PROPOSED LANDFILL CAP AND GAS REPAIRS HOLTZ KRAUSE LANDFILL

HOLTZ KRAUSE LANDFILL
WAUSAU, WISCONSIN

Prepared For:
Holtz Krause Steering Committee

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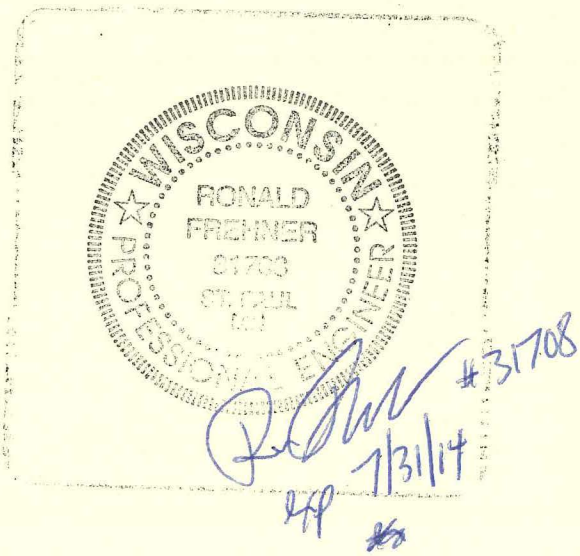

Prepared by:
Conestoga-Rovers & Associates

1801 Old Highway 8 Northwest, Suite 114
St. Paul, Minnesota 55112

Office: 651-639-0913
Fax: 651-639-0923

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1.0 INTRODUCTION

This Design Report provides the final design for cap repairs and landfill gas repairs at the Holtz Krause Landfill.

This report was based on the report entitled: Final Design Report For Athletic Fields and Proposed Modifications to Holtz Krause Landfill, February, 2013. The Wisconsin Department of Natural Resources (WDNR) approved this report on March 6, 2013, under NR 506 (Building on an Abandoned Landfill).

This report is being submitted under Section IX (Modification of Work) of the 1993 Consent Decree, which governs work relating to the landfill closure undertaken in the 1990s. As provided in this section, additional work related to the original remedy requires WDNR approval under the 1993 Consent Decree before it can proceed.

1.1 SITE HISTORY AND FEATURES

The Holtz Krause Landfill and vicinity is a 64 acre site that operated between 1957 and 1980. The Site is located at the end of East Kent Street east of Grand Avenue. This landfill received approximately 2.0 million cubic yards (CY) of waste, including municipal solid waste, noncombustible waste, demolition material, and wood waste.

The Wisconsin Department of Natural Resources (WDNR) selected a remedy for the landfill in July 1992. A double-barrier cover and active landfill gas extraction system were constructed in 1994. Additionally, institutional controls and deed restrictions were implemented at the site to provide further protection to public health and welfare. The 1994 design was developed with the intent to use the Site for recreational use. The cap surface was established with flat slopes of 1 to 2 percent.

Groundwater monitoring and operation of the active gas system was undertaken. Long-term groundwater and landfill gas monitoring are summarized in annual monitoring reports from 1997 to present.

In 2011, an amendment to the remedy was issued by the WDNR that approved Monitored Natural Attenuation (MNA) as the final groundwater remedy. The decision to approve MNA was based on monitoring data from approximately 38 monitoring wells. These data show that the groundwater contamination plume is stable or decreasing and aquifer chemistry is favorable for anaerobic biodegradation of the contaminants of concern.

On July 25, 2012, the WDNR issued an Assurance Letter which provided the steps to be undertaken to re-develop the property into an athletic complex and comply with the requirements of the Voluntary Party Liability Exemption (VPLE) program.

On August 28, 2012, the Marathon County passed a resolution to take ownership of the property with the City of Wausau continuing to operate the active gas collection system for odor control. On October 12, 2012, Marathon County obtained title to the property.

1.2 LANDFILL CAP

The cover system consists of (from ground surface):

- A Vegetative Layer consisting of 6 inches of topsoil and 2.5 feet of rooting zone soil
- Primary Barrier Layer consisting of a 40 mil very low density polyethylene (VLDPE) geomembrane liner
- Secondary Barrier Layer consisting of 2 feet of compacted clay
- The 1982 soil cover (0 to 2 feet thick)

1.3 ACTIVE LANDFILL GAS

The current active gas collection system began operation on December 22, 1994. The active gas collection flow rate and methane levels over the 17-year operating history declined from 375 cubic feet per minute (CFM) in 1995 to an average of 178 cfm in 2011.

1.4 SCOPE OF FINAL DESIGN REPORT

This report provides a description of the additional work, subject to Consent Decree approval, as follows:

- Cap repairs
- Landfill Gas modifications

1.5 ROLES AND RESPONSIBILITIES

The following describes the roles and responsibilities for construction and long-term operation and maintenance.

- **Holtz Krause Group:** The Holtz Krause Group are potential responsible parties (PRPs) that have implemented the remedy.
- **Conestoga-Rovers & Associates (CRA):** CRA is the primary contractor retained by the Holtz Krause Group to design and construct the repairs.
- **Marathon County:** Marathon County facilitated the transfer of ownership from prior owners to the County and is the owner of the 64-acre property.
- **Wisconsin Department of Natural Resources (WDNR):** The WDNR is responsible for reviewing the design of the landfill gas and cap improvements.

2.0 CAP REPAIRS

All landfills experience some settlement after closure as the waste compacts and decomposes. The vast majority of settlement takes place in the first several years after closure. For the Holtz Krause Landfill, the period of significant settlement would have been in the 1980s and 1990s.

Appendix A shows the areas of settlement that have resulted in ponding areas. These areas will be repaired as follows:

The existing topsoil will be stripped and temporarily stockpiled in each settlement area. Clean common fill will be imported and placed in the work area to raise the rooting zone layer to provide surface drainage. The topsoil will be replaced and augmented with clean topsoil in order to provide a new 6 inch thick topsoil layer. Finally, the topsoil will be seeded to restore the vegetation.

3.0 LANDFILL GAS EXTRACTION AND FLARE SYSTEM

3.1 OVERVIEW

For the planned future use as athletic fields, active landfill gas (LFG) extraction with flaring will be used for odor control. A substantial portion of the existing active gas extraction system such as the landfill gas wells, gas and condensate conveyance piping will continue to be used for this purpose with minor modifications. The existing flare station, which consists of a blower skid unit and candlestick flare, will be replaced primarily due to significant declines in landfill gas production over 17 years following the installation of the flare station in 1995.

The drawings provide the layout of the athletic fields along with the proposed layout of the landfill odor control system. Due to interferences with the proposed layout of the athletic fields, two existing gas extraction wells, EW-16, EW-27 will be inactivated and three replacement wells (EW-36, EW-37 and EW-38) will be installed. For EW-16, a replacement well will be installed approximately 75' north-northeast of the current location. For EW-27, two new extraction wells will be installed approximately 150 feet east and west of the current location.

Other planned modifications and improvements to the LFG system include the following:

- Slope adjustments and/or replacement of LFG conveyance piping in select areas to improve condensate drainage;
- Replacement of the surface completions for existing LFG extraction wells to reduce tripping hazards for athletic field users; and
- Inactivating, but not abandoning, LFG extraction wells EW-25, EW-26, EW-28, and EW-29 due to little to no LFG that is produced or captured in this area. (See Annual Reports for gas production data)

3.2 LANDFILL GAS WELLS

Table 3.1 provides a summary of the existing LFG wells and planned construction of the LFG replacement wells. Construction of the three new LFG wells (EW-36, EW-37 and EW-38) will be similar to existing LFG wells. A 3-foot borehole will be advanced to the bottom of waste. The waste from the boreholes (estimated to be a total of 20 CY) will staged on-Site and covered temporarily and ultimately sent to a permitted solid waste

facility for disposal. Free liquids in the waste cuttings, if any, will be decanted back into the borehole. Following the completion of the borehole, a 6-inch diameter schedule 80 PVC slotted screen and riser will be installed and centered in the borehole. A non-calcareous clear stone will be placed around the screen. Above the clear stone will be a geotextile ring, filter sand, and bentonite seal. The bentonite seal will extend to the top of the 2-foot clay layer. The existing VLDPE geomembrane will be extrusion welded to a landfill cover slip/settlement pipe installed around the LFG well riser and LFG conveyance pipe. A high density polyethylene (HPDE) vault and cover that will house the LFG flow control equipment will be installed and completed near-grade. The existing LFG flow control equipment will continue to be used. The drawings present the design detail of the LFG well and surface completion details which has the 36-inch HDPE riser set below the frost line and granular drainage to prevent water from accumulating inside the vault. This design is similar to the existing gas well vaults with the exception of the at grade covers.

