ALLIANT ENERGY
Interstate Power and Light Company
Burlington Generating Station

CCR SURFACE IMPOUNDMENT

HISTORY OF CONSTRUCTION

Report Issued: August 25, 2016
Revision 0

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EXECUTIVE SUMMARY

This History of Construction (Report) is prepared in accordance with the requirements of the United States Environmental Protection Agency (USEPA) published Final Rule for Hazardous and Solid Waste Management System – Disposal of Coal Combustion Residual (CCR) from Electric Utilities (40 CFR Parts 257 and 261, also known as the CCR Rule) published on April 17, 2015 and effective October 19, 2015.

This Report documents the construction history of each CCR unit at Burlington Generating Station in Burlington, Iowa in accordance with §257.73(c) of the CCR Rule. For purposes of this Report, the term "CCR unit" only refers to existing CCR surface impoundments.

Primarily, this Report is focused on providing history of construction information for each CCR surface impoundment to the extent that such information is reasonably and readily available.

Table of Contents

Figures

Appendices

1 INTRODUCTION

The owner/operator of the CCR unit must provide a history of construction for the existing CCR surface impoundments at Burlington Generating Station (BGS) in Burlington, Iowa in accordance with §257.73(c)(1) of the CCR Rule. Hard Hat Services, on behalf of Interstate Power and Light Company, provides this history of construction information for each existing CCR surface impoundment to the extent that such information is reasonably and readily available.

1.1 CCR Rule Applicability

The CCR Rule requires that an owner/operator of the CCR unit must provide a history of construction for existing CCR surface impoundments with a height of 5 feet or more and a storage volume of 20 acre-feet or more (§257.73(b)(1)); or the existing CCR surface impoundment has a height of 20 feet or more (§257.73(b)(2)).

1.2 History of Construction Applicability

BGS has four existing CCR surface impoundments, which meet the requirements of §257.73(b)(1) and/or §257.73(b)(2), identified as follows:

- BGS Ash Seal Pond
- BGS Main Ash Pond
- BGS Economizer Pond
- BGS Upper Ash Pond

2 FACILITY DESCRIPTION

The following sub-sections provide a general facility description.

2.1 Name and Address - §257.73(c)(1)(i)

Included below is the name and address of the owner/operator of the CCR units, name of each CCR unit, and state identification numbers for each CCR Unit (if one has been assigned by the state).

Owner/Operator Name and Address:

Interstate Power and Light Company (*an Alliant Energy Company*)
Burlington Generating Station
4282 Sullivan Slough Road
Burlington, IA 52601

The names of the CCR Units located at BGS are identified as follows:

- BGS Ash Seal Pond
- BGS Main Ash Pond
- BGS Economizer Pond
- BGS Upper Ash Pond

The Iowa Department of Natural Recourses has assigned identification number 29-UDP-01-15 the CCR units at BGS.

2.2 General Facility History

BGS is located southeast of the City of Burlington, Iowa on the western shore of the Mississippi River in Des Moines County. Figure 1 provides both a topographic map and an aerial photograph of the BGS facility location, with the approximate property boundary of the facility identified.

BGS, originally constructed, owned, and operated by the Iowa Southern Utilities Company, initiated facility operations in June 1968. At the time of initial operations BGS was a fossil–fueled electric generating station that consisted of one steam electric generating unit (Unit 1) which used coal as its fuel source. The initial steam electric generating unit at BGS had a nameplate rating of 188,187 kilowatts. The CCR that was

produced from the burning of coal was sluiced to two ash disposal basins. The two ash settling basins, identified as Ash Disposal Basin #1 and Ash Disposal Basin #2, were located south of the generating plant and were the only original CCR units present at the time of initial facility operations (Appendix A). Ash Settling Basin #1 was located in the footprint of what is now identified as the BGS Ash Seal Pond. Ash Disposal Basin #2 was located west of the Ash Disposal Basin #1 and west of the condenser cooling water discharge pipe. A portion of the footprint of the Ash Disposal Basin #2 was located in the eastern most portion of what is now identified as the BGS Main Ash Pond. Additional information related to the historical construction and operational use of each of the original CCR surface impoundments is discussed in further detail throughout Section 3.

From 1968 to 1991 the owner/operator of BGS was the Iowa Southern Utilities Company. In 1991, the Iowa Southern Utilities Company merged with Iowa Electric into IES Industries. In 1998, a three-way merger was completed between IES Industries, Interstate Power and Light Company, and Wisconsin Power and Light Company forming Interstate Energy Corporation. In 1999, Interstate Energy Corporation changed its name to Alliant Energy Corporation.

As BGS exists today, the generating plant consists of one steam electric generating unit (Unit 1), as well as four combustion turbine (CT) units. The current steam electric generating unit at BGS has a nameplate rating of 212 megawatts. Sub-bituminous coal remains the primary fuel for producing steam while natural gas is a secondary fuel source. The CT units use fuel oil for the starting engines and natural gas for the generating units.

The burning of coal at BGS produces three types of CCR, which includes bottom ash, economizer ash, and precipitator fly ash. Current CCR operations at BGS include bottom ash being sluiced to the BGS Main Ash Pond while economizer ash is sluiced to the BGS Economizer Pond. Precipitator fly ash is collected by the electrostatic precipitators and sent to the on-site fly ash storage silo located south of the generating plant. Precipitator

fly ash is transported offsite for beneficial reuse. Additional discussions on historical operations and handling of the CCR at BGS is provided in further detail throughout Section 3.

3 HISTORY OF CONSTRUCTION - §257.73(c)(1)

This Report documents the history of construction information for each existing CCR surface impoundment to the extent feasible, provided that such information is reasonably and readily available. The following activities were completed in order to reasonably collect and assemble the readily available history of construction information:

- File review at the local regulatory agency;
- Historical aerial photography review;
- Historical topography review;
- Onsite design drawing, specification, and report review;
- Electronic design drawing, specification, and report review; and
- Interview(s) with onsite personnel with historical knowledge of the existing CCR surface impoundments.

3.1 BGS Ash Seal Pond

The following subsections are intended to meet the requirements of the CCR Rule §257.73(c)(1) for the BGS Ash Seal Pond.

3.1.1 CCR Unit Location - §257.73(c)(1)(ii)

The BGS Ash Seal Pond is located south of the generating plant, west of the Mississippi River, and east of the BGS Main Ash Pond. The location of the BGS Ash Seal Pond, in reference to the surrounding topography, is identified on both a USGS 7 ½ minute topographic quadrangle map and aerial photograph on Figure 1. The location of the BGS Ash Seal Pond, in reference to the immediate surroundings within the BGS property, is identified on Figure 2.

3.1.2 Statement of Purpose - §257.73(c)(1)(iii)

The BGS Ash Seal Pond is generally operated as a storm water runoff pond as it no longer is a primary receiver of CCR or other process flows from the generating plant as of 2009. Storm water runoff from the area surrounding the fly ash storage silo, located south of the generating plant, drains into the BGS Ash Seal Pond. Occasionally, the BGS Ash Seal Pond receives facility process water, such as boiler seal water, if there is an issue with the boiler seal water pumps. The boiler seal water, which is normally pumped to the BGS

Main Ash Pond, may be routed to the BGS Ash Seal Pond as needed based on facility operations.

The hydraulic structure associated with the BGS Ash Seal Pond, formerly identified as NPDES Outfall 006, was permanently closed in 2009[1,2] and therefore the BGS Ash Seal Pond generally operates as a zero discharge pond. The water that presently collects within the BGS Ash Seal Pond either exfiltrates through the bottom of the CCR surface impoundment or evaporates. If necessary, BGS has the capability of pumping water from the BGS Ash Seal Pond to the adjacent BGS Main Ash Pond via a manually operated lift pump.

3.1.3 Physical Layout Information - §257.73(c)(1)(iv)

As identified in an Inflow Flood Control Plan[3] prepared for BGS in accordance with §257.82 of the CCR Rule, the BGS Ash Seal Pond has a watershed of approximately 7.7 acres. The surface area of the BGS Ash Seal Pond is approximately 5.7 acres.

As discussed in an Annual Inspection Report[4] prepared for BGS in accordance with §257.83 of the CCR Rule, the BGS Ash Seal Pond is incised along the west, north, and east sides of the CCR unit. The south embankment of the BGS Ash Seal Pond is located adjacent to the condenser cooling water discharge channel and has a height of approximately 12 feet from the crest to the toe of the downstream slope of the embankment. The embankment crest is at elevation 534 feet, which is the same elevation as the site grade of the generating plant and equivalent to the 100-year flood water elevation of the Mississippi River. The interior storage depth of the BGS Ash Seal Pond is approximately 8.5 feet. The total volume of impounded CCR within the BGS Ash Seal

[1] William Skalitzky – Alliant Energy, Letter to Steve Williams – IDNR, November 06, 2009
[2] Matt Morgan – Klinger & Associates, P.C., Letter to Robert Palla – IDNR, November 09, 2009
[3] Inflow Flood Control Plan, Burlington Generating Station, 2016, Hard Hat Environmental Services
[4] Annual Inspection Report, Burlington Generating Station, 2016, Hard Hat Environmental Services

Pond is approximately 79,000 cubic yards. This volume does not include general fill material that has been added in the northeast corner of the BGS Ash Seal Pond.

3.1.4 Foundation and Abutment Properties - §257.73(c)(1)(v)

As identified in a Safety Factor Assessment[5] prepared for BGS in accordance with §257.73(e) of the CCR Rule, BGS is constructed on a natural levee deposit on the west bank of the Mississippi River at River Mile 399. Soil borings were installed in the vicinity of the BGS Ash Seal Pond in 1962, 2007, and 2008 (Appendix D). Additionally, soil borings and cone penetrometer test (CPT) borings were installed along the crest of the south embankment of the BGS Ash Seal Pond in 2011 (Appendix E). The borings indicated bedrock at elevation 450, very dense sand and gravel to elevation 470, and medium dense sand to elevation 510. Above elevation 510 the plant area and the BGS Ash Seal Pond have loose layers of silt and silty sand with compacted fill to bring the site grade to elevation 534.

3.1.5 Historical Construction and Use - §257.73(c)(1)(vi)

The BGS Ash Seal Pond, formerly identified as Ash Disposal Basin #1 in original plant arrangement drawings (Appendix A), was one of two original CCR surface impoundments located at BGS at the time of initial facility operations in June 1968. Historical aerial photographs (Appendix B) confirm the presence of the Ash Disposal Basin #1 at the time of initial facility operations.

There are no known reasonably and readily available documents that detail the method of site preparation and construction of each zone of the Ash Disposal Basin #1. Plant arrangement drawings (Appendix A) that were approved for construction provide details of the original design of Ash Disposal Basin #1 at the time of plant construction. In addition to the plant arrangement drawings, the in-situ soil properties of the CCR unit were identified in a Safety Factor Assessment[6] prepared for BGS in accordance with §257.73(e) of the CCR Rule. As discussed in the Safety Factor Assessment, soil borings

[5] Safety Factor Assessment, Burlington Generating Station, 2016, Hard Hat Environmental Services
[6] Safety Factor Assessment, Burlington Generating Station, 2016, Hard Hat Environmental Services

were installed in the vicinity of the BGS Ash Seal Pond in 1962, 2007, and 2008 (Appendix D). Additionally, soil borings and CPT borings were installed along the crest of the south embankment of the BGS Ash Seal Pond in 2011 (Appendix E). Soil samples were collected from the 2011 soil boring in order to determine water content, Atterberg limits, and grain size (Appendix F). The soil boring data, along with soil sample laboratory analytical results, identified loose layers of silt and silty sand with compacted fill from elevation 510 to the site grade elevation 534.

Historical use of Ash Disposal Basin #1, from the time of initial facility operations in June 1968 until August 1970, consisted of all CCR (bottom ash, economizer ash, precipitator fly ash) at BGS to be sluiced to Ash Disposal Basin #1[7]. The sluiced CCR was discharged into the northern portion of the CCR Unit. The water that was used to sluice the CCR flowed towards the southwest corner of the CCR Unit where a hydraulic structure was located within the south embankment. The original hydraulic structure consisted of an 18-inch diameter corrugated metal pipe (CMP) that was approximately 56 feet long and consisted of a 90° upturned elbow on the inlet end of the CMP (Appendix A). The water in Ash Disposal Basin #1 would overflow into the hydraulic structure and flow to the south where it would discharge into the condenser cooling water discharge channel prior to flowing to the east into the Mississippi River. In August 1970, BGS ceased sluicing CCR into Ash Disposal Basin #1 due to available storage capacity. The CCR sluice pipe was extended to discharge into Ash Disposal Basin #2.

The following list provides a general overview of the known modifications associated with the BGS Ash Seal Pond since initial facility operations.

- Ash Disposal Basin #1 was re-identified as the BGS Ash Seal Pond. The timeframe of this modification has not been documented.

[7] Patrick Kelleher – Alliant Energy, Email to William Skalitzky – Alliant Energy, May 12, 2009

- The BGS Ash Seal Pond, after being a primary receiver of sluiced CCR, was also a primary receiver of process water flows (e.g. boiler seal water) from the generating plant. The timeframe of this modification has not been documented.

- The original 18-inch CMP hydraulic structure was replaced with a 12-inch polyvinyl chloride (PVC) pipe. Similar to the 18-inch CMP, the 12-inch PVC pipe consisted of a 90° upturned elbow on the inlet end of the hydraulic structure. The timeframe of this modification has not been documented.

- The hydraulic structure associated with the BGS Ash Seal Pond was listed with the State of Iowa in the facilities National Pollutant Discharge Elimination System (NPDES) Permit as NPDES Outfall 006. The timeframe of this modification has not been documented.

- In August 2007, a geotechnical investigation[8] was completed along the south embankment of the BGS Ash Seal Pond in order to identify the cause of observed seeps along the embankments downstream slope. The geotechnical investigation identified several shallow seeps which were a result of thin sand seams within the embankment. In November 2007, a 275 foot long soil-bentonite slurry wall was installed along the eastern portion of the south embankment in order to repair the shallow seeps.

- In October 2009, BGS completed the boiler seal water reroute from the BGS Ash Seal Pond to the BGS Main Ash Pond. The boiler seal water was rerouted in order to eliminate the process water discharge into the BGS Ash Seal Pond. The process water flow was rerouted through the NPDES Outfall 001 located north of the generating plant. The reroute of the boiler seal water allowed for the closure of NPDES Outfall 006. Project closure documentation[9] was submitted to the IDNR.

[8] Mark Loerop – Hard Hat Services, Letter to Robin Nelson – Burlington Generating Station, August 31, 2007
[9] Matt Morgan – Klinger & Associates, P.C., Letter to Robert Palla – IDNR, November 09, 2009

- In October 2009, BGS ceased discharging process water and storm water through NPDES Outfall 006 into the condenser cooling water discharge channel. BGS permanently closed the hydraulic structure. The inlet end of the hydraulic structure was filled with concrete while the effluent end was sealed with a pipe end cap. BGS submitted the outfall closure notification documentation[10] to the IDNR.

Historical aerial photographs (Appendix B) and historical topographic maps (Appendix C) identify the topographic changes to the BGS Ash Seal Pond that have occurred since the time of initial facility operations.

3.1.6 Structures, Appurtenances, and Operations- §257.73(c)(1)(vii)

Detailed dimensional drawings of the BGS Ash Seal Pond that were reasonably and readily available are identified below. The detailed dimensional drawings were obtained from various designs, plans, and reports that were assembled during the historical information review.

- Plant Arrangement Drawings (May 1966) – Drawings provide details of the original design of Ash Disposal Basin #1 at the time of plant construction prior to placement of CCR. Drawings identify original design contours of the ash disposal basins, as well as detailed information of the initial hydraulic structure (Appendix A)

- Slurry Wall Construction and Seep Repair (October 2007) – Design drawings identify the approximate location of the soil-bentonite slurry wall that was installed along the eastern portion of the south embankment of the BGS Ash Seal Pond in 2007. Included with the design drawings are specifications detailing the installation requirements (Appendix G).

[10] William Skalitzky – Alliant Energy, Letter to Steve Williams – IDNR, November 06, 2009

- Existing Site Layout (June 2008) – Drawing identifies existing conditions of the BGS Ash Seal Pond at the time the survey was completed in 2008. Drawing identifies topographic contours of the area surrounding the BGS Ash Seal Pond, existing utilities, and existing hydraulic structures (Appendix G).

- Boiler Seal Water Reroute (March 2009) – Design drawings identify proposed reroute of boiler seal water from BGS Ash Seal Pond to BGS Main Ash Pond. Note, not all aspects of the design drawings were fully implemented as part of the boiler seal water reroute (Appendix G).

3.1.7 Instrumentation - §257.73(c)(1)(viii)

The BGS Ash Seal Pond does not have existing instrumentation that supports the operation of the CCR unit. Additionally, review of readily available historical documents has not identified any past instrumentation that was used to support the operation of the BGS Ash Seal Pond.

3.1.8 Area-Capacity Curve - §257.73(c)(1)(ix)

After review of readily available historical documents there is no readable available information regarding area-capacity curves for the BGS Ash Seal Pond.

3.1.9 Spillway and Diversion Features - §257.73(c)(1)(x)

The BGS Ash Seal Pond generally operates as a zero discharge pond and does not consist of any spillway or diversion feature. If necessary, BGS has the capability of pumping water from the BGS Ash Seal Pond to the BGS Main Ash Pond via a manually operated lift pump.

3.1.10 Construction Specifications, Surveillance, Maintenance, and Repair - §257.73(c)(1)(xi)

BGS implements a Site-Specific Inspection and Maintenance (I&M) Plan[11], in accordance with an Alliant Energy I&M Plan[12]. The Site-Specific I&M Plan has been implemented at BGS in order to identify the factors which may affect the long-term stability of the existing

[11] Inspection and Maintenance (I&M) Plan, Burlington Generating Station, October 2015, Version 2.0-Revision 0.0
[12] Inspection and Maintenance (I&M) Plan, Alliant Energy, September 2015, Version 2.0-Revision 0.0

CCR surface impoundments. The Site-Specific I&M Plan identifies existing operation and maintenance activities, and identifies the inspection, monitoring, maintenance, and recordkeeping requirements as outlined in the Alliant Energy I&M Plan in order to maintain the integrity of the existing CCR surface impoundments.

Visual inspections of the BGS Ash Seal Pond are completed in accordance with §257.83 of the CCR Rule. At intervals not exceeding seven days, the BGS Ash Seal Pond is visually inspected for any appearances of structural weakness or other conditions which are disrupting or have the potential to disrupt the operation or safety of the existing CCR surface impoundment. In addition to seven-day inspections, BGS conducts event-related inspections which may include inspections following storm events, seismic events, major maintenance activities, as well as other unusual events. Annual inspections are conducted by a qualified PE who is familiar with the requirements of the CCR Rule, the Alliant Energy I&M Plan, the BGS Site-Specific I&M Plan, and other facility specific information pertaining to the existing CCR surface impoundment.

Maintenance activities that are completed at BGS may include routine maintenance, event-related maintenance, and long-term maintenance. Routine maintenance activities may include management of vegetation (or other forms of slope protection), tree and sapling removal, reseeding of disturbed vegetated areas, removal of debris from collection and diversion channels, and repair of eroded areas. Event-related maintenance activities may include maintenance after unusual events such as heavy rainfall, periods of very high winds, or seismic activity. Maintenance may include repair of eroded areas or removal of damaged vegetation. Long-term maintenance activities are identified as part of the ongoing inspection program, through the annual inspections, or through other engineering evaluations and may include larger remediation activities.

3.1.11 Structural Instability Records - §257.73(c)(1)(xii)

After review of readily available historical documents there are no known records of structural instability associated with the BGS Ash Seal Pond that were identified.

3.2 BGS Main Ash Pond

The following subsections are intended to meet the requirements of the CCR Rule §257.73(c)(1) for the BGS Main Ash Pond.

3.2.1 CCR Unit Location - §257.73(c)(1)(ii)

The BGS Main Ash Pond is located southwest of the generating plant and west of the BGS Ash Seal Pond. The location of the BGS Main Ash Pond, in reference to the surrounding topography, is identified on both a USGS 7 ½ minute topographic quadrangle map and aerial photograph on Figure 1. The location of the BGS Main Ash Pond, in reference to the immediate surroundings within the BGS property, is identified on Figure 2.

3.2.2 Statement of Purpose - §257.73(c)(1)(iii)

The BGS Main Ash Pond is currently the primary receiver of bottom ash at BGS. The BGS Main Ash Pond is also a primary receiver of process water flows from the generating plant, which includes flows from the boiler seal water system, rinse water from previous chemical cleans, waste water from non-chemical metal cleaning (air heater wash and economizer wash), and boiler makeup/blowdown water[13]. Additionally, based on facility operations BGS has the capability to reroute the sluiced economizer ash from the BGS Economizer Pond to the BGS Main Ash Pond. The sluiced bottom ash, process water flows from the generating plant, and sluiced economizer ash (when necessary) all discharge into the northeast corner of the BGS Main Ash Pond. The sluiced bottom ash that settles out in the northeast corner of the BGS Main Ash Pond is reclaimed for beneficial reuse.

Additional use of the BGS Main Ash Pond includes the existing AGPAVE pile located in the southeast corner of the CCR unit. The AGPAVE pile consists of an aggregate-like material produced from Class C fly ash that has been hydrated and hardened. Fly ash from the on-site storage silo, when not transported off-site, was previously hauled from the generating plant to the BGS Main Ash Pond where it was hydrated, hardened, and

[13] Water and Ash Planning Project - Preliminary Water Balance, Burlington Generating Station, 2015, Sargent & Lundy

eventually reclaimed for beneficial reuse. As of 2015 AGPAVE is no longer produced at BGS and the remainder of the existing AGPAVE pile is in the process of being reclaimed for beneficial reuse.

The hydraulic structures associated with the BGS Main Ash Pond are located near the northwest corner of the CCR Unit. The hydraulic structures consist of two parallel 15-inch diameter CMP culverts. The hydraulic structures are located beneath the generating plant access road. The water from the BGS Main Ash Pond flows through the hydraulic structures to the north and discharges into a small channel located in the southwest corner of the BGS Upper Ash Pond.

3.2.3 Physical Layout Information - §257.73(c)(1)(iv)

As identified in an Inflow Flood Control Plan[14] prepared for BGS in accordance with §257.82 of the CCR Rule, the BGS Main Ash Pond has a watershed of approximately 18.7 acres, which is equal to the surface area of the CCR Unit.

As discussed in an Annual Inspection Report[15] prepared for BGS in accordance with §257.83 of the CCR Rule, the BGS Main Ash Pond is incised along the north and east sides of the CCR unit. The south and west embankments of the BGS Main Ash Pond have a height of approximately 12 feet from the crest to the toe of the downstream slope of the embankments. The embankment crests are at elevation 534, which is the same elevation as the site grade of the generating plant and equivalent to the 100-year flood water elevation of the Mississippi River. The interior storage depth of the BGS Main Ash Pond is approximately 8 feet. The total volume of impounded CCR and water within the BGS Main Ash Pond at normal water operation elevation is approximately 240,000 cubic yards. Additional volume of impounded CCR, located in the eastern half of the BGS Main Ash Pond above the crest elevation of the embankments, includes the bottom ash storage area and AGPAVE pile. In 2008, the surveyed quantity of the additional CCR

[14] Inflow Flood Control Plan, Burlington Generating Station, 2016, Hard Hat Environmental Services
[15] Annual Inspection Report, Burlington Generating Station, 2016, Hard Hat Environmental Services

located above the crest elevation of the embankments was approximately 104,000 cubic yards.

3.2.4 Foundation and Abutment Properties - §257.73(c)(1)(v)

As identified in a Safety Factor Assessment[16] prepared for BGS in accordance with §257.73(e) of the CCR Rule, BGS is constructed on a natural levee deposit on the west bank of the Mississippi River at River Mile 399. Soil borings were installed in the area of the BGS Main Ash Pond in 1962 and 2010 (Appendix D). Additionally, soil borings and CPT borings were installed along the crest of the south and west embankments of the BGS Main Ash Pond in 2011 (Appendix E). The borings indicated bedrock at elevation 450, very dense sand and gravel to elevation 470, and medium dense sand to elevation 510. Above elevation 510 the area of the BGS Main Ash Pond consists of a natural clay layer with plastic index greater than 20% and natural water content greater than 25%. The soil is a low plasticity clay deposited during river flooding in the backwater areas west of the generating plant.

3.2.5 Historical Construction and Use - §257.73(c)(1)(vi)

An ash settling basin, formerly identified as Ash Disposal Basin #2 in historical plant documents (Appendix A), was one of two original CCR surface impoundments at the time of initial facility operations in June 1968. A portion of the Ash Disposal Basin #2 was located in the very eastern portion of what is now identified as the BGS Main Ash Pond. Historical aerial photographs (Appendix B) confirm the presence of the Ash Disposal Basin #2 at the time of initial facility operations.

There are no known reasonably and readily available documents that detail the method of site preparation and construction of each zone of either the Ash Disposal Basin #2 or the BGS Main Ash Pond. Plant arrangement drawings (Appendix A) that were approved for construction provide details of the original design of Ash Disposal Basin #2 at the time of plant construction. In addition to the plant arrangement drawings, the in-situ soil

[16] Safety Factor Assessment, Burlington Generating Station, 2016, Hard Hat Environmental Services

properties of the BGS Main Ash Pond were identified in a Safety Factor Assessment[17] prepared for BGS in accordance with §257.73(e) of the CCR Rule. As discussed in the Safety Factor Assessment, soil borings were installed in the area of what is now identified as the BGS Main Ash Pond in 1962 and 2010 (Appendix D). Additionally, soil borings and CPT borings were installed along the crest of the south and west embankments of the BGS Main Ash Pond in 2011 (Appendix E). Soil samples were collected from the 2011 soil boring in order to determine water content, Atterberg limits, and grain size (Appendix F). The soil boring data, along with soil sample laboratory analytical results, observed the embankments of the BGS Main Ash Pond to be constructed of clayey silt that was compacted over the natural clay deposit.

Historical use of Ash Disposal Basin #2, from August 1970 to June 1971, consisted of all CCR (bottom ash, economizer ash, precipitator fly ash) at BGS to be sluiced to Ash Disposal Basin #2[18]. Initial design of the CCR Unit did not provide for decanting of sluiced CCR. There is no readily available information about how the water that was used to sluice the CCR into Ash Disposal Basin #2 was discharged. CCR was sluiced into Ash Disposal Basin #2 until June 1971 when the CCR sluice pipe was rerouted to the area of the BGS Upper Ash Pond and BGS Economizer Pond.

In August 1980, the south and west embankments of what is now identified as the BGS Main Ash Pond were constructed and all of the CCR (bottom ash, economizer ash, precipitator fly ash) at BGS was rerouted from the area of the BGS Upper Ash Pond and BGS Economizer Pond to the BGS Main Ash Pond. The CCR was sluiced into the northeastern corner of the CCR unit. The water that was used to sluice the CCR flowed to the west towards the northwest corner of the CCR unit where a hydraulic structure was located. The original hydraulic structure associated with the BGS Main Ash Pond was located beneath the generating plant access road and consisted of one 15-inch diameter culvert. The water within the BGS Main Ash Pond would flow through the

[17] Safety Factor Assessment, Burlington Generating Station, 2016, Hard Hat Environmental Services
[18] Patrick Kelleher – Alliant Energy, Email to William Skalitzky – Alliant Energy, May 12, 2009

hydraulic structure, beneath the generating plant access road, and discharge into the southwest corner of the BGS Upper Ash Pond. By November 1986, the only remaining CCR that continued to be sluiced to the BGS Main Ash Pond was bottom ash. The economizer ash and precipitator fly ash were rerouted back to the area of the BGS Upper Ash Pond and BGS Economizer Pond.

The following list provides a general overview of the known modifications associated with the BGS Main Ash Pond since initial facility operations.

- The original 15-inch diameter culvert that was located in the northwest corner of the BGS Main Ash Pond was replaced with two parallel 15-inch diameter CMP culverts. The timeframe of this modification has not been documented.

- The BGS Main Ash Pond became a primary receiver of process water flows from the generating plant. The timeframe of the initiation of this process has not been documented.

- The southeast portion of the BGS Main Ash Pond became a fly ash handling area as part of the AGPAVE production process. The timeframe of the initiation of this process has not been documented.

- In October 2009, BGS completed the boiler seal water reroute from the BGS Ash Seal Pond to the BGS Main Ash Pond. The boiler seal water was rerouted in order to eliminate the process water discharge into the BGS Ash Seal Pond. The reroute of the boiler seal water allowed for the closure of NPDES Outfall 006. Project closure documentation[19] was submitted to the IDNR.

[19] Matt Morgan – Klinger & Associates, P.C., Letter to Robert Palla – IDNR, November 09, 2009

Historical aerial photographs (Appendix B) and historical topographic maps (Appendix C) identify the topographic changes to the BGS Main Ash Pond that have occurred since the time of initial facility operations.

3.2.6 Structures, Appurtenances, and Operations- §257.73(c)(1)(vii)

Detailed dimensional drawings of the BGS Main Ash Pond that were reasonably and readily available are identified below. The detailed dimensional drawings were obtained from various designs, plans, and reports that were assembled during the historical information review.

- Plant Arrangement Drawings (May 1966) – Drawings provide details of the original design of Ash Disposal Basin #2 at the time of plant construction prior to placement of CCR. Drawings identify original design contours of the ash disposal basins (Appendix A)

- Discharge Location Map (June 1971) – Drawing identifies the general location of the BGS Main Ash Pond and identifies the size of the original hydraulic structure located in the northwest corner of the CCR unit (Appendix H).

- Boiler Seal Water Reroute (March 2009) – Drawing identifies existing conditions of the BGS Ash Seal Pond at the time the survey was completed in 2008. Drawing identifies topographic contours of the area surrounding the BGS Main Ash Pond, existing utilities, hydraulic routing, and existing hydraulic structures (Appendix G).

3.2.7 Instrumentation - §257.73(c)(1)(viii)

The BGS Main Ash Pond does not have existing instrumentation that supports the operation of the CCR unit. Additionally, review of readily available historical documents has not identified any past instrumentation that was used to support the operation of the BGS Main Ash Pond.

3.2.8 Area-Capacity Curve - §257.73(c)(1)(ix)

After review of readily available historical documents there is no readily available information regarding area-capacity curves for the BGS Main Ash Pond.

3.2.9 Spillway and Diversion Features - §257.73(c)(1)(x)

The BGS Main Ash Pond is equipped with two parallel 15-inch diameter CMP culverts located under the generating plant access road in the northwest corner of the CCR unit. The culverts are constructed of non-erodible material and designed to carry sustained flows. Additional information regarding the hydraulic capacity of the hydraulic structures associated with the BGS Main Ash Pond is provided in the Inflow Flood Control Plan[20].

3.2.10 Construction Specifications, Surveillance, Maintenance, and Repair - §257.73(c)(1)(xi)

BGS implements a Site-Specific Inspection and Maintenance (I&M) Plan, in accordance with an Alliant Energy I&M Plan. The Site-Specific I&M Plan has been implemented at BGS in order to identify the factors which may affect the long-term stability of the existing CCR surface impoundments. The Site-Specific I&M Plan identifies existing operation and maintenance activities, and identifies the inspection, monitoring, maintenance, and recordkeeping requirements as outlined in the Alliant Energy I&M Plan in order to maintain the integrity of the existing CCR surface impoundments.

Visual inspections of the BGS Main Ash Pond are completed in accordance with §257.83 of the CCR Rule. At intervals not exceeding seven days, the BGS Main Ash Pond is visually inspected for any appearances of structural weakness or other conditions which are disrupting or have the potential to disrupt the operation or safety of the existing CCR surface impoundment. In addition to seven-day inspections, BGS conducts event-related inspections which may include inspections following storm events, seismic events, major maintenance activities, as well as other unusual events. Annual inspections are conducted by a qualified PE who is familiar with the requirements of the CCR Rule, the

[20] Inflow Flood Control Plan, Burlington Generating Station, 2016, Hard Hat Environmental Services

Alliant Energy I&M Plan, the BGS Site-Specific I&M Plan, and other facility specific information pertaining to the existing CCR surface impoundment.

Maintenance activities that are completed at BGS may include routine maintenance, event-related maintenance, and long-term maintenance. Routine maintenance activities may include management of vegetation (or other forms of slope protection), tree and sapling removal, reseeding of disturbed vegetated areas, removal of debris from collection and diversion channels, and repair of eroded areas. Event-related maintenance activities may include maintenance after unusual events such as heavy rainfall, periods of very high winds, or seismic activity. Maintenance may include repair of eroded areas or removal of damaged vegetation. Long-term maintenance activities are identified as part of the ongoing inspection program, through the annual inspections, or through other engineering evaluations and may include larger remediation activities.

3.2.11 Structural Instability Records - §257.73(c)(1)(xii)

After review of readily available historical documents the following list identifies records of structural instability associated with the BGS Main Ash Pond.

- In June 2012, water was discovered along the crest of the south embankment between the BGS Main Ash Pond and the freshwater forested/shrub wetland area located south of the south embankment. A beaver dam, located north of the generating plant access road in the southwest corner of the BGS Upper Ash Pond, was the cause for the water backup in the BGS Main Ash Pond. The beaver dam was promptly removed and the water was observed to recede along the south embankment. BGS notified the IDNR of the bypass[21].

3.3 BGS Economizer Pond

The following subsections are intended to meet the requirements of the CCR Rule §257.73(c)(1) for the BGS Economizer Pond.

[21] Robin Nelson – Alliant Energy, Written Report for Hazardous Conditions to Brian Lee – IDNR, June 28, 2012

3.3.1 CCR Unit Location - §257.73(c)(1)(ii)

The BGS Economizer Pond is located west of the generating plant and north of the BGS Main Ash Pond. The BGS Economizer Pond was constructed in the southern and eastern portion of the original footprint of the BGS Upper Ash Pond. The location of the BGS Economizer Pond, in reference to the surrounding topography, is identified on both a USGS 7 ½ minute topographic quadrangle map and aerial photograph on Figure 1. The location of the BGS Economizer Pond, in reference to the immediate surroundings within the BGS property, is identified on Figure 2.

3.3.2 Statement of Purpose - §257.73(c)(1)(iii)

The BGS Economizer Pond is the primary receiver of economizer ash at BGS. The economizer ash is sluiced from the generating plant and discharged into the east end of the BGS Economizer Pond. The economizer ash is dredged from the BGS Economizer Pond, as needed, in order to maintain storage capacity within the CCR Unit. Based on facility operations, BGS has the capability to reroute the sluiced economizer ash from the BGS Economizer Pond to the BGS Main Ash Pond.

The hydraulic structure associated with the BGS Economizer Pond is located near the southwest corner of the CCR Unit. The hydraulic structure consists of an 18-inch diameter high-density polyethylene (HDPE) pipe. The water from the BGS Economizer Pond flows to the south through the hydraulic structure and discharges into a storm water and process water channel located along the south side of the economizer ash pile. In addition to the influent flow from the BGS Economizer Pond, the storm water and process water channel receives influent flows from a pump vault located at the toe of the downstream slope of the east embankment of the BGS Economizer Pond. The majority of the storm water from the eight acres surrounding the generating plant is collected in the storm drainage system and drains into the pump vault. In addition to the storm water, the generating plant floor drains and water treatment process water flows through an oil/water separator and discharges into the pump vault. The water in the pump vault is then pumped up to the storm water and process water channel. The storm water and

process water channel flows to the west towards the southwest corner of the economizer ash pile where two hydraulic structures are located. The primary hydraulic structure consists of an 18-inch diameter HDPE pipe. The water in the channel flows through the primary hydraulic structure and discharges at the toe of the economizer ash pile into a small channel located in the southwest corner of the BGS Upper Ash Pond. The secondary hydraulic structure acts as an emergency overflow and consists of a 12-inch diameter steel pipe. The emergency overflow pipe also discharges at the toe of the economizer ash pile into the southwest corner of the BGS Upper Ash Pond.

3.3.3 Physical Layout Information - §257.73(c)(1)(iv)

As identified in an Inflow Flood Control Plan[22] prepared for BGS in accordance with §257.82 of the CCR Rule, the BGS Economizer Pond has a watershed of approximately 11 acres, which includes the economizer ash pile and the BGS Economizer Pond. The surface area of the BGS Economizer Pond is approximately 0.4 acres.

As discussed in an Annual Inspection Report[23] prepared for BGS in accordance with §257.83 of the CCR Rule, the embankments of the BGS Economizer Pond have a height of approximately 13 feet from the crest to the toe of the downstream slope. The interior storage depth of the economizer ash pile, from the crest to the bottom of the original footprint of the BGS Upper Ash Pond, is approximately 27 feet. The total volume of impounded CCR and water within the economizer ash pile and BGS Economizer Pond area, including CCR already in place when the pond was established, is approximately 480,000 cubic yards.

3.3.4 Foundation and Abutment Properties - §257.73(c)(1)(v)

As identified in a Safety Factor Assessment[24] prepared for BGS in accordance with §257.73(e) of the CCR Rule, BGS is constructed on a natural levee deposit on the west bank of the Mississippi River at River Mile 399. Soil borings were installed in the area of

[22] Inflow Flood Control Plan, Burlington Generating Station, 2016, Hard Hat Environmental Services
[23] Annual Inspection Report, Burlington Generating Station, 2016, Hard Hat Environmental Services
[24] Safety Factor Assessment, Burlington Generating Station, 2016, Hard Hat Environmental Services

the BGS Economizer Pond in 1962 and 2010 (Appendix D). Additionally, soil borings and CPT borings were installed along the crest of economizer ash pile in 2011 (Appendix E). The borings indicated bedrock at elevation 450, very dense sand and gravel to elevation 470, and medium dense sand to elevation 510. Above elevation 510 the area of the BGS Economizer Pond consists of a natural clay layer with plastic index greater than 20% and natural water content greater than 25%. The soil is a low plasticity clay deposited during river flooding in the backwater areas west of the generating plant.

3.3.5 Historical Construction and Use - §257.73(c)(1)(vi)

The BGS Economizer Pond is located on top of the east end of the economizer ash pile approximately 13 feet above the site grade elevation of the generating plant. The footprint of the economizer ash pile, formerly identified as the north ash pond in historical plant documents, is located in the southern and eastern portion of the original footprint of what is now identified as the BGS Upper Ash Pond. In 1971, BGS constructed a levee north of the generating plant access road to form the area of the BGS Upper Ash Pond. Once the levee was constructed BGS rerouted all the CCR (bottom ash, economizer ash, precipitator fly ash) at BGS from the Ash Disposal Basin #2 to the area of the north ash pond. In August 1980, BGS constructed the south and west embankments of the BGS Main Ash Pond and rerouted all the CCR from the north ash pond to the BGS Main Ash Pond. In November 1986, BGS rerouted the economizer ash and precipitator fly ash from the BGS Main Ash Pond back to the southeast corner of the BGS Upper Ash Pond in the footprint of what was identified as the north ash pond and is currently identified as the economizer ash pile.

In 1990, BGS raised the existing levee of the north ash pond approximately five feet above the low point of the generating plant access road. The levee was constructed of compacted clay on top of existing CCR material that had been deposited in the area. The original hydraulic structure associated with the north ash pond consisted of a 15-inch diameter pipe. The hydraulic structure was located at the west end of the north ash pond.

In 1992, BGS raised the existing levee of the north ash pond an additional ten feet. The raised levee was constructed of compacted clay on top of the existing levee.

In 1996, BGS constructed the precipitator fly ash storage silo located along the south side of the generating plant. BGS ceased sluicing fly ash to the BGS Economizer Pond and began handling the precipitator fly ash in the dry.

In-situ soil properties of the CCR Unit were identified in a Safety Factor Assessment[25] prepared for BGS in accordance with §257.73(e) of the CCR Rule. As discussed in the Safety Factor Assessment, soil borings were installed in the area of the economizer ash pile in 1962 and 2010 (Appendix D). Additionally, soil borings and CPT borings were installed along the crest of the economizer ash pile in 2011 (Appendix E). Soil samples were collected from the 2011 soil boring in order to determine water content, Atterberg limits, and grain size (Appendix F). The soil boring data, along with soil sample laboratory analytical results, observed the embankments of the BGS Economizer Pond to be constructed of clayey silt. The imported clayey silt used to raise the embankments of the BGS Economizer Pond was identified in the south, east, and west embankments. Additionally, the imported clayey silt was found in the western half of the north embankment. However, the eastern half of the north embankment contained no imported clay and was observed to be constructed of CCR only.

The following list provides a general overview of the known modifications associated with the BGS Economizer Pond since initial facility operations.

- The original 15-inch diameter pipe that was located in the southwest corner of the north ash pond was replaced with an 18-inch diameter CMP. The timeframe of this modification is not known.

- In 2009, the BGS Economizer Pond was dredged due to degradation of the ponds functionality. The BGS Economizer Pond was dredged to create a larger ponding

[25] Safety Factor Assessment, Burlington Generating Station, 2016, Hard Hat Environmental Services

area to allow the sluiced CCR to settle out. The drainage channel that was located along the north side of the economizer ash pile was widened to promote additional settlement of the sluiced CCR prior to discharging into the southwest corner of the BGS Upper Ash Pond.

- In 2011, a series of Ash Pond Stability and Hydraulic Analysis Reports[26,27] were completed which confirmed the stability of the economizer ash pile met the minimum acceptable factors of safety used by the USEPA for both static and seismic loading. However, the analysis concluded that the economizer ash pile embankment may deform or liquefy during a design basis earthquake and the contents of the BGS Economizer Pond may deposit into the BGS Upper Ash Pond. In order to achieve higher factors of safety BGS implemented a redesigned layout of the economizer ash pile and BGS Economizer Pond. The surface area of the BGS Economizer Pond was reduced in size and centered along the east end of the economizer ash pile. The drainage channel previously located along the north embankment of the economizer ash pile was filled in and the water from the BGS Economizer Pond was rerouted to the south towards the existing storm water and process water channel. The eastern half of the north embankment was reduced to a 5:1 slope while a toe berm was constructed along the toe of the western half of the north embankment. The 18-inch CMP hydraulic structure located at the west end of the economizer ash pile was replaced with an 18-inch diameter HDPE pipe.

Historical aerial photographs (Appendix B) and historical topographic maps (Appendix C) identify the topographic changes to the BGS Economizer Pond that have occurred since the time of initial facility operations.

[26] Ash Pond Slope Stability and Hydraulic Analysis, Burlington Generating Station, February 2011, Aether DBS
[27] Ash Pond Slope Stability and Seismic Analysis – Supplement, Burlington Generating Station, June 2011, Aether DBS

3.3.6 Structures, Appurtenances, and Operations- §257.73(c)(1)(vii)

Detailed dimensional drawings of the BGS Economizer Pond that were reasonably and readily available are identified below. The detailed dimensional drawings were obtained from various designs, plans, and reports that were assembled during the historical information review.

- Discharge Location Map (June 1971) – Drawing identifies the general location of the BGS Economizer Pond and identifies the size of the original hydraulic structure located along the west end of the CCR unit (Appendix H).

- Economizer Ash Pond Breach Reconstruction and Stabilization (October 2008) – Drawings identify the proposed reconfigurations and stabilizations for the breach that occurred along the north embankment of the BGS Economizer Ash Pond (Appendix I)

- Economizer Ash Pond Reconfiguration (October 2011) – Drawings identify the conditions of the BGS Economizer Pond prior to the reconfiguration that was completed in 2011, as well as as-built conditions post reconfiguration. Drawings identify topographic/bathymetric contours, utilities, appurtenances, and hydraulic structures associated with the BGS Economizer Pond (Appendix I).

3.3.7 Instrumentation - §257.73(c)(1)(viii)

The BGS Economizer Pond does not have existing instrumentation that supports the operation of the CCR unit. Additionally, review of readily available historical documents has not identified any past instrumentation that was used to support the operation of the BGS Economizer Pond.

3.3.8 Area-Capacity Curve - §257.73(c)(1)(ix)

After review of readily available historical documents there is readily available information regarding area-capacity curves for the BGS Economizer Pond.

3.3.9 Spillway and Diversion Features - §257.73(c)(1)(x)

The BGS Economizer Pond is equipped with an 18-inch diameter HDPE pipe. The hydraulic structure is located in the southwest corner of the CCR Unit. The storm water and process water channel consists of two hydraulic structures, both located at the very west end of the economizer ash pile. The primary hydraulic structure consists of an 18-inch diameter HDPE pipe while the emergency overflow hydraulic structure consist of a 12-inch diameter steel pipe. The hydraulic structures are constructed of non-erodible material and designed to carry sustained flows. Additional information regarding the hydraulic capacity of the hydraulic structures associated with the BGS Economizer Pond is provided in the Inflow Flood Control Plan[28]

3.3.10 Construction Specifications, Surveillance, Maintenance, and Repair - §257.73(c)(1)(xi)

BGS implements a Site-Specific Inspection and Maintenance (I&M) Plan, in accordance with an Alliant Energy I&M Plan. The Site-Specific I&M Plan has been implemented at BGS in order to identify the factors which may affect the long-term stability of the existing CCR surface impoundments. The Site-Specific I&M Plan identifies existing operation and maintenance activities, and identifies the inspection, monitoring, maintenance, and recordkeeping requirements as outlined in the Alliant Energy I&M Plan in order to maintain the integrity of the existing CCR surface impoundments.

Visual inspections of the BGS Economizer Pond are completed in accordance with §257.83 of the CCR Rule. At intervals not exceeding seven days, the BGS Economizer Pond is visually inspected for any appearances of structural weakness or other conditions which are disrupting or have the potential to disrupt the operation or safety of the existing CCR surface impoundment. In addition to seven-day inspections, BGS conducts event-related inspections which may include inspections following storm events, seismic events, major maintenance activities, as well as other unusual events. Annual inspections are conducted by a qualified PE who is familiar with the requirements of the CCR Rule, the

[28] Inflow Flood Control Plan, Burlington Generating Station, 2016, Hard Hat Environmental Services

Alliant Energy I&M Plan, the BGS Site-Specific I&M Plan, and other facility specific information pertaining to the existing CCR surface impoundment.

Maintenance activities that are completed at BGS may include routine maintenance, event-related maintenance, and long-term maintenance. Routine maintenance activities may include management of vegetation (or other forms of slope protection), tree and sapling removal, reseeding of disturbed vegetated areas, removal of debris from collection and diversion channels, and repair of eroded areas. Event-related maintenance activities may include maintenance after unusual events such as heavy rainfall, periods of very high winds, or seismic activity. Maintenance may include repair of eroded areas or removal of damaged vegetation. Long-term maintenance activities are identified as part of the ongoing inspection program, through the annual inspections, or through other engineering evaluations and may include larger remediation activities.

3.3.11 Structural Instability Records - §257.73(c)(1)(xii)

After review of readily available historical documents the following list identifies records of structural instability associated with the BGS Main Ash Pond.

- In October 2008, a breach was observed along the north embankment of the BGS Economizer Pond. The area where the breach occurred was excavated and replaced with imported clay that was compacted in lifts (Appendix I).

- In 2011, a series of Ash Pond Stability and Hydraulic Analysis Reports[29,30] were completed which confirmed the stability of the economizer ash pile met the minimum acceptable factors of safety used by the USEPA for both static and seismic loading. However, the analysis concluded that the economizer ash pile embankment may deform or liquefy during a design basis earthquake and the contents of the BGS Economizer Pond may deposit into the BGS Upper Ash Pond.

[29] Ash Pond Slope Stability and Hydraulic Analysis, Burlington Generating Station, February 2011, Aether DBS
[30] Ash Pond Slope Stability and Seismic Analysis – Supplement, Burlington Generating Station, June 2011, Aether DBS

In order to achieve higher factors of safety BGS implemented a redesigned layout of the economizer ash pile and BGS Economizer Pond. Additional details of the modifications that were completed are identified in Section 3.3.5 and 3.3.6.

3.4 BGS Upper Ash Pond

The following subsections are intended to meet the requirements of the CCR Rule §257.73(c)(1) for BGS Upper Ash Pond.

3.4.1 CCR Unit Location - §257.73(c)(1)(ii)

The BGS Upper Ash Pond is located northwest of the generating plant and north of the BGS Economizer Pond. The location of the BGS Upper Ash Pond, in reference to the surrounding topography, is identified on both a USGS 7 ½ minute topographic quadrangle map and aerial photograph on Figure 1. The location of the BGS Upper Ash Pond, in reference to the immediate surroundings within the BGS property, is identified on Figure 2.

3.4.2 Statement of Purpose - §257.73(c)(1)(iii)

The BGS Upper Ash Pond is the downstream receiver of both the BGS Main Ash Pond and BGS Economizer Pond, which includes influent flows from bottom ash sluicing activities, economizer ash sluicing activities, process water flows from the generating plant, and storm water flows.

There are two hydraulic structure associated with the BGS Upper Ash Pond. Both hydraulic structures are located in the northeast corner of the CCR unit. The primary hydraulic structure consists of a 24-inch wide precast concrete parshall flume that discharges into a concrete catch basin. The water in the catch basin flows through a 15-inch diameter PVC pipe and discharges into the BGS Lower Pond prior to flowing to the north through NPDES Outfall 001 and into the Mississippi River. A second hydraulic structure, which is used as an emergency overflow, is located east of the primary hydraulic structure and consists of a 14-inch PVC pipe that also discharges into the BGS Lower Pond.

3.4.3 Physical Layout Information - §257.73(c)(1)(iv)

As identified in an Inflow Flood Control Plan[31] prepared for BGS in accordance with §257.82 of the CCR Rule, the BGS Upper Ash Pond has a watershed of approximately 13.3 acres, which is equal to the surface area of the CCR unit.

As discussed in an Annual Inspection Report[32] prepared for BGS in accordance with §257.83 of the CCR Rule, the BGS Upper Ash Pond is incised along the south and east sides of the CCR unit. The constructed levee that defines the west and north embankments of the BGS Upper Ash Pond has a height of approximately 10 feet from the crest to the toe of the downstream slope of the embankment. The embankment crest is at elevation 531, approximately three feet lower than the 100-year flood elevation of the Mississippi River. The embankment is armored with riprap along the length of the upstream slope of the embankment. The downstream slope of the embankment consists of vegetated slope except for a small section in the area adjacent to the primary hydraulic structure. Additionally, the crest of the embankment is armored with an aggregate base in the event of overtopping during extreme flood stage in the Mississippi River. The interior storage depth of the BGS Upper Ash Pond is approximately 7 feet. The total volume of impounded CCR and water within the BGS Upper Ash Pond at normal water operation elevation is approximately 150,000 cubic yards.

3.4.4 Foundation and Abutment Properties - §257.73(c)(1)(v)

As identified in a Safety Factor Assessment[33] prepared for BGS in accordance with §257.73(e) of the CCR Rule, BGS is constructed on a natural levee deposit on the west bank of the Mississippi River at River Mile 399. Numerous soil borings were installed in the area of the BGS Upper Ash Pond in 2010 (Appendix D). Additionally, soil borings and CPT borings were installed along the crest of the embankments of the BGS Upper Ash Pond in 2011 (Appendix E). The borings indicated bedrock at elevation 450, very dense sand and gravel to elevation 470, and medium dense sand to elevation 510. Above

[31] Inflow Flood Control Plan, Burlington Generating Station, 2016, Hard Hat Environmental Services
[32] Annual Inspection Report, Burlington Generating Station, 2016, Hard Hat Environmental Services
[33] Safety Factor Assessment, Burlington Generating Station, 2016, Hard Hat Environmental Services

elevation 510 the area of the BGS Upper Ash Pond consists of a natural clay layer with plastic index greater than 20% and natural water content greater than 25%. The soil is a low plasticity clay deposited during river flooding in the backwater areas west of the generating plant.

3.4.5 Historical Construction and Use - §257.73(c)(1)(vi)

In 1971, BGS constructed a levee to the north of the generating plant access road to form the BGS Upper Ash Pond. Once the levee was constructed BGS rerouted all the CCR (bottom ash, economizer ash, precipitator fly ash) at BGS from the Ash Disposal Basin #2 to the area of the BGS Upper Ash Pond in the footprint of what was identified as the north ash pond in historical documents. In August 1980, BGS constructed the south and west embankments of the BGS Main Ash Pond and rerouted all the CCR from the north ash pond to the BGS Main Ash Pond. In November 1986, BGS rerouted the economizer ash and precipitator fly ash from the BGS Main Ash Pond back to the southeast corner of the BGS Upper Ash Pond in the footprint of what was identified as the north ash pond and is currently identified as the economizer ash pile. In 1996, BGS constructed the precipitator fly ash storage silo located along the south side of the generating plant. BGS ceased sluicing fly ash to the area of the BGS Upper Ash Pond and BGS Economizer Pond and began handling the precipitator fly ash in the dry.

In-situ soil properties of the CCR Unit were identified in a Safety Factor Assessment[34] prepared for BGS in accordance with §257.73(e) of the CCR Rule. As discussed in the Safety Factor Assessment, soil borings were installed in the area of the BGS Upper Ash Pond in 2010 (Appendix D). Additionally, soil borings and CPT borings were installed along the crest of the north and west embankments of the BGS Upper Ash Pond in 2011 (Appendix E). Soil samples were collected from the 2011 soil boring in order to determine water content, Atterberg limits, and grain size (Appendix F). The soil boring data, along

[34] Safety Factor Assessment, Burlington Generating Station, 2016, Hard Hat Environmental Services

with soil sample laboratory analytical results, observed the embankments of the BGS Upper Ash Pond to be constructed of clayey silt over the natural clay deposit.

The following list provides a general overview of the known modifications associated with the BGS Upper Ash Pond since initial facility operations.

- In 2009, BGS conducted the rehabilitation of the levee of the BGS Upper Ash Pond. The original levee consisted of earthen material with many small and large diameter trees located along the downstream slope. The rehabilitated levee consisted of imported clay that was compacted along the crest and upstream slope, followed by placement of geotextile fabric and a 6-inch aggregate base along the crest. The upstream slope received a 12-inch layer of riprap from the crest to approximately two feet below normal water elevation of the BGS Upper Ash Pond in order to provide erosion protection. Many of the small and large diameter trees were removed from the downstream slope as part of the levee rehabilitation.

- In 2011, the primary hydraulic structure associated with the BGS Upper Ash Pond was redesigned. The hydraulic structure was located in the northeast corner of the BGS Upper Ash Pond and consisted of a 15-inch PVC pipe that discharged into a pre-cast concrete catch basin. The water in the catch basin would flow through a second 15-inch PVC pipe that discharged into the BGS Lower Pond. In order to resolve the issues of frequent clogging of the hydraulic structure, as well as maintenance issues with the existing flow metering instrumentation, the hydraulic structure was modified. The new hydraulic structure consisted of a 24-inch wide pre-cast concrete parshall flume in place of the 15-inch PVC pipe. The in-pipe area velocity flow sensor was replaced with an ultrasonic transducer down look sensor.

- In 2012, large riprap was placed along a section of the downstream slope of the north embankment immediately west of the primary hydraulic structure associated with the BGS Upper Ash Pond.

Historical aerial photographs (Appendix B) and historical topographic maps (Appendix C) identify the topographic changes to the BGS Upper Ash Pond that have occurred since the time of initial facility operations.

3.4.6 Structures, Appurtenances, and Operations- §257.73(c)(1)(vii)

Detailed dimensional drawings of the BGS Upper Ash Pond that were reasonably and readily available are identified below. The detailed dimensional drawings were obtained from various designs, plans, and reports that were assembled during the historical information review.

- Upper Ash Pond Outfall Modification (August 2005) – Drawing identifies the conditions of the BGS Upper Ash Pond north embankment and hydraulic structure prior to the modifications that were completed in 2005, as well as the proposed design for the modified outfall structure. Drawing identifies topographic contours, utilities, appurtenances, instrumentation, and the hydraulic structure associated with the BGS Upper Ash Pond (Appendix J).

- Upper Ash Pond Outfall Modification (September 2011) - Drawings identify the conditions of the BGS Upper Ash Pond north embankment and hydraulic structure prior to the modifications that were completed in 2011, as well as as-built conditions after the outfall modifications were completed. Drawings identify topographic contours, utilities, appurtenances, instrumentation, and the hydraulic structure associated with the BGS Upper Ash Pond (Appendix J).

3.4.7 Instrumentation - §257.73(c)(1)(viii)

Instrumentation used to support the operation of the BGS Upper Ash Pond consists of an ultrasonic transducer down look sensor mounted over a 24-inch wide parshall flume hydraulic structure in the northeast corner of the BGS Upper Ash Pond. The ultrasonic transducer down look sensor was installed in 2011 and replaced the in-pipe area velocity flow meter that was used with the former hydraulic structure. The ultrasonic transducer

down look sensor collects flow data in accordance with the requirements of the facility's NPDES permit for NPDES Outfall 001.

3.4.8 Area-Capacity Curve - §257.73(c)(1)(ix)

After review of readily available historical documents there is no readily available information regarding area-capacity curves for the BGS Upper Ash Pond.

3.4.9 Spillway and Diversion Features - §257.73(c)(1)(x)

The BGS Upper Ash Pond is equipped with two hydraulic structures located in the northeast corner of the CCR Unit. The primary hydraulic structure consists of one 24-inch wide precast concrete parshall flume connected to a concrete catch basin. The water that flows into the catch basin discharges through a 15-inch diameter PVC pipe. A second hydraulic structure, used as an emergency overflow, consists of a 14-inch diameter PVC pipe. Both hydraulic structures are constructed of non-erodible material and designed to carry sustained flows. Additional information regarding the hydraulic capacity of the hydraulic structures associated with the BGS Upper Ash Pond is provided in the Inflow Flood Control Plan[35]

3.4.10 Construction Specifications, Surveillance, Maintenance, and Repair - §257.73(c)(1)(xi)

BGS implements a Site-Specific Inspection and Maintenance (I&M) Plan, in accordance with an Alliant Energy I&M Plan. The Site-Specific I&M Plan has been implemented at BGS in order to identify the factors which may affect the long-term stability of the existing CCR surface impoundments. The Site-Specific I&M Plan identifies existing operation and maintenance activities, and identifies the inspection, monitoring, maintenance, and recordkeeping requirements as outlined in the Alliant Energy I&M Plan in order to maintain the integrity of the existing CCR surface impoundments.

Visual inspections of the BGS Upper Ash Pond are completed in accordance with §257.83 of the CCR Rule. At intervals not exceeding seven days, the BGS Upper Ash Pond is visually inspected for any appearances of structural weakness or other conditions which

[35] Inflow Flood Control Plan, Burlington Generating Station, 2016, Hard Hat Environmental Services

are disrupting or have the potential to disrupt the operation or safety of the existing CCR surface impoundment. In addition to seven-day inspections, BGS conducts event-related inspections which may include inspections following storm events, seismic events, major maintenance activities, as well as other unusual events. Annual inspections are conducted by a qualified PE who is familiar with the requirements of the CCR Rule, the Alliant Energy I&M Plan, the BGS Site-Specific I&M Plan, and other facility specific information pertaining to the existing CCR surface impoundment.

Maintenance activities that are completed at BGS may include routine maintenance, event-related maintenance, and long-term maintenance. Routine maintenance activities may include management of vegetation (or other forms of slope protection), tree and sapling removal, reseeding of disturbed vegetated areas, removal of debris from collection and diversion channels, and repair of eroded areas. Event-related maintenance activities may include maintenance after unusual events such as heavy rainfall, periods of very high winds, or seismic activity. Maintenance may include repair of eroded areas or removal of damaged vegetation. Long-term maintenance activities are identified as part of the ongoing inspection program, through the annual inspections, or through other engineering evaluations and may include larger remediation activities.

3.4.11 Structural Instability Records - §257.73(c)(1)(xii)

After review of readily available historical documents the following list identifies records of structural instability associated with the BGS Upper Ash Pond.

- In 2005, BGS identified a previously unknown hydraulic structure located within the levee of the BGS Upper Ash Pond. The hydraulic structure, which was a CMP of an unknown size, was reported to the IDNR as a bypass. The hydraulic structure was later removed.

4 CHANGES TO THE HISTORY OF CONSTRUCTION

If there is a significant change to any information compiled within the Report, the owner or operator of the CCR unit must update the relevant information and place into the facility's operating record as required by §257.105(f)(9).

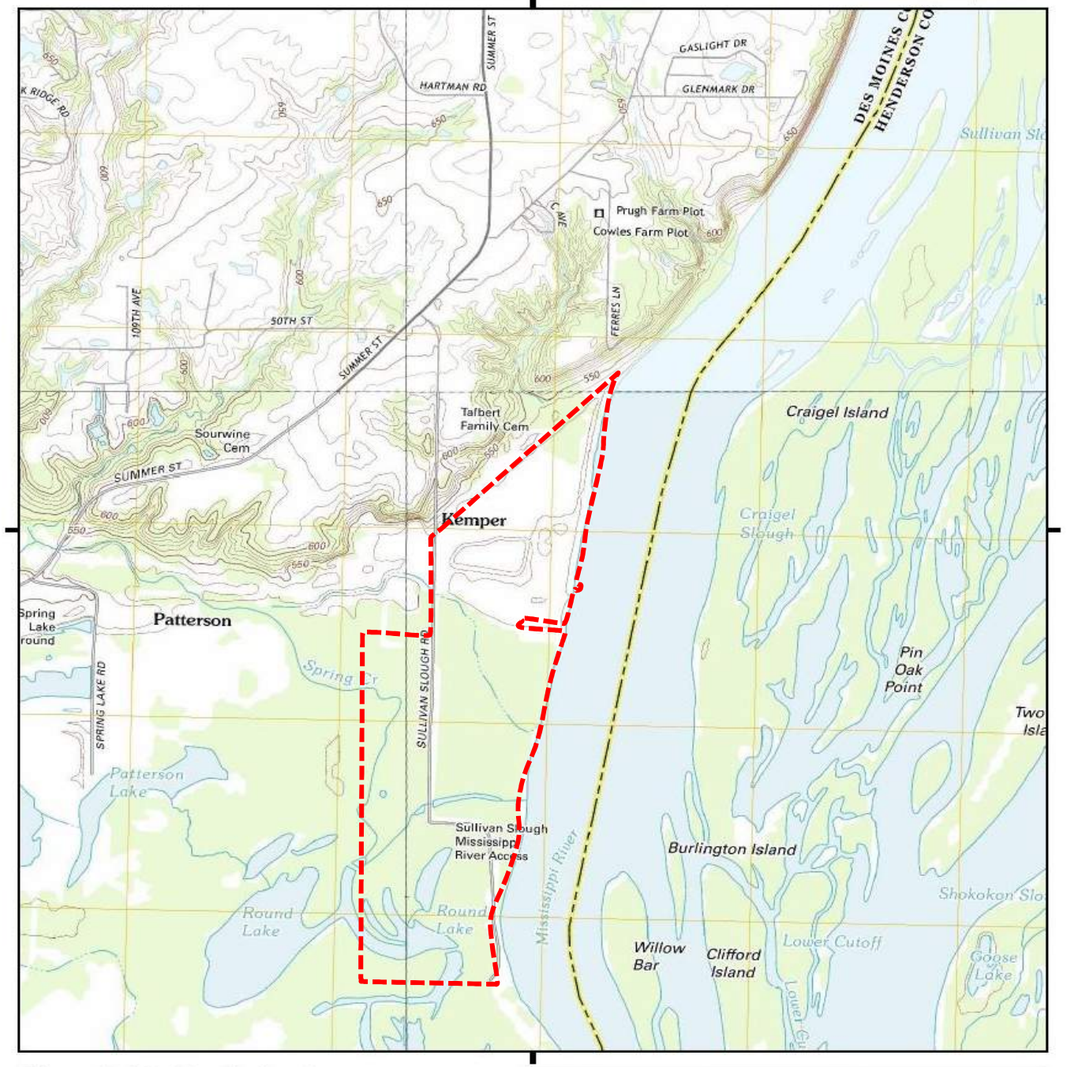
FIGURES

Alliant Energy
Interstate Power and Light Company
Burlington Generating Station
Burlington, Iowa

History of Construction

Historical Topo Map

2012, 2013



This report includes information from the following map sheet(s).

Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

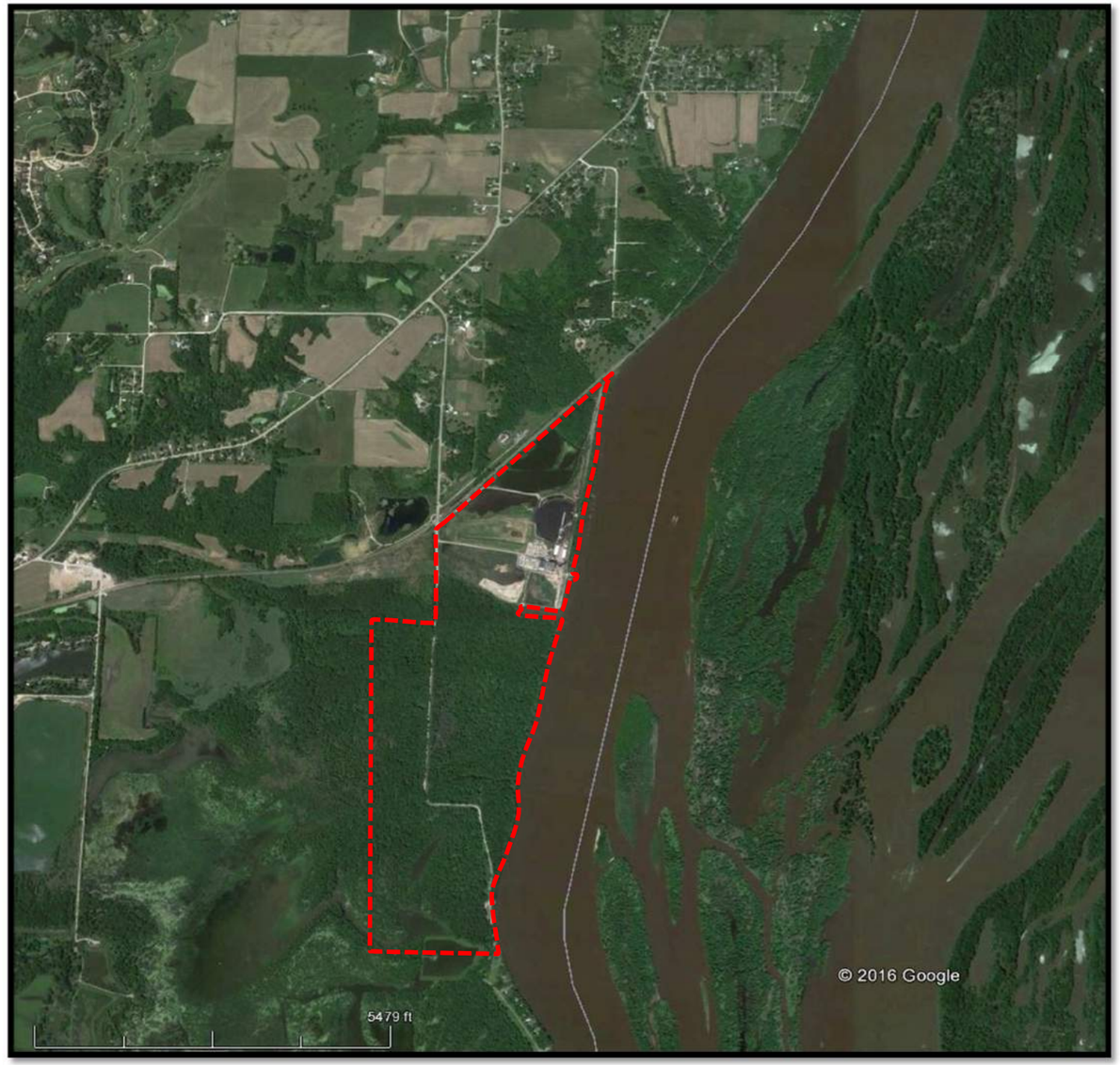
TP, Lomax, 2012, 7.5-minute
NE, Burlington, 2013, 7.5-minute
SW, Dallas City, 2012, 7.5-minute
NW, West Burlington, 2013, 7.5-minute

SITE NAME: Burlington Generating Station
ADDRESS: 4282 Sullivan Slough Road
Burlington, IA 52601
CLIENT: Environmental Site Assessors

N

4555570 - 3 page 4

Historical Aerial Photo 6/12/2014



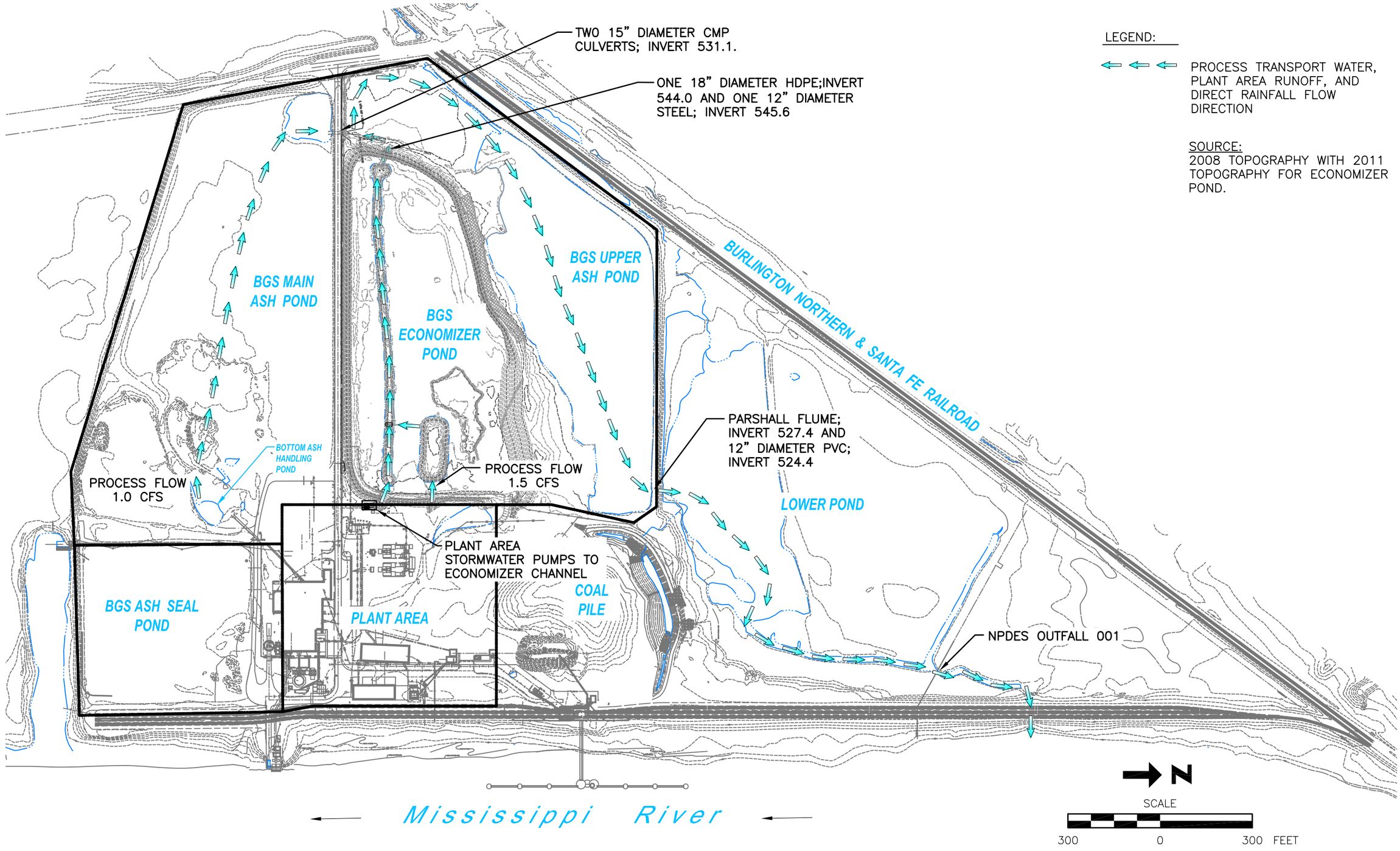
Approximate Property Boundary

HARD HAT SERVICES™
Engineering, Construction and Management Solutions

Site Location
Burlington Generating Station
Intersate Power and Light Company

Drawing
Figure 1

Date
5/25/2016



LEGEND:

PROCESS TRANSPORT WATER, PLANT AREA RUNOFF, AND DIRECT RAINFALL FLOW DIRECTION

SOURCE:
2008 TOPOGRAPHY WITH 2011 TOPOGRAPHY FOR ECONOMIZER POND.

REV	DATE	BY	DESCRIPTION
5			
4			
3			
2			
1			

SCALE: AS SHOWN | DATE: 5-13-16
DRAWN BY: JFD | CHECKED BY: TJH | APPROVED BY: MWL

HARD HAT SERVICES™
Engineering, Construction and Management Solutions

CLIENT / LOCATION
ALLIANT ENERGY
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION
INFLOW FLOOD CONTROL
SITE PLAN

JOB 154.018.012.001
SHT. FIGURE 1
DWG. 154.018.012.001-D1

APPENDIX A – Original Plant Arrangement Drawings – 1966

Alliant Energy
Interstate Power and Light Company
Burlington Generating Station
Burlington, Iowa

History of Construction

30" x 42" = 8.75 SQ. FT.

ALLIANT ENERGY.

DWG. NO.			INITIAL / DATE
1 2015-0-D-C3501	SHT. 1	REV. 0	HP 1/23/02

DATE	REVISIONS AND RECORD OF ISSUE	REV. NO.	BY	CK	APP.
3-11-66	ISSUED FOR FIELD CONSTRUCTION BIDS.				

IOWA SOUTHERN UTILITIES COMPANY

CENTERVILLE, IOWA

BURLINGTON GENERATING STATION UNIT 1

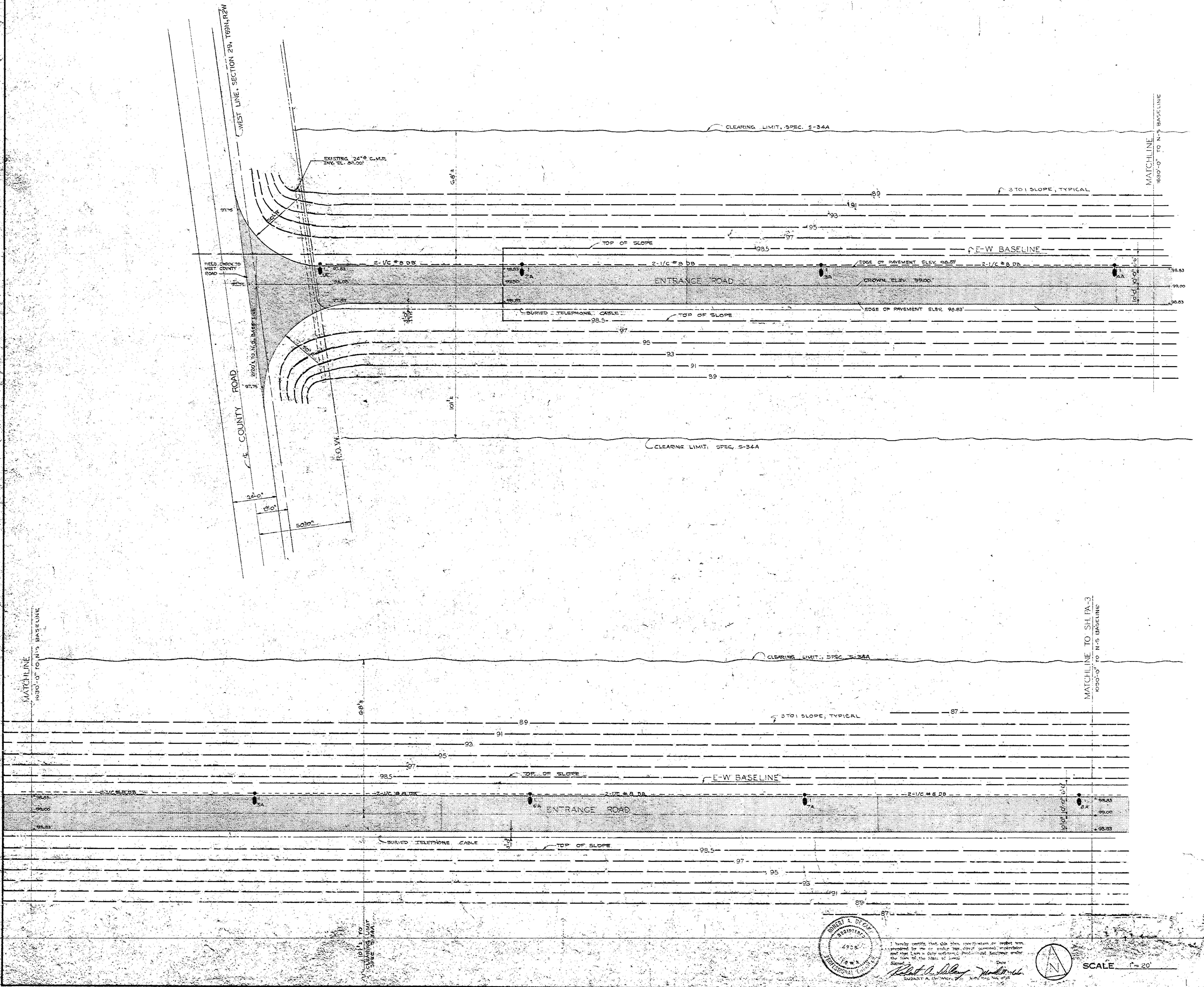
PLANT ARRANGEMENT
SITE LAYOUT
GENERAL SITE ARRANGEMENT

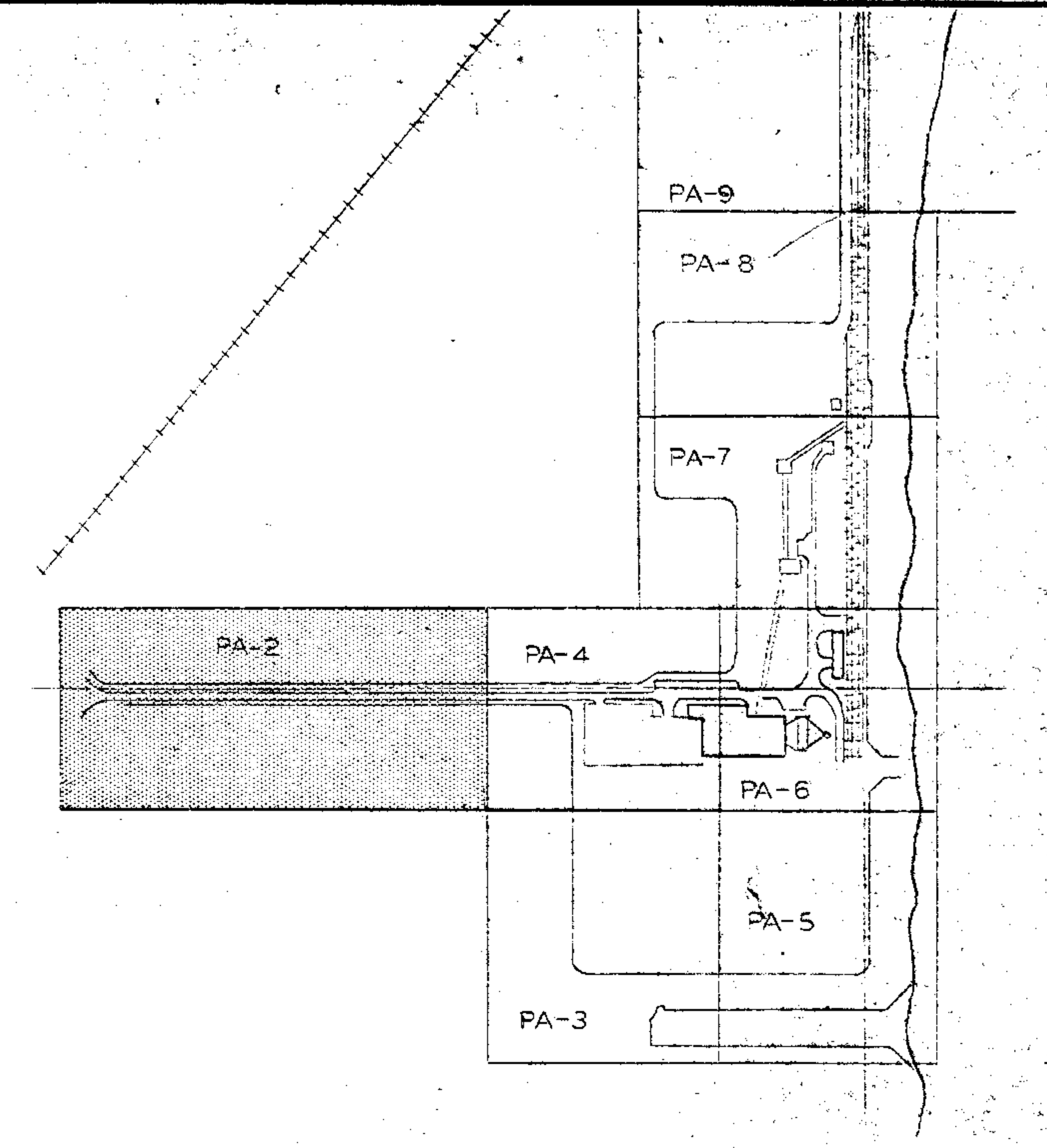
APPROVED FOR CONSTRUCTION	DEPT. HEAD	DES. ENGR.	CHECKED	DRAWN	PROJ. NO.
BY ____ DATE ____	CLM	VHS		JGD	3849

BLACK & VEATCH
CONSULTING ENGINEERS KANSAS CITY, MISSOURI

DRAWING NO. PA-1

Flat File B-3





SHEET LAYOUT

LEGEND

(shaded)	ASPHALT PAVEMENT
——99——	EXISTING CONTOURS
—·ROW·—	RIGHT OF WAY
(wavy line)	CLEARING LIMIT, SPEC. S-34A
C.M.P.	CORRUGATED METAL PIPE
$●^{1}_{3A}$	250 WATT MERCURY VAPOR STREET LIGHTING LUMINAIRE. SUPERSCRIPT 1 DENOTES PANEL CIRCUIT NUMBER. SUBSCRIPT 3 DENOTES INSTALLATION NUMBER. LETTER A DENOTES INSTALLATION DETAIL. SEE DRAWING E-270 FOR DESCRIPTION AND DETAILS.
--2-1/C #8DB--	TWO SINGLE, NUMBER 8 A.W.G. DIRECT BURIAL CABLES.
——— - - ———	BURIED TELEPHONE CABLE BY TELEPHONE COMPANY

APPROVED
FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF ISSUE	REV. NO.	BY	CK	APP.
12-11-69	CONFORMED TO CONSTRUCTION RECORDS		GAY		
5-10-66	ISSUED FOR FIELD CONSTRUCTION				RO
3-11-66	ISSUED FOR FIELD CONSTRUCTION BIDS				RGS

IOWA SOUTHERN UTILITIES COMPANY
CENTERVILLE, IOWA
BURLINGTON GENERATING STATION UNIT 1

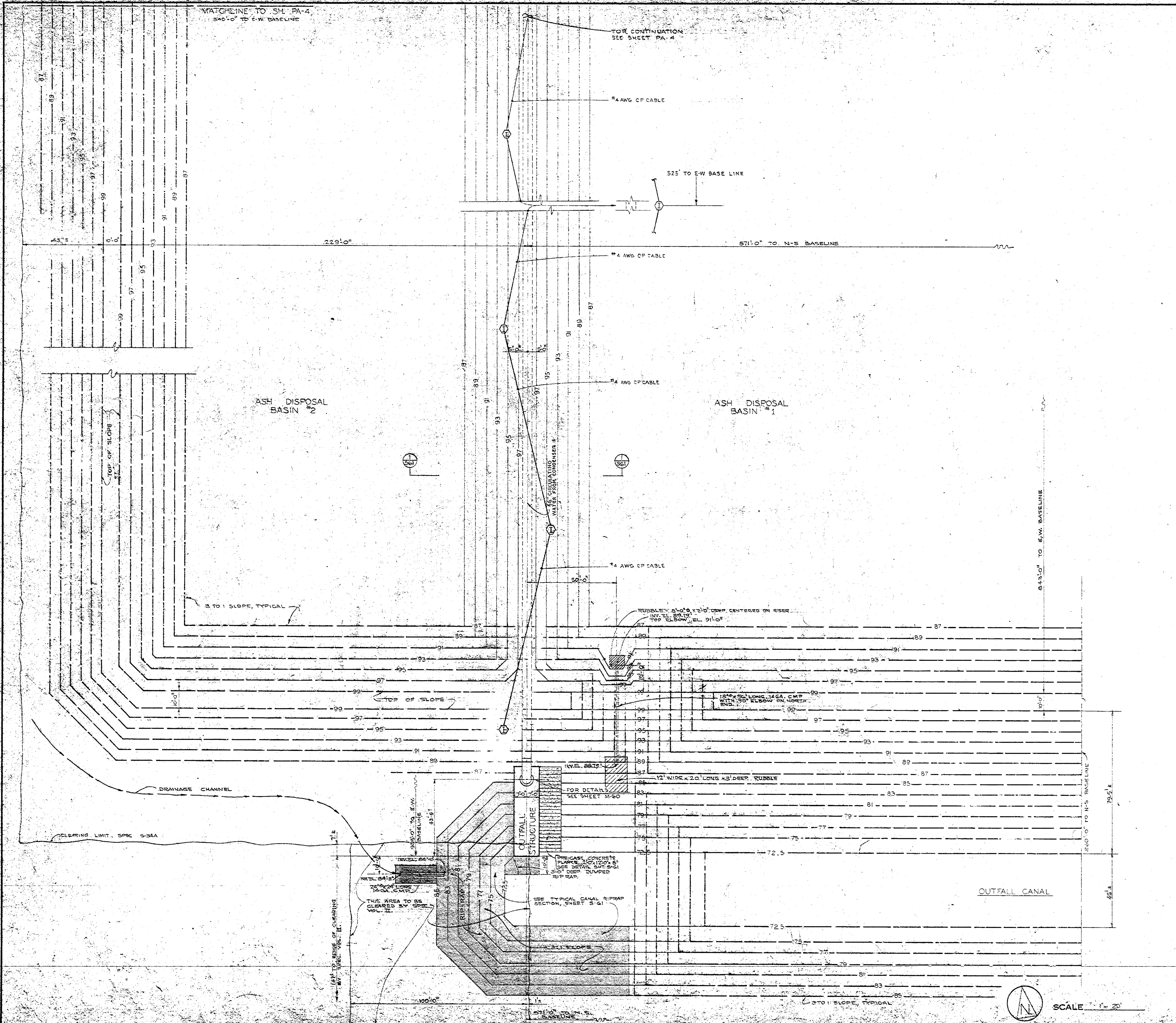
PLANT ARRANGEMENT
SITE LAYOUT
ENTRANCE ROAD AREA

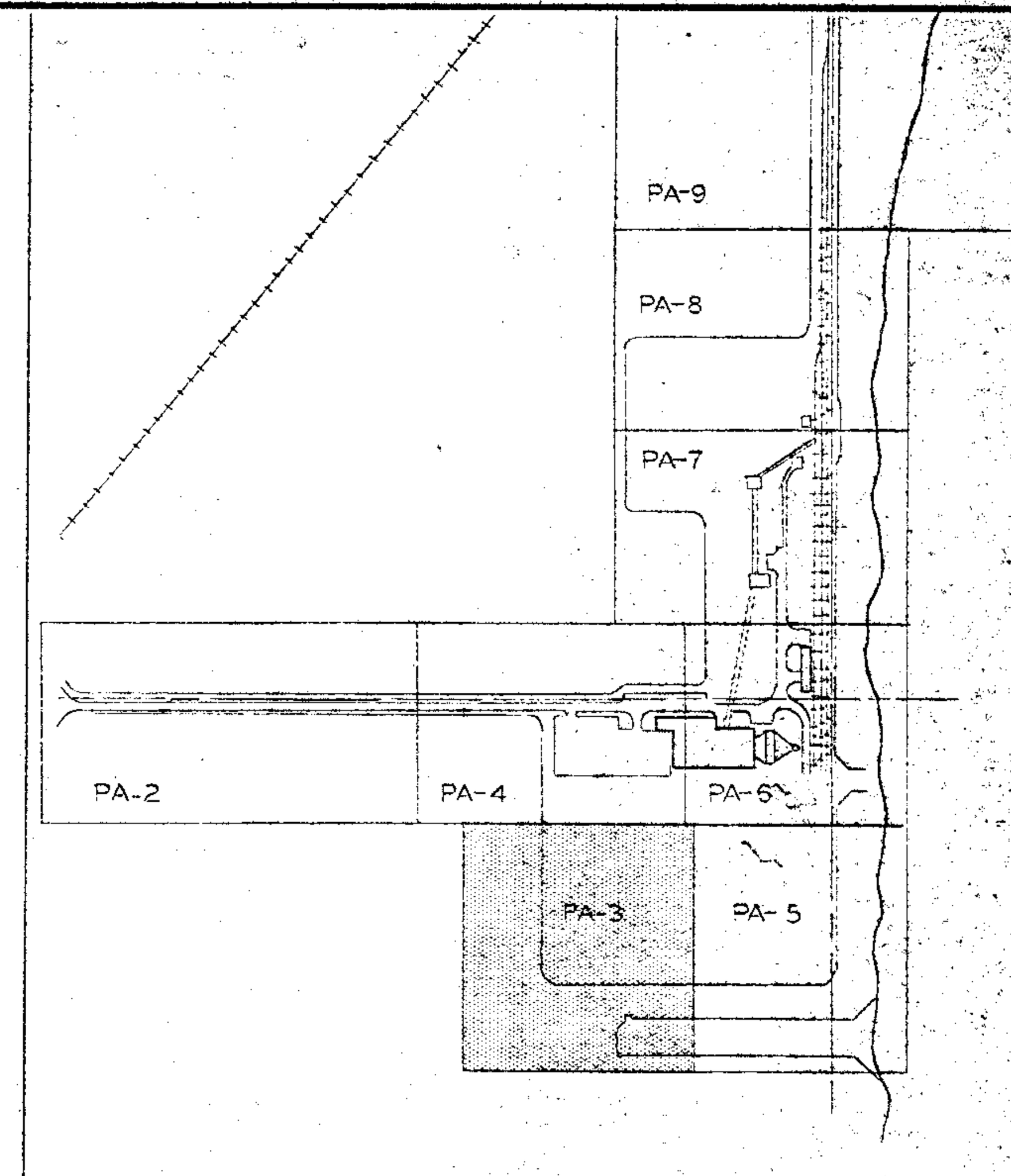
APPROVED FOR CONSTRUCTION	DEPT. HEAD	DES. ENGR.	CHECKED	DRAWN	PROJ. NO.
BY R. O. DeCamp DATE 5-10-66	CLM	VHS	VHS	WTM DLO	3849

BLACK & VEATCH
CONSULTING ENGINEERS KANSAS CITY, MISSOURI

DRAWING NO. PA-2

30" X 42" = 8.750 FT.





SHEET LAYOUT

LEGEND

- RIP RAP
- PRECAST CONCRETE SLABS
- —99— EXISTING CONTOURS
- —99— FINISH CONTOURS
- CLEARING LIMIT, SPEC. S-34A
- C.M.P. CORRUGATED METAL PIPE
- (I) IMPRESSED CURRENT ANODE INSTALLATION

Robert A. DeCamp, Registered Professional Engineer, Iowa, 4928

Robert A. DeCamp P.E.

APPROVED
FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF ISSUE	REV. NO.	BY	CK	APP.
12-11-69	CONFORMED TO CONSTRUCTION RECORDS		CAY		
5-10-66	ISSUED FOR FIELD CONSTRUCTION				
3-11-66	ISSUED FOR FIELD CONSTRUCTION BIDS				

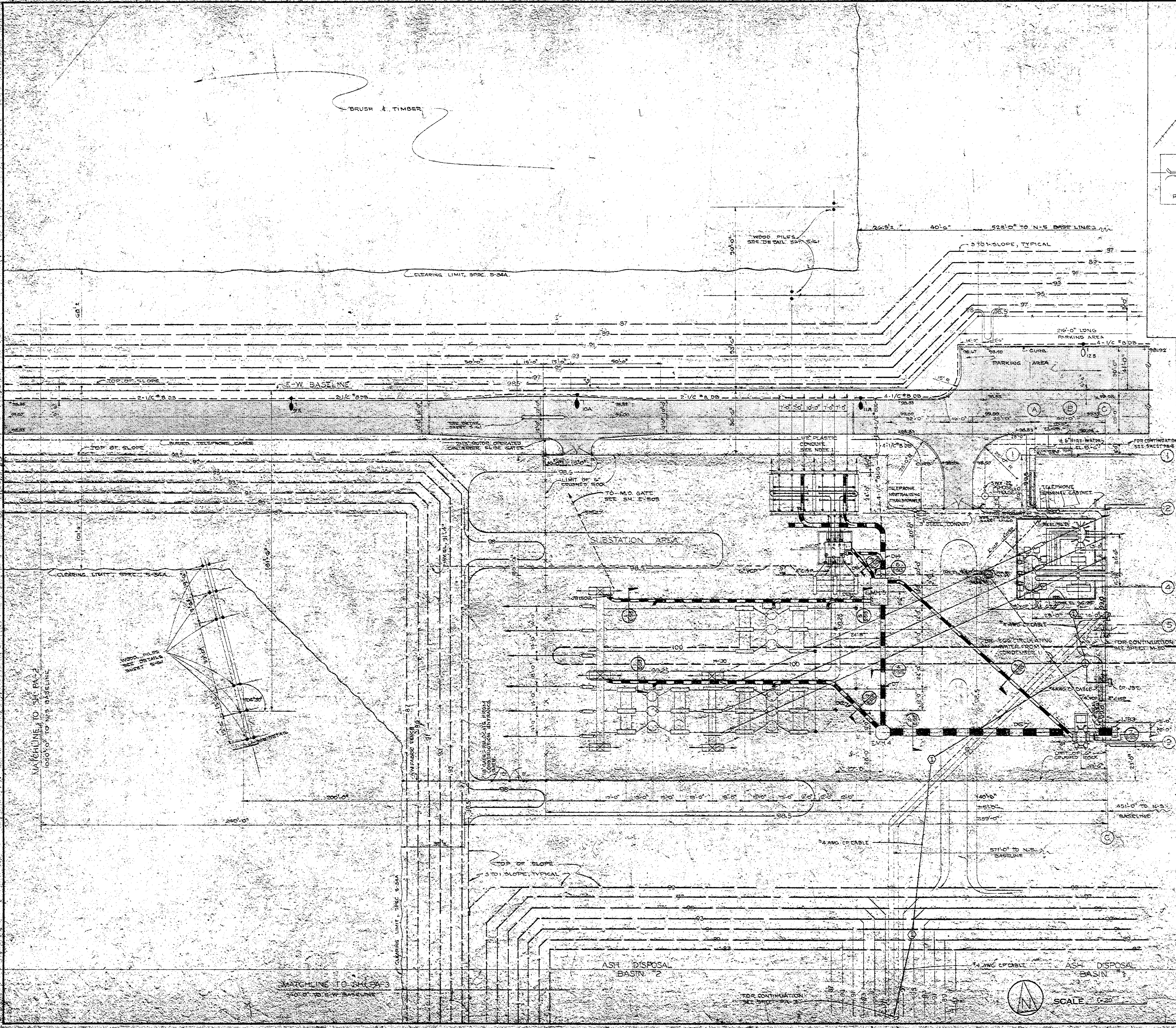
IOWA SOUTHERN UTILITIES COMPANY
CENTERVILLE, IOWA
BURLINGTON GENERATING STATION UNIT 1

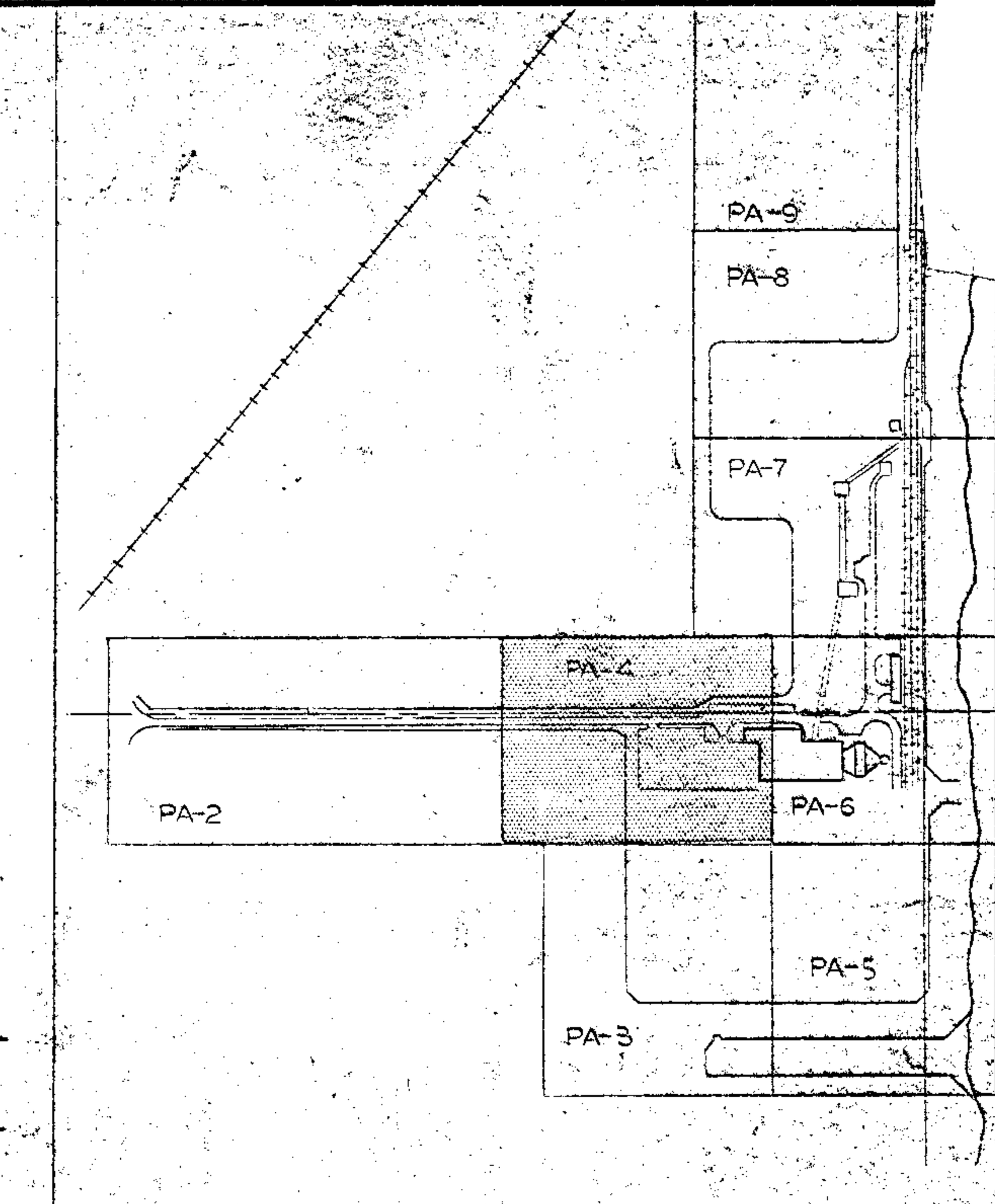
PLANT ARRANGEMENT
SITE LAYOUT
OUTFALL STRUCTURE AREA

APPROVED FOR CONSTRUCTION	DEPT. HEAD	DES. ENGR.	CHECKED	DRAWN	PROJ. NO.
BY R. A. DeCamp DATE 5-10-66	CLM	VHS	VHS	WTM DLO	3849

BLACK & VEATCH
CONSULTING ENGINEERS KANSAS CITY, MISSOURI

DRAWING NO. PA-3





SHEET LAYOUT

LEGEND

CONCRETE ENCASED DUCT BANK. SEE SHEET E-510 FOR DUCT BANK TERMINATION & DIMENSIONS. SEE SHEET E-515 FOR SECTIONS & MANHOLE DETAILS.

ASPHALT PAVEMENT

8'-0" CHAIN LINK FENCE

EXISTING CONTOURS

FINISH CONTOURS

E.M.H. #5 ELECTRICAL MANHOLE

250 WATT MERCURY VAPOR STREET LIGHTING LUMINAIRE. SUPERSCRIPT 1 DENOTES PANEL CIRCUIT NUMBER, SUBSCRIPT 9 DENOTES INSTALLATION NUMBER, LETTER A DENOTES INSTALLATION DETAIL. SEE DRAWING E-270 FOR DESCRIPTION.

400 WATT MERCURY VAPOR STREET LIGHTING LUMINAIRE. SUPERSCRIPT 1 DENOTES PANEL CIRCUIT NUMBER, SUBSCRIPT 12 DENOTES INSTALLATION NUMBER, LETTER B DENOTES INSTALLATION DETAIL. SEE DRAWING E-270 FOR DESCRIPTION.

2-1/C #8DB — TWO SINGLE, NUMBER 8 A.W.G. DIRECT BURIAL CABLES.

IMPRESSED CURRENT ANODE INSTALLATION.

BURIED TELEPHONE CABLE BY TELEPHONE COMPANY.

CLEARING LIMIT, SPEC. S-34A

C.I.S.P. CAST IRON SOIL PIPE

V.C.P. VITRIFIED CLAY PIPE

NOTES

1. ELEVATIONS SHOWN AT SUBSTATION ARE ELEVATION OF SUBGRADE. ELEVATION OF TOP OF CRUSHED ROCK TO BE 6" HIGHER.
2. INSTALL 4/0 BARE COPPER GROUND CABLE BELOW THE ENTIRE LENGTH OF DUCT BANKS D8 & D9. CONNECT TO STATION GROUND SYSTEM AT THE MAIN BUILDING AND THE SUBSTATION.

APPROVED
FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF ISSUE	REV. NO.	BY	CK.	APP.
12-11-69	CONFORMED TO CONSTRUCTION RECORDS		CAY		
8-15-66	ADDED TRANSFORMER DIMENSIONS		DA		
5-10-66	ISSUED FOR FIELD CONSTRUCTION				
3-11-66	ISSUED FOR FIELD CONSTRUCTION BIDS				

IOWA SOUTHERN UTILITIES COMPANY
CENTERVILLE, IOWA
BURLINGTON GENERATING STATION UNIT 1

PLANT ARRANGEMENT
SITE LAYOUT
SUBSTATION AREA

APPROVED FOR CONSTRUCTION	DEPT. HEAD	DES. ENGR.	CHECKED	DRAWN
DATE 5-10-66	CLM	VHS	VHS	

BLACK & VEATCH
CONSULTING ENGINEERS KANSAS CITY, MISSOURI

30" X 42" = 8.75 SQ. FT.

MATCHLINE TO SH. PA-6
360'-0" TO E-W BASELINE

ASH DISPOSAL BASIN #1

843'-0" TO E-W BASE LINE

3 TO 1 SLOPE, TYPICAL

TOP OF SLOPE

OUTFALL CANAL

350' TO E-W BASE LINE

160' TO SOUTH PROPERTY LINE

3 TO 1 SLOPE, TYPICAL

CONTINUE TO SOUTH PROPERTY LINE

N-S BASELINE

CLEARING LIMIT, SPEC. S-34A

BRUSH AND TIMBER

NORMAL HIGH WATER LINE

MISSISSIPPI RIVER
(NORMAL POOL EL. 83.2)

SEE TYPICAL CANAL RIP RAP SECTION, SHEET S-61

SCALE 1" = 20'

PA-9
PA-8
PA-7
PA-2
PA-4
PA-6
PA-5
PA-3

SHEET LAYOUT

LEGEND

- RIP RAP
- —99— EXISTING CONTOURS
- —99— FINISH CONTOURS
- CLEARING LