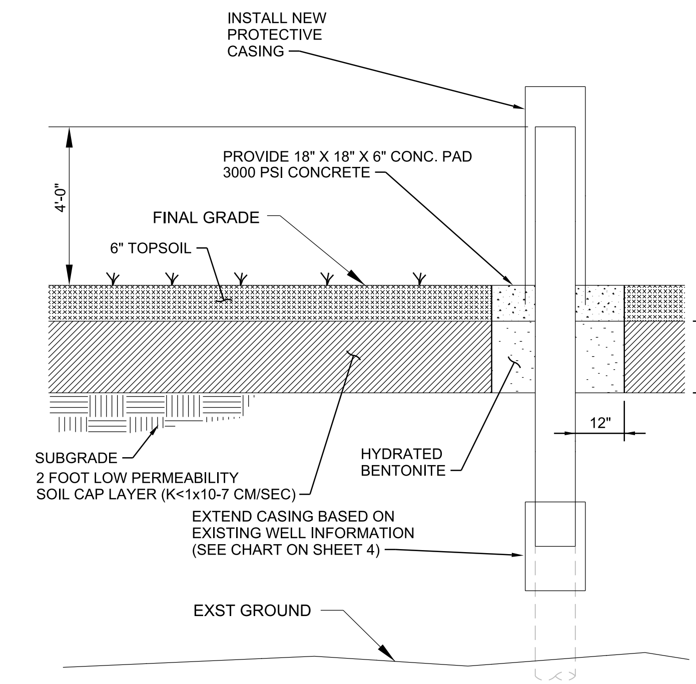


DAM SPACING

MAINTENANCE STANDARDS:

1. ANY SEDIMENT DEPOSITION OF MORE THAN 0.5 FEET SHALL BE REMOVED SO THAT THE CHANNEL IS RESTORED TO ITS DESIGN CAPACITY.
2. THE CHANNEL SHALL BE EXAMINED FOR SIGNS OF SCOURING AND EROSION OF THE BED AND BANKS. IF SCOURING OR EROSION HAS OCCURRED, AFFECTED AREAS SHALL BE PROTECTED BY RIP-RAP OR AN EROSION CONTROL BLANKET OR NET.

5 CHECK DAMS
NTS



NOTE:
1. NO GLUE ALLOWED FOR COUPLER EXTENSIONS. ONLY PLASTIC DOWEL PINS WILL BE ALLOWED.

6 WELL EXTENSION DETAIL
NTS

PRELIMINARY DESIGN

NO.	DATE	REVISION	BY	APVD

DSGN A MORAN | DR D CORBETT | CHK B ANDRAE | APVD B CARLING

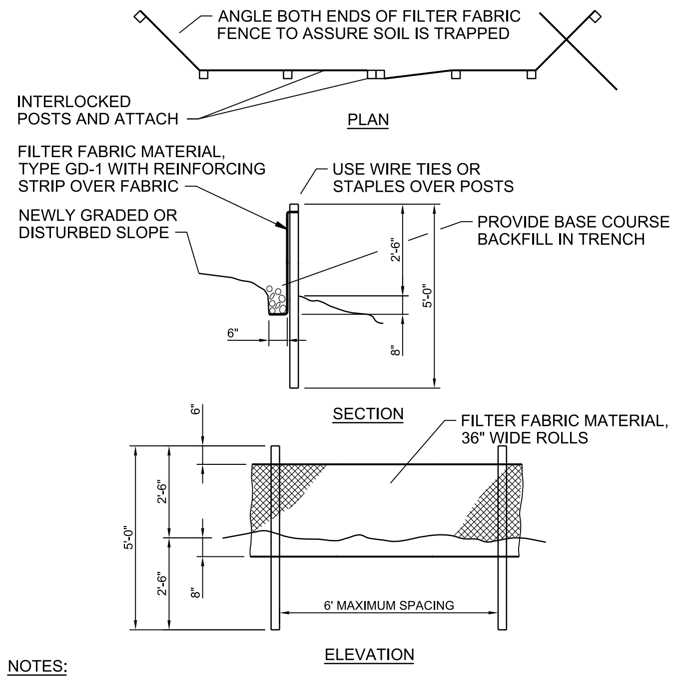
SWMU 1 CORRECTIVE MEASURES
FORMER HAMPSHIRE CHEMICAL CORP. SITE
WATERLOO, NEW YORK

CH2MHILL

CIVIL
DETAILS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

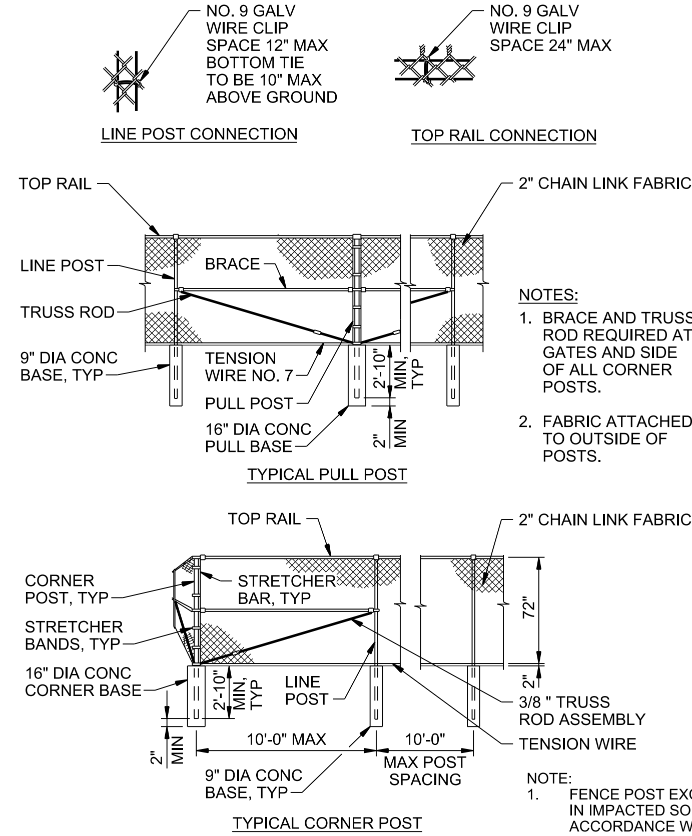
DATE	JULY 2014
PROJ	479856
DWG	C-208
SHEET	10 of 11



NOTES:

1. BURY BOTTOM OF FILTER FABRIC 8" VERTICALLY BELOW FINISHED GRADE.
2. HARDWOOD OR STEEL FENCE POSTS ("T" OR "U").
3. STITCHED LOOPS TO BE INSTALLED DOWNHILL SIDE OF SLOPE.
4. COMPACT ALL AREAS OF FILTER FABRIC TRENCH.

1 SILT FENCE
NTS



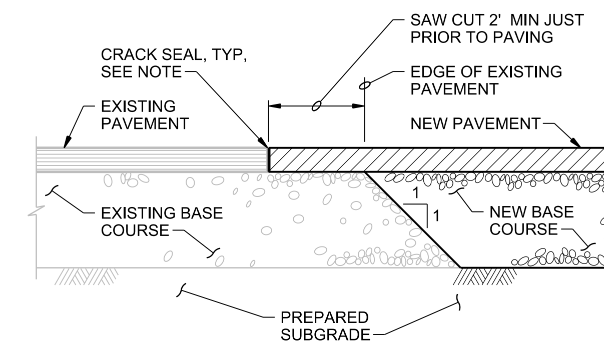
NOTES:

1. BRACE AND TRUSS ROD REQUIRED AT GATES AND SIDE OF ALL CORNER POSTS.
2. FABRIC ATTACHED TO OUTSIDE OF POSTS.

NOTE:

1. FENCE POST EXCAVATION IS ASSUMED TO BE IN IMPACTED SOIL AND MUST BE HANDLED IN ACCORDANCE WITH THE WASTE MANAGEMENT PLAN.

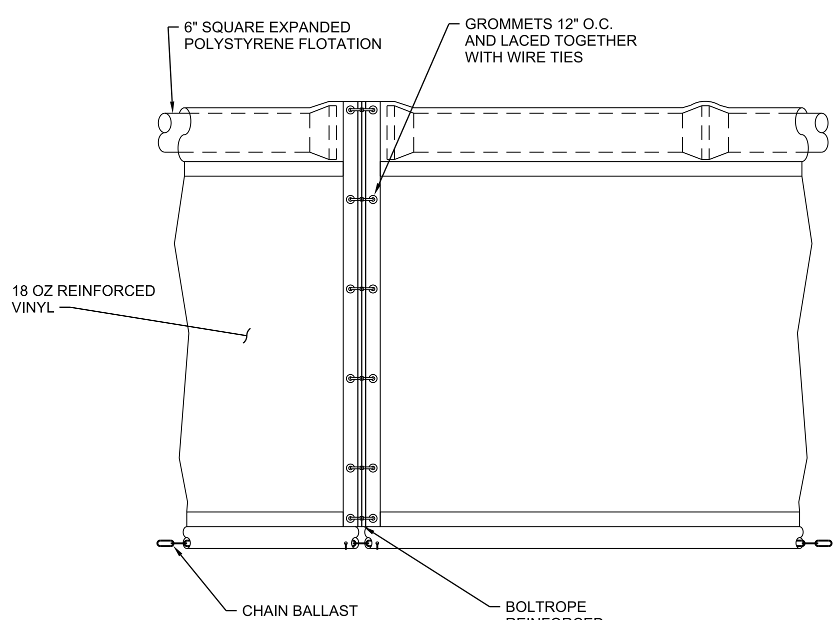
3 PERMANENT FENCE DETAIL
NTS



NOTE:

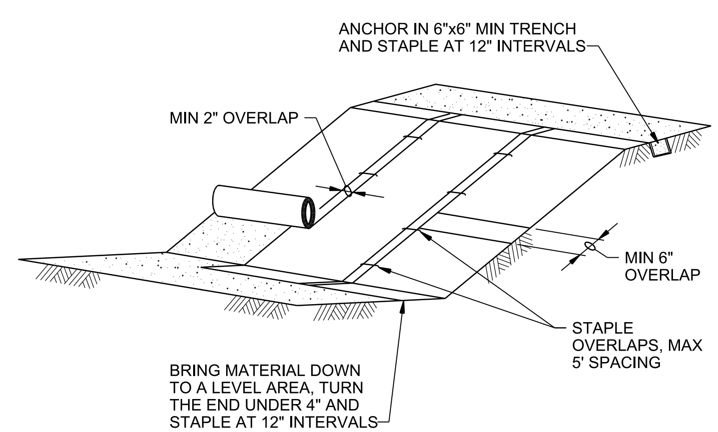
PAINT EDGE OF EXISTING ASPHALT WITH TACK COAT PRIOR TO PAVING. CRACK SEAL JOINT AFTER PAVING OPERATION HAS BEEN COMPLETED.

5 PAVEMENT CONNECTION
NTS



TYPE I TURBIDITY BARRIER

2 FLOATING TURBIDITY BARRIER
NTS



NOTES:

1. IF THERE IS A BERM AT THE TOP OF SLOPE, ANCHOR UPSLOPE OF THE BERM.
2. SLOPE SURFACE SHALL BE SMOOTH BEFORE PLACEMENT FOR PROPER SOIL CONTACT.
3. DO NOT STRETCH BLANKETS/MATTINGS TIGHT, ALLOW THE ROLLS TO MOLD TO ANY IRREGULARITIES.
4. STAPLING PATTERN AS PER MANUFACTURER'S RECOMMENDATIONS.
5. FOR SLOPES LESS THAN 3:1, ROLLS MAY BE PLACED IN HORIZONTAL STRIPS.
6. LIME, FERTILIZE AND SEED BEFORE INSTALLATION. PLANTING OF SHRUBS, TREES, ETC SHOULD OCCUR AFTER INSTALLATION.

4 ESC BLANKET ON SLOPE
NTS

PRELIMINARY DESIGN

NO.	DATE	REVISION	BY	APVD

DSGN A MORAN | DR D CORBETT | CHK B ANDRAE | APVD B CARLING

SWMU 1 CORRECTIVE MEASURES
FORMER HAMPSHIRE CHEMICAL CORP. SITE
WATERLOO, NEW YORK

CH2MHILL®

CIVIL

STANDARD DETAILS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JULY 2014
PROJ	479856
DWG	C-209
SHEET	11 of 11