As shown on the LFG wells and surface completion detail, the top of the vault will be installed 12-inches above the surrounding grade. Topsoil will be used to taper the transition from the top of the vault out for a radius of 10-feet to the surround grade in order to reduce the tripping hazard to athletic field users and to divert surface water away from the vault cover. LFG wells/vaults will be installed at least 10 feet outside the edge of the designated field of play boundary to further reduce tripping potential. The LFG well vault lids will be secured with two bolts to deter unauthorized access. Signage warning of hazards (confined space and flammable) will be either engraved on the outside of the vault lid or placed over the opening under the vault lid viewable upon opening of the lid. Parks will make a final determination as to the need of any anti-slip measures required for the well enclosure covers, if any, and make any needed modifications such as adding an anti-slip coating or artificial turf to the covers.

LFG extraction wells EW-16, EW-25, EW-26, EW-27, EW-28, and EW-29 will be inactivated but not abandoned. Inactivation will consist of removing the existing protective enclosure and flow control equipment, install temporary caps on the well riser and LFG conveyance header and backfilling the vault.

3.3 LFG CONVEYANCE PIPING INSTALLATION AND REPAIRS

As part of Site improvements, modifications to the existing LFG conveyance piping system are required. Modifications include the installation of new LFG piping to three new LFG wells and the repair of LFG piping in select areas. Repairs primarily consist of making adjustments to the pipe slope in order improve condensate drainage. All piping

is installed below the geomembrane and, with the exception of the EW-11 lateral, is SDR-11 HDPE. The piping used for the EW-11 lateral is SDR-17 HDPE.

The piping system was designed to gravity drain condensate that collects within the pipe to either the flare station area or to the southwest corner of the landfill. At these two locations, the condensate discharges into the City of Wausau sanitary sewer system. However, some settlement of the landfill over time has caused sag points in the LFG piping system resulting in the accumulation of condensate in select areas. Review of historical operational data finds that vacuum is present at all LFG wells with the exception of EW-12 which suggests condensate is blocking the header line. In addition, the system operator has reported that surging has been observed at times in monitoring select gas wells suggesting the accumulation condensate in the LFG piping.

In 2011, AECOM and their subcontractor evaluated the header system to identify low areas in the LFG piping that may be holding condensate. A significant portion of the LFG header and laterals were televised and video logged. From a review of the video logs, Figure 3.1 provides CRA's understanding of low points in the LFG piping that holds condensate. As part of Site improvements, significant sag points will be corrected in select areas. As expected in the use of SDR11 HDPE piping which has a very thick sidewall and hence pipe strength, no collapsed or deformed piping was noted in the video logs.

From the evaluation of the video logging work, slope corrections and new pipe installations are planned for the following segments of piping:

- Reset header between EW-1 and EW-19
- Install new header from EW-36 and EW-37 to existing line south of EW-27
- Reset header from EW-28 to EW-29
- Reset header from EW-2 to EW-4
- Reset header in EW-7 area
- Reset header in EW-10, EW-11, EW-12 and EW-13 area
- Reset header in EW-18 area
- Reset header in EW-3 area
- Install new header to EW-38
- Reset header in EW-30 and EW-31 area

In each reset area, excavation will start in the sag areas identified in the video log and then work outward from that point. In order to minimize excavation through the liner, only the portion of the liner with sags will be reset.

Although the header section from EW-25 to EW-26 has numerous sags, the repair of this section is not planned given the minimal amount of landfill gas that is extracted from the wells along this segment. As noted earlier, the wells in this segment will be inactivated.

A significant portion of the cross-over header from near EW1 to EW19, which is approximately 850 feet in length, was not video logged given access and camera limitations. During construction, CRA will cut into this line and televise the line. If necessary, the line will be reset.

In additional to slope repairs, new sections of header and laterals will be installed to the three new LFG wells. A new header will be installed to LFG wells EW-36 and EW-37. Landfill gas will follow the header system to the east and north. In addition, a new lateral to LFG well EW-38.

Figure 3.2 shows the proposed modifications to the LFG well and piping system.

The repair and installation of new piping will be similar to that of the existing piping. A detail showing a typical cross-section of the pipe repair and new installation is shown on the drawings. Installation and repair work will consist of excavating cover soils above the geomembrane liner and staging the cover soils along the excavation. Care will be taken to segregate the clay from the non-cohesive rooting zone soils. The geomembrane liner will be hand cut in the desired locations. Excavation will then continue to the desired depth likely using trench boxes to minimize the excavation width and for personnel access. Excavated waste will be staged on plastic, adjacent to the excavation and covered. Once at the desired excavation depth, the base of the excavation will be compacted and at least 6-inches of granular material will be placed for piping bedding. The pipe bedding will be adjusted as necessary to achieve the desired pipe sloping and minimum pipe bedding material thickness of 6-inches. The conveyance piping will be installed/adjusted and granular material will be placed around and over the piping to a minimum height of 12-inches above the top of the pipe. Waste removed from the excavation will be placed above the pipe bedding and compacted.

Following pipe bedding and waste material placement, the fine-grained low permeability soil (clay) previously removed will be placed and compacted in 6-inch lifts up to the elevation of the geomembrane liner. CRA will establish a clay source

acceptable to WDNR prior to construction. Just above the clay and below the geomembrane, Geocomposite Liner (GCL) will be placed such that there is a 2-foot overlap on each side of the excavation face. This Geocomposite is comparable to the two foot low permeability cover and is being installed as an added level of protection. A new section of 40-mil geomembrane will be welded to the existing 40-mil geomembrane. Following installation of the geomembrane, the excavated cover soils will be placed into the excavation in 12-inch compacted lifts to the desired surface elevation.

3.4 FLARE STATION

The existing flare station, which consists of a blower skid unit and candlestick flare, will be replaced primarily due to significant declines in landfill gas production since the installation of the flare station in 1995. As a result of decreased landfill gas production, the existing flare station is oversized and cannot be operated within the desired flow rate range.

The existing flare station has an operational flow range of 130 to 650 cfm. Figure 3.3 presents the flare station historical flow rates and methane concentration versus time since the start of operation in 1995. As shown in the figure, flare station flow rates started out in the 250 to 300 cfm range and is now in the 150 to 200 cfm range. At approximately 170 cfm, the blower starts surging and LFG extraction is no longer at steady-state. At the lower limits of the flare station operational flow range, methane concentration of the influent is in the 20 to 25 percent range which is well below the desired range of 45 to 50 percent. Given the above and the age/condition of the flare station, a replacement unit will be installed.

The replacement flare station will installed in the same location as the current system and will also be a candlestick flare. The new flare station will have an approximate flow rate range of 40 to 200 cfm and will be fully automated. Major flare station system components will likely consist of the following:

- Flare mast assembly of black iron pipe, blasted, primed, and coated
- Stainless steel burner tip
- Stainless steel flare shroud with ceramic fiber insulation
- Electrically actuated/spring loaded shutdown valve assembly
- Aluminum flame arrestor
- Thermocouple flame supervision system

- Propane gas pilot ignition system
- Structural skid with mounting feet and lifting lugs
- Stainless steel piping
- Variable frequency drive centrifugal blower
- Insulation and heat tracing of blower drain line and demister filter assembly drain line
- Stainless steel demister/filter system with multiple layers of knitted polyethylene mesh.
- Velocity averaging, differential pressure flow metering system
- Control Panel
- Fused disconnect service entrance
- Electrical surge suppression
- Blower motor breaker and overload system
- Thermostatically controlled panel heating and air conditioning system
- PLC supervision and logical control system
- Touch screen operator interface system
- Remote monitoring and troubleshooting capable
- Alarm and Shutdown message annunciation
- Autodialing alarm call-out system

The flare station will be installed on the existing concrete pads for the candlestick mast and the blower skid unit. The existing building will be removed and the flare station will reside outside. Heat tracing and insulation blankets will be used on critical piping sections. All condensate from the flare station and well field will continue to gravity discharged, via permit, to the City of Wausau publically operated treatment system. Access into the odor control flare station area will continue to be controlled via fencing with screening and a locked gate.

It is anticipated that the shutdown of the old landfill gas system and installation of the new odor control system will require two weeks or less. During that time period, the gas system cannot be operated. During this shut down period, the gas probes will be monitored daily.

With respect to long-term plans, the upgraded active gas extraction system will continue to be operated to control odors as long as the athletic complex is being used. The flare is

capable of operating as low as 40 cfm, which is the lower limit of commercial flares. The new flare station blower will be variable speed driven can be operated to continue landfill gas extraction and odor control, without flaring, to well below 40 cfm.

4.0 CONSTRUCTION, OPERATION AND MAINTENANCE DOCUMENTS

4.1 CONSTRUCTION QUALITY ASSURANCE PLAN (CQAP)

A CQAP will identify the construction requirements of the WDNR-approved final design, specifications and drawings and convert these requirements into a check list during construction. The construction supervisor and the certifying professional engineer will utilize the CQAP to ensure that the construction complies with the design.

The CQAP will specifically address the requirements for on-site and off-site testing of all soil used in the cap repairs as well as the testing requirements for the geomembrane repairs. Since the existing liner is VLDPE, which is no longer available, all repairs, patches and boots will be made of LLDPE. These two materials are compatible and can be seamed successfully. A qualified geocomposite contractor will be required to field trial seam and destruct test these two geocomposites to establish correct operating temperatures and welder speed.

4.2 RECORD DRAWINGS AND CONSTRUCTION REPORT

After construction has been completed, CRA will prepare record drawings and a construction report. These documents will serve as a record of the facilities constructed.

5.0 DRAWINGS

An electronic version of the design drawings are provided in Appendix B.

6.0 REFERENCES

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- AECOM, January 2005, Work Plan for Additional Site Investigation
- AECOM, 2010, Five-Year Review Report for Holtz Krause Landfill, Wausau, Wisconsin
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- Becher-Hoppe Engineers, Inc., February 1980, Holtz Krause Landfill Final Abandonment Plan (revised). This document was summarized in Technical Memorandum Number One (Geraghty & Miller, 1989)
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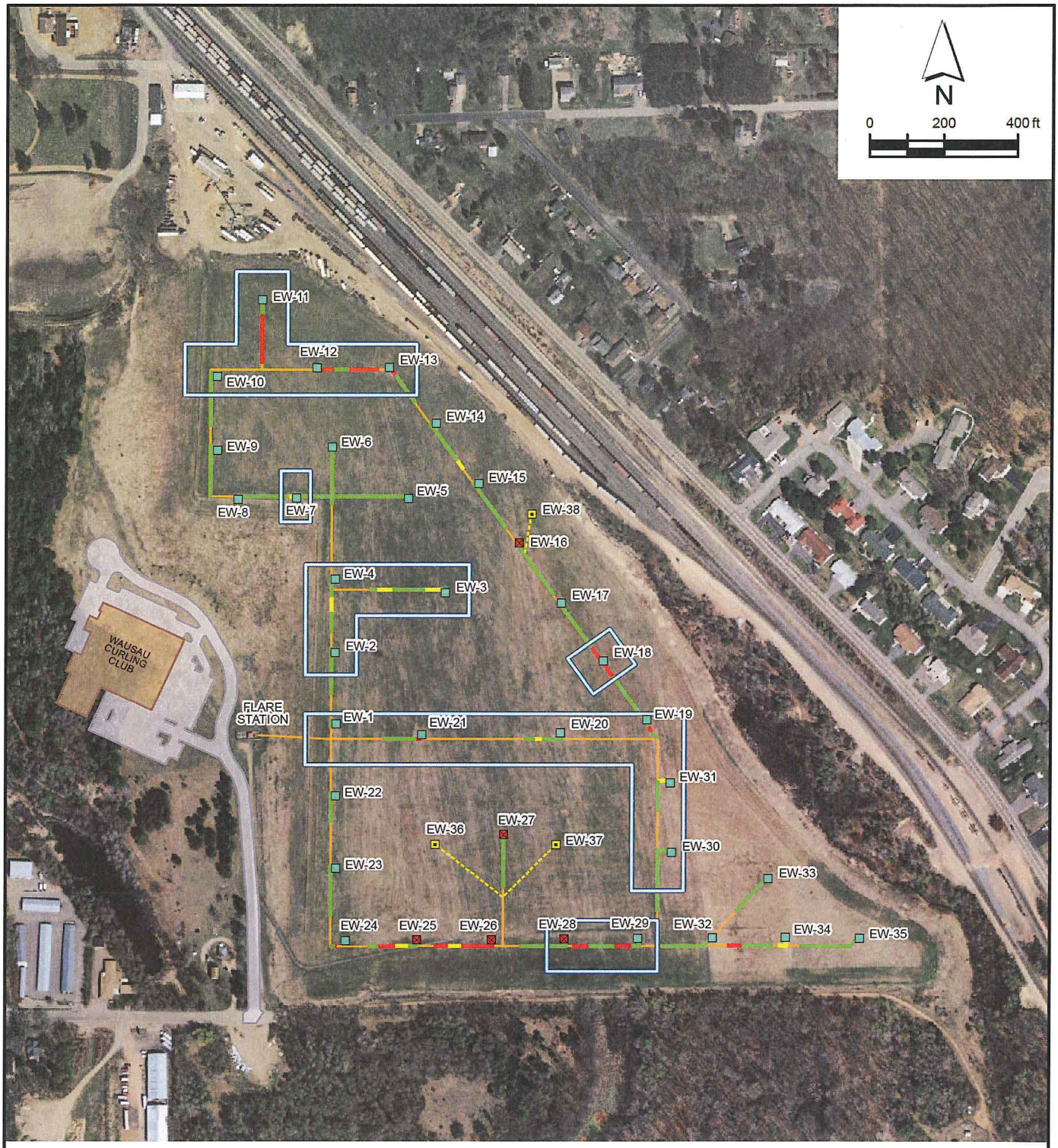
- Wisconsin Department of Natural Resources, 2009, Guidance on Case Closure and the Requirements for Managing Continuing Obligations, PUB-RR-606, June 2009
- Wisconsin Department of Natural Resources, June 2010, Fact Sheet 13, PUB-RR-661
- Wisconsin Department of Natural Resources, June 2011, Declaration for an Amendment to the ROD
- Wisconsin Department of Natural Resources, July 2012, Assurance Letter



LEGEND

- PIPE REPAIR WORK AREA
- EXISTING GAS EXTRACTION WELL
- GAS EXTRACTION WELL TO BE INACTIVATED
- NEW GAS EXTRACTION WELL
- EXISTING GAS EXTRACTION HEADER
- NEW GAS EXTRACTION HEADER
- HEADER <1/3 FULL
- HEADER 1/3 - 2/3 FULL
- HEADER >2/3 FULL
- PROPOSED FIELD
- CURLING CLUB

figure 3.1

WATER IN LANDFILL GAS LINES
HOLTZ KRAUSE LANDFILL
Wausau, Wisconsin

074702-40(009)GIS-SP014 DEC 06/2012

LEGEND

- NEW GAS EXTRACTION WELL
- EXISTING GAS EXTRACTION WELL
- GAS EXTRACTION WELL TO BE ABANDONED
- NEW GAS EXTRACTION HEADER
- EXISTING GAS EXTRACTION HEADER
- PROPOSED FIELD
- CURLING CLUB

figure 3.2

CONCEPTUAL ACTIVE GAS EXTRACTION SYSTEM LAYOUT HOLTZ KRAUSE LANDFILL

Wausau, Wisconsin

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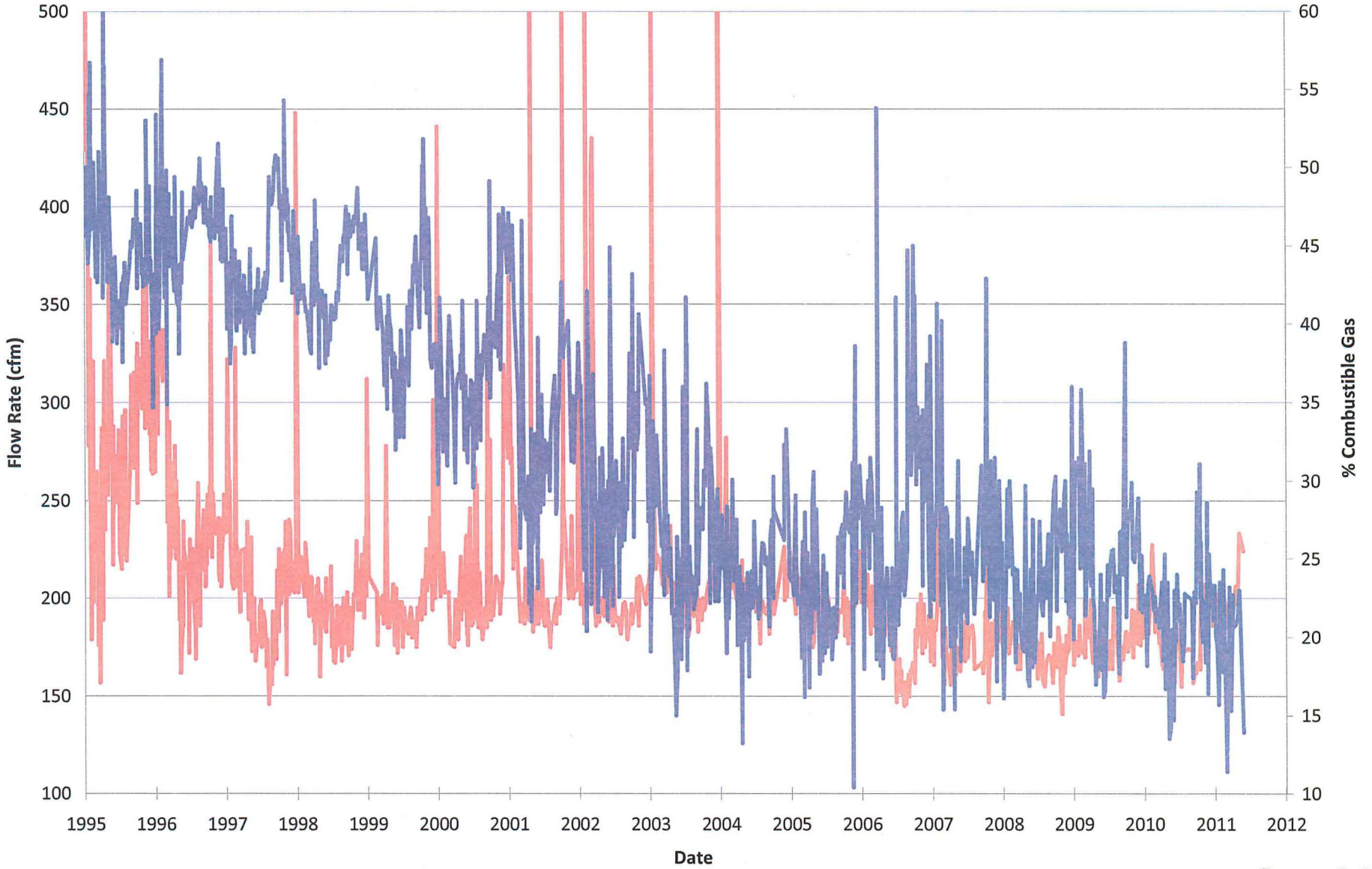


figure 3.3

LANDFILL GAS FLOW RATE AND CONCENTRATION VS. TIME
HOLTZ KRAUSE LANDFILL
Wausau, Wisconsin

074702-40(009)GIS-SP007 NOV 15/2012

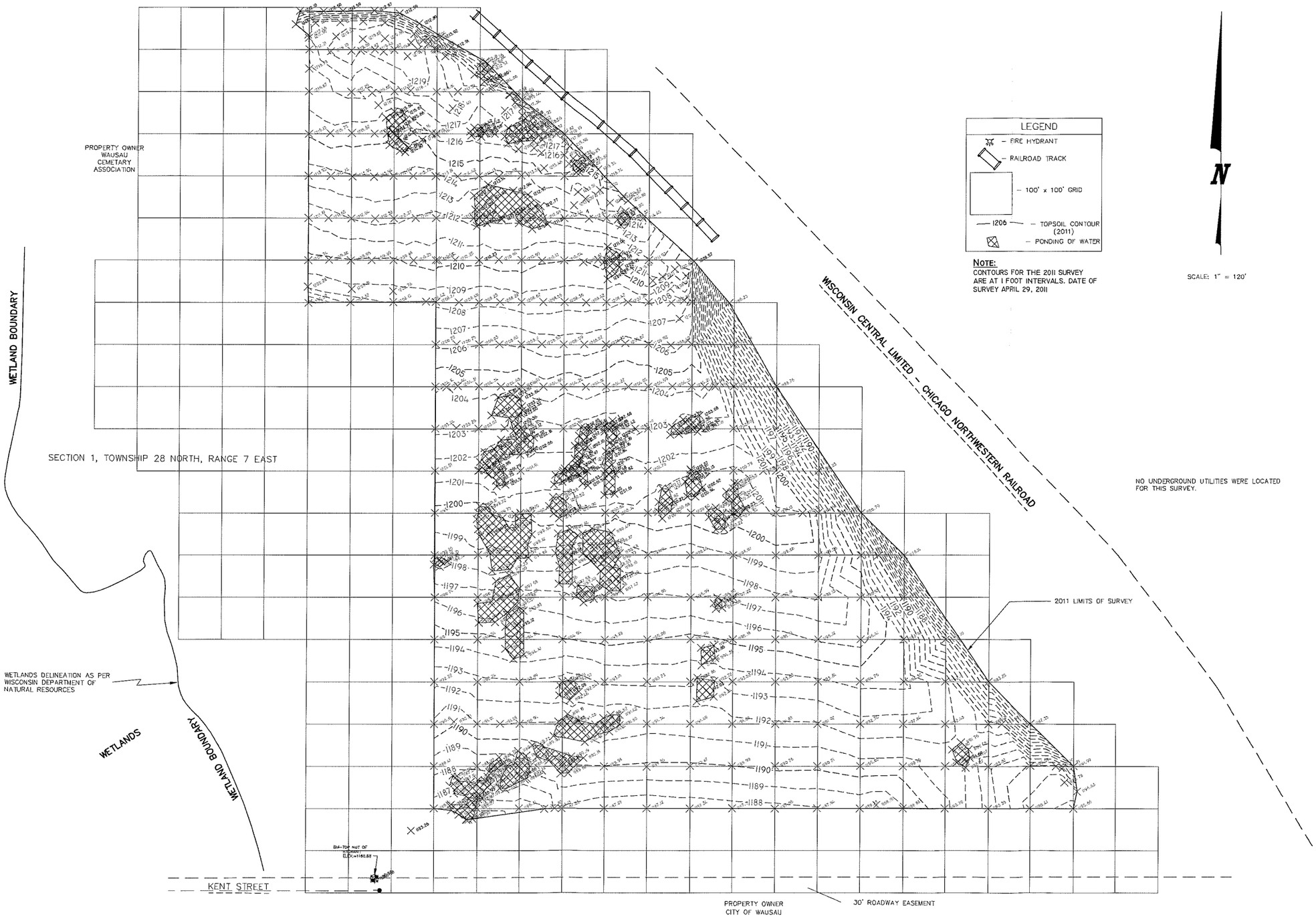
TABLE 3.1

EXISTING GAS EXTRACTION WELL AS-BUILT DATA
HOLTZ KRAUSE LANDFILL
WAUSAU, WISCONSIN

Well No.	*As-Built Estimated Final Grade Depth (ft)*	*Estimated Bottom of Well Elevation (ft m.s.l.)*	*Screen Length (ft)*	*Comment*
Existing Wells				
EW-1	33.5	1166.2	24.5	
EW-2	39.1	1164.5	30.1	
EW-3	36.8	1169.2	27.8	
EW-4	35.7	1170.0	26.7	
EW-5	38.1	1172.0	29.1	
EW-6	45.1	1168.0	36.1	
EW-7	43.6	1166.0	34.6	
EW-8	44.3	1166.0	35.3	
EW-9	46.0	1166.0	37.0	
EW-10	43.4	1174.0	34.4	
EW-11	18.9	1202.0	9.9	
EW-12	41.5	1176.0	32.5	
EW-13	23.2	1195.0	14.2	
EW-14	31.4	1183.0	22.4	
EW-15	37.5	1174.0	28.5	
EW-16	41.9	1166.0	32.9	To be inactivated
EW-17	27.8	1177.0	18.8	
EW-18	33.8	1167.4	24.8	
EW-19	24.2	1171.1	15.2	
EW-20	36.2	1163.8	27.2	
EW-21	29.5	1169.7	20.5	
EW-22	29.2	1164.3	20.2	
EW-23	26.9	1164.6	17.9	
EW-24	21.9	1167.3	12.9	
EW-25	18.1	1170.7	9.1	To be inactivated
EW-26	16.2	1166.6	7.2	To be inactivated
EW-27	25.8	1167.6	16.8	To be inactivated
EW-28	14.4	1168.8	5.4	To be inactivated
EW-29	18.7	1167.2	9.7	To be inactivated
EW-30	22.4	1167.8	13.4	
EW-31	23.7	1170.3	14.7	
EW-32	22.2	1167.0	13.2	
EW-33	20.2	1170.6	11.2	
EW-34	22.0	1172.2	13.0	
EW-35	18.0	1181.1	9.0	
Proposed Wells				
EW-36	26.0	1167.8	17.0	
EW-37	26.0	1167.8	17.0	
EW-38	43.0	1165.0	34.0	

APPENDIX A

SETTLEMENT LOCATIONS



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PLOTTED: MAY 05, 2011 - 10:07AM PLOTTED BY: JOSHUAP

REI Engineering, INC.
4080 N. 20TH AVENUE
WAUSAU, WISCONSIN 54401
PHONE: 715.675.9784 FAX: 715.675.4060
EMAIL: MAIL@REIENGINEERING.COM

REI CIVIL & ENVIRONMENTAL ENGINEERING, SURVEYING

SCALE 0 120 240

DATE	REVISION	BY	CHK'D

DESIGNED BY:	CHECKED BY:
SURVEYED BY: AJB, JWP	APPROVED BY: AJB
DRAWN BY: JWP	DATE: 5-4-2011

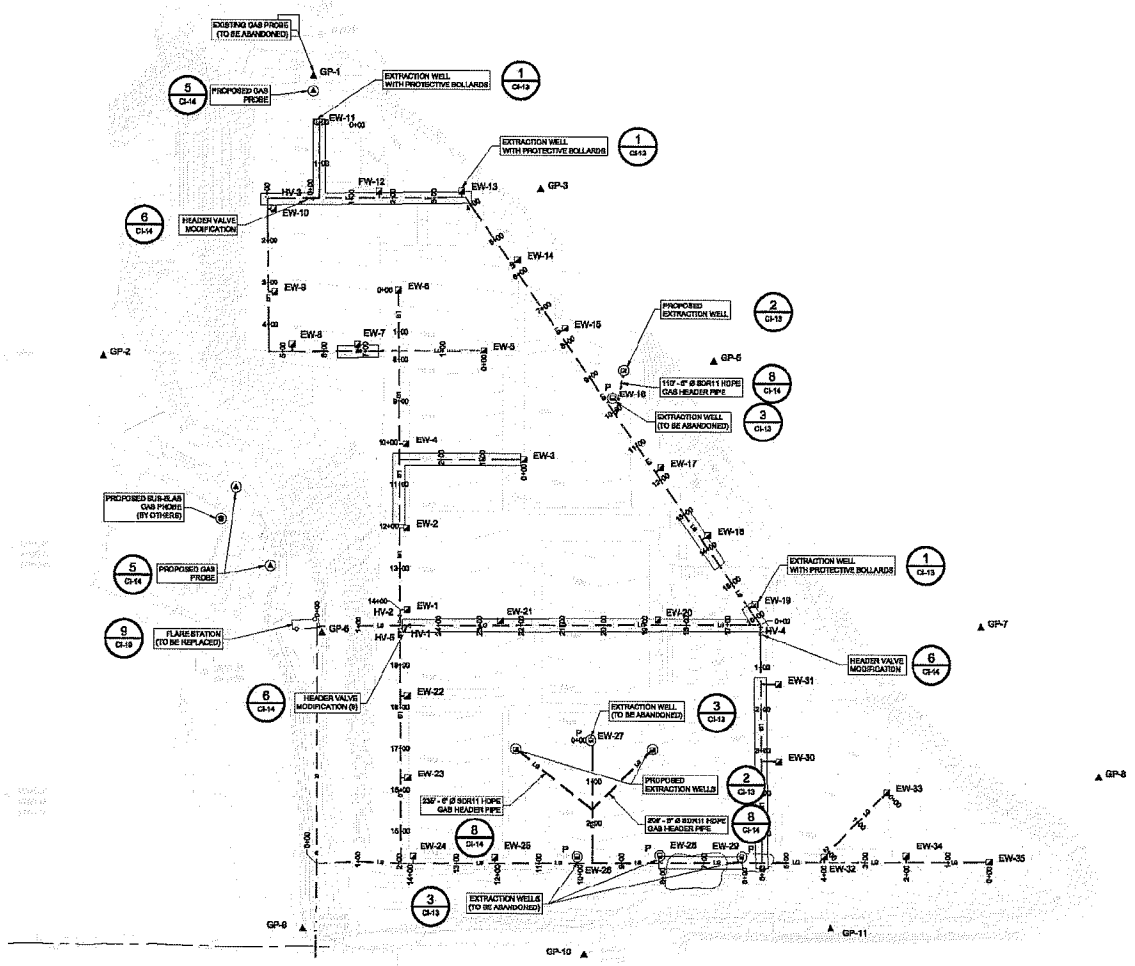
2011 TOPOGRAPHIC MAP-HOLTZ KRAUSE LANDFILL

CITY OF WAUSAU/WATER WORKS
407 GRANT STREET
WAUSAU, WI 54403

REI No. 084
SHEET 1 OF

APPENDIX B

DESIGN DRAWINGS



NO	Revision	Date	Initial

0 60 120ft

LEGEND

- EXISTING CONTOUR
- EXISTING LANDFILL GAS EXTRACTION HEADER
- EXISTING FENCE
- NATURAL GAS LINE
- PROPOSED LANDFILL GAS EXTRACTION HEADER
- HEADER SLOPE CORRECTION AREA
- EW-4 EXISTING EXTRACTION WELL
- HV-3 EXISTING CONTROL VALVE
- GP-5 EXISTING GAS PROBE
- EXISTING MONITORING WELL
- EW-27 EXISTING EXTRACTION WELL (TO BE ABANDONED)
- P LANDFILL GAS EXTRACTION WELL TO BE DISCONNECTED AND CAPPED
- PROPOSED LANDFILL GAS EXTRACTION WELL
- PROPOSED GAS PROBE
- PROPOSED SUB-SLAB GAS PROBE

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR AGENCY REVIEW	07-DEC-12	BJM
ISSUED FOR CLIENT REVIEW	19-NOV-12	BJM

HOLTZ KRAUSE LANDFILL
MARATHON COUNTY, WISCONSIN

ATHLETIC FIELD AND MODIFICATIONS TO LANDFILL

SITE PLAN - REVISED LANDFILL GAS EXTRACTION SYSTEM

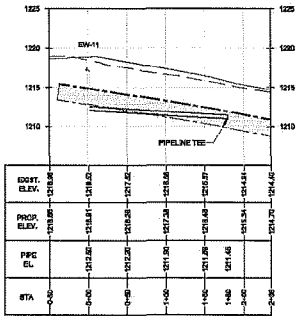
CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
REI SURVEY RECEIVED MARCH 2012

Project Manager:	Reviewed By:	Date:
S. MOCKENHAUPT	N. FINEHNER	DECEMBER 2012

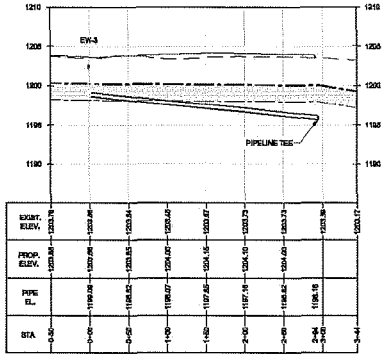
Scale:	Project No:	Report No:	Drawing No:
1" = 150'	74702-40	009	CI-08

74702-40(009)GN-WA004 DEC 07/2012



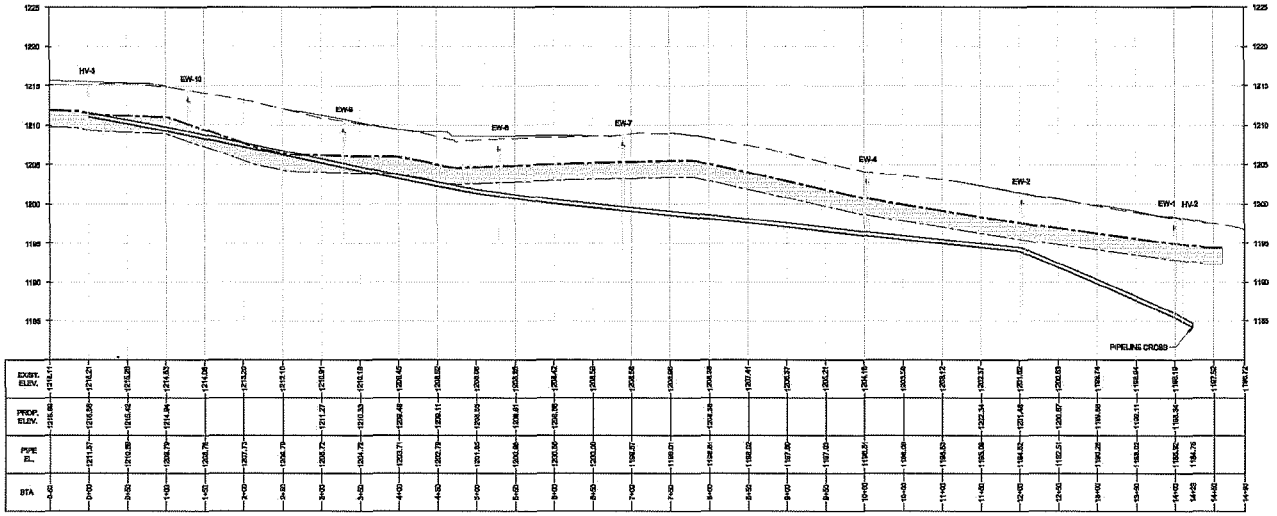
EW-11 TO TEE

HOR = 1" = 80' VERT = 1" = 8'



EW-3 TO TEE

HOR = 1" = 80' VERT = 1" = 8'



HV-3 WEST TO HV-2 AND CROSS

HOR = 1" = 80' VERT = 1" = 8'

NO	Revision	Date	Initial

0 40 80ft

LEGEND

- EXISTING GRADE
- PROPOSED GRADE
- EXISTING 40mil VLDPE LINER (2012)
- EXISTING 2' THICK CLAY LAYER (2012)
- GAS HEADER PIPE INSTALLED ELEVATION (1994)

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR AGENCY REVIEW	07-DEC-12	SJH

HOLTZ KRAUSE LANDFILL
MARATHON COUNTY, WISCONSIN

ATHLETIC FIELD AND MODIFICATIONS TO LANDFILL

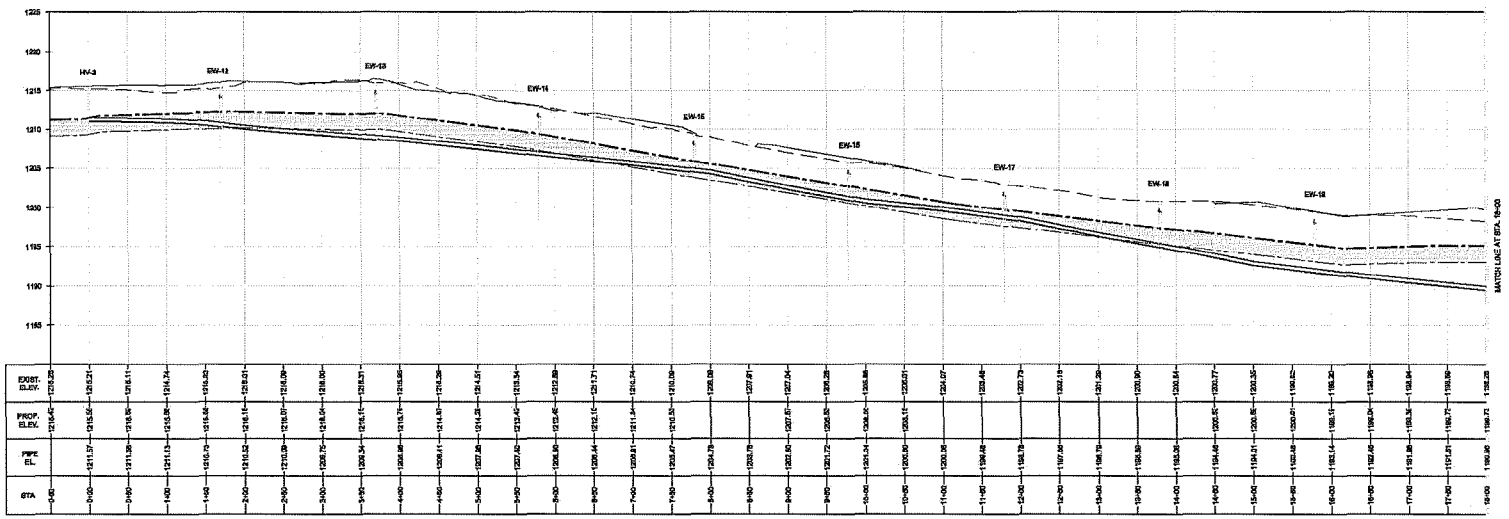
GAS HEADER PROFILES
HEADER REPAIR AREAS (1 OF 3)

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

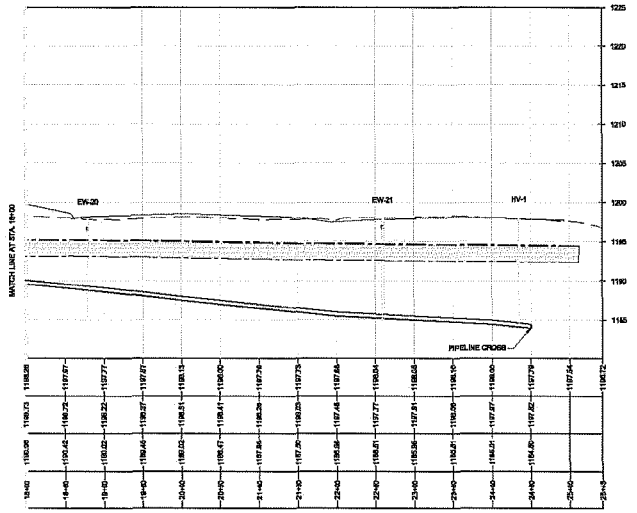
Project Manager:	Reviewed By:	Date:	
S. MOCKENHAUPT	R. FREHNER	DECEMBER 2012	
Scale: AS SHOWN	Project No.: 74702-40	Report No.: 009	Drawing No.: CI-09

74702-40(009)GN-WA004 DEC 07/2012



HV-3 EAST TO HV-1 AND CROSS

HOR = 1" = 80' VERT = 1" = 8'



HV-3 EAST TO HV-1 AND CROSS

HOR = 1" = 80' VERT = 1" = 8'

NO	Revision	Date	Initial

0 40 80ft

LEGEND

- EXISTING GRADE
- PROPOSED GRADE
- EXISTING 40mil VLDPE LINER (2012)
- EXISTING 2' THICK CLAY LAYER (2012)
- GAS HEADER PIPE INSTALLED ELEVATION (1994)

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR AGENCY REVIEW	07-DEC-12	BJH

HOLTZ KRAUSE LANDFILL
MARATHON COUNTY, WISCONSIN

ATHLETIC FIELD AND MODIFICATIONS TO LANDFILL

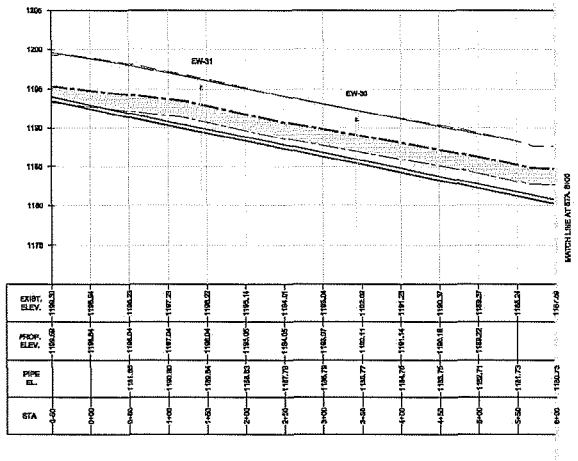
GAS HEADER PROFILES
HEADER REPAIR AREAS (2 OF 3)

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

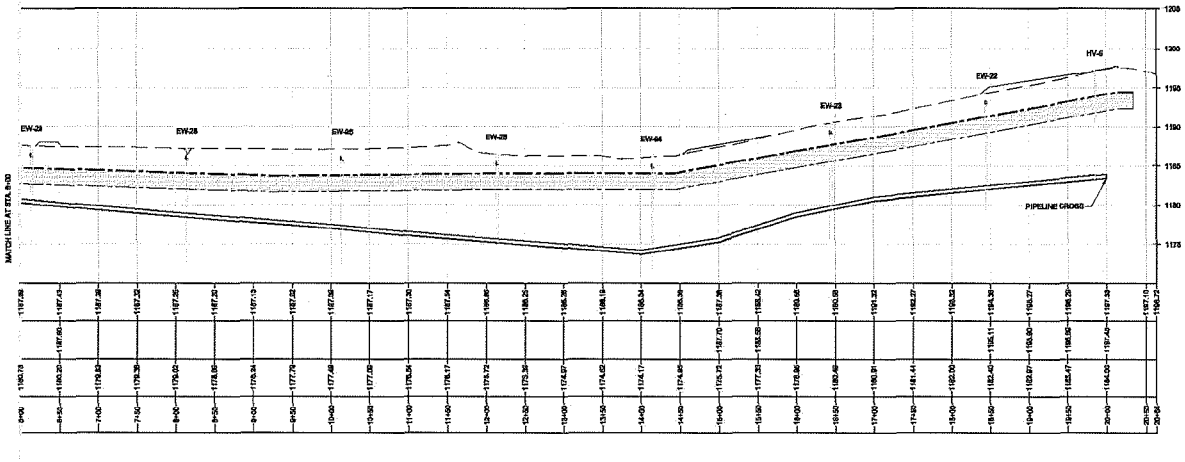
Project Manager:	Reviewed By:	Date:	
S. MOCKENHAUPT	R. PREHNER	DECEMBER 2012	
Scale: AS SHOWN	Project No.: 74702-40	Report No: 009	Drawing No.: CI-10

74702-40(009)GI-WA004 DEC 07/2012



EW-31 TO HV-5 AND CROSS

HOR = 1" = 80' VERT = 1" = 8'



EW-31 TO HV-5 AND CROSS

HOR = 1" = 80' VERT = 1" = 8'

NO	Revision	Date	Initial

0 40 80ft

LEGEND

- EXISTING GRADE
- PROPOSED GRADE
- EXISTING 40mil VLDPE LINER (2012)
- EXISTING 2' THICK CLAY LAYER (2012)
- GAS HEADER PIPE INSTALLED ELEVATION (1994)

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR AGENCY REVIEW	07-DEC-12	BJH

HOLTZ KRAUSE LANDFILL
MARATHON COUNTY, WISCONSIN

ATHLETIC FIELD AND MODIFICATIONS TO LANDFILL

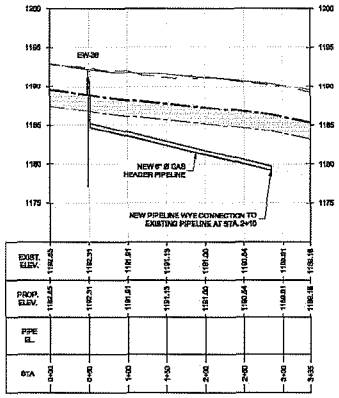
GAS HEADER PROFILES
HEADER REPAIR AREAS (3 OF 3)

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

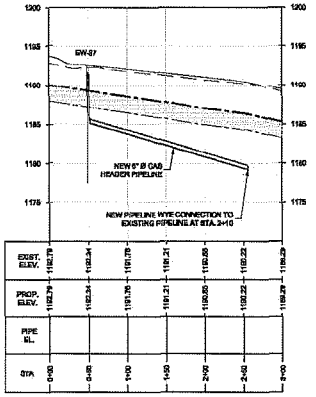
Project Manager:	Reviewed By:	Date:	
S. MOCKENHAUPT	R. FREHNER	DECEMBER 2012	
Scale: AS SHOWN	Project No.: 74702-40	Report No.: 009	Drawing No.: CI-11

74702-40(009)GN-WA004 DEC 07/2012



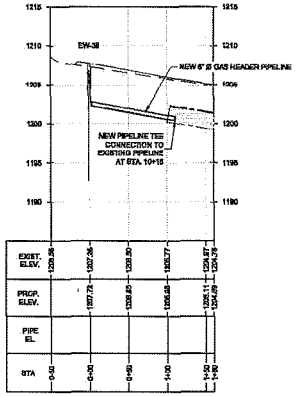
PROPOSED EW-36 TO EXISTING PIPE

HOR = 1" = 50' VERT = 1" = 5'



PROPOSED EW-37 TO EXISTING PIPE

HOR = 1" = 50' VERT = 1" = 5'



PROPOSED EW-38 TO EXISTING PIPE

HOR = 1" = 50' VERT = 1" = 5'

NO	Revision	Date	Initial

0 40 80ft

LEGEND

- EXISTING GRADE
- PROPOSED GRADE
- EXISTING 40mil VLDPE LINER (2012)
- EXISTING 2' THICK CLAY LAYER (2012)
- GAS HEADER PIPE INSTALLED ELEVATION (1994)
- NEW GAS HEADER PIPE

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR AGENCY REVIEW	07-DEC-12	GJM

HOLTZ KRAUSE LANDFILL
MARATHON COUNTY, WISCONSIN

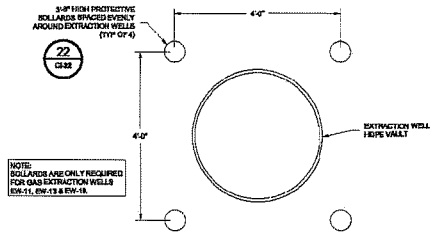
ATHLETIC FIELD AND MODIFICATIONS TO LANDFILL

PROPOSED GAS HEADER PIPE PROFILES

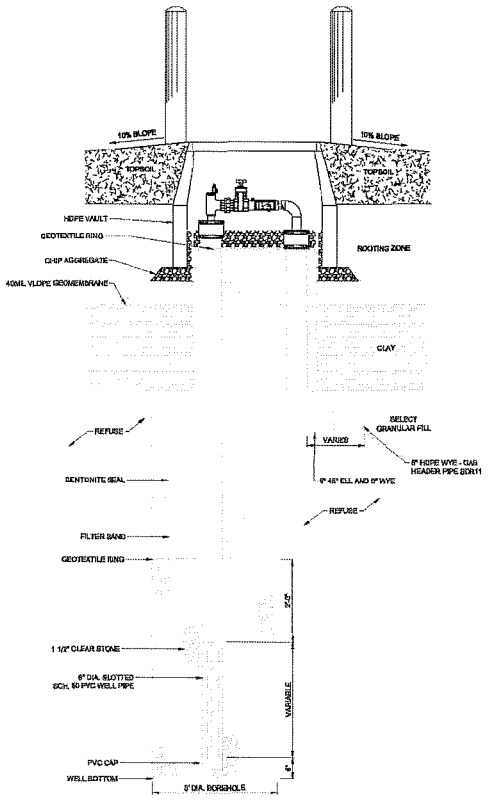
CONESTOGA-ROVERS & ASSOCIATES

Source Reference:			
Project Manager: S. MOCKENHAUPT	Reviewed By: N. PREHNER	Date: DECEMBER 2012	
Scale: AS SHOWN	Project No.: 74702-40	Report No.: 009	Drawing No.: CI-12

74702-40(009)CI-WA004 DEC 07/2012



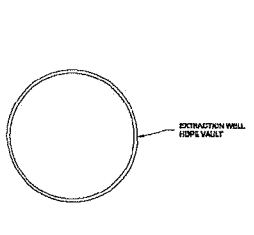
PLAN



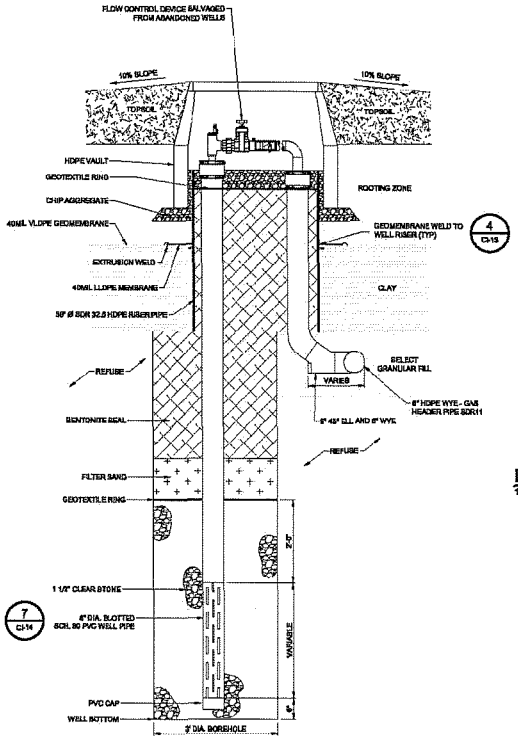
SECTION

DETAIL 1 (CI-08) 1" = 1'-0"

GAS EXTRACTION WELL - EXISTING SURFACE COMPLETION MODIFICATION



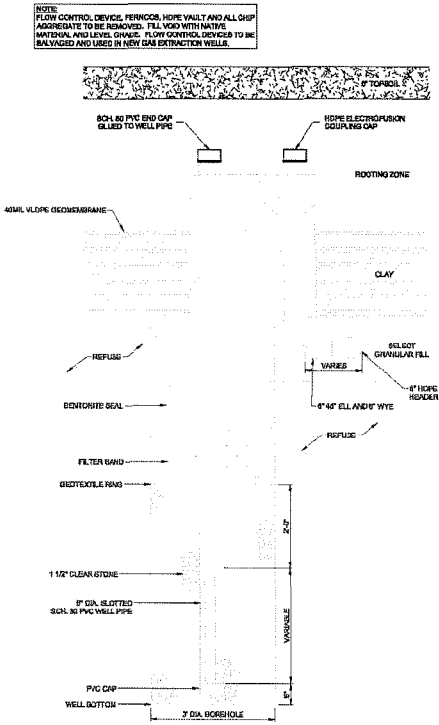
PLAN



SECTION

DETAIL 2 (CI-08) 1" = 1'-0"

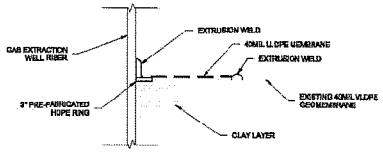
GAS EXTRACTION WELL - NEW EW-36, EW-37 & EW-38



SECTION

DETAIL 3 (CI-08) 1" = 1'-0"

GAS EXTRACTION WELL - INACTIVATED EW-16, EW-25, EW-26, EW-27, EW-28 & EW-29



DETAIL 4 (CI-13) N.T.S.

LINER WELD TO RISER

No	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR AGENCY REVIEW	07-DEC-12	S.M.
ISSUED FOR CLIENT REVIEW	19-NOV-12	S.M.

HOLTZ KRAUSE LANDFILL
MARATHON COUNTY, WISCONSIN

ATHLETIC FIELD AND MODIFICATIONS TO LANDFILL

LFG SYSTEM DETAILS
(1 OF 2)

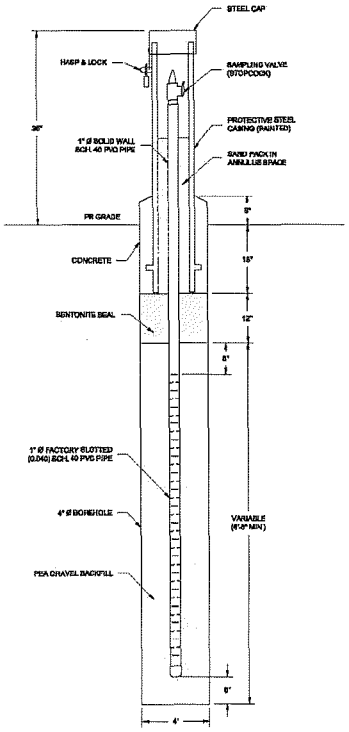
CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

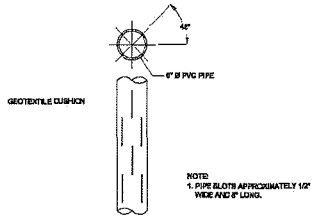
Project Manager:	Reviewed By:	Date:
S. MOCKENHAUPT	R. FREHNER	DECEMBER 2012

Scale:	Project No.	Report No.	Drawing No.
AS SHOWN	74702-40	009	CI-13

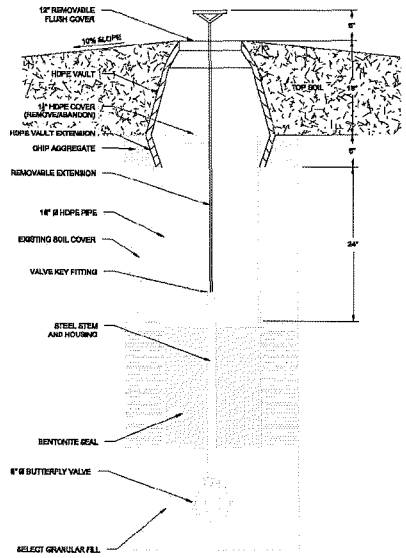
74702-40(009)CI-WA006 DEC 07/2012



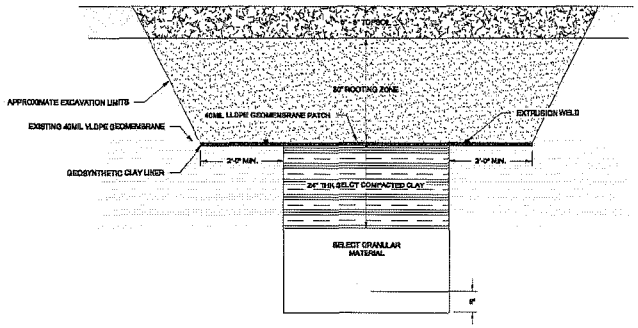
DETAIL 5 GAS PROBE
N.T.S. CI-08



DETAIL 7 GAS WELL SCREEN
N.T.S. CI-14



DETAIL 6 LFG HEADER VALVE
N.T.S. CI-08



DETAIL 8 LFG HEADER REPAIR
1" = 1'-0" CI-08

NO	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR AGENCY REVIEW	07-DEC-12	SJM
ISSUED FOR CLIENT REVIEW	19-NOV-12	SJM

HOLTZ KRAUSE LANDFILL
MARATHON COUNTY, WISCONSIN

ATHLETIC FIELD AND MODIFICATIONS TO LANDFILL

LFG SYSTEM DETAILS (2 OF 2)

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:

Project Manager:	Reviewed By:	Date:
S. MOCKENHAUPT	H. FRENNER	DECEMBER 2012

Scale:	Project No:	Report No:	Drawing No:
AS SHOWN	74702-40	009	CI-14

74702-40(009)CI-WA008 DEC 07/2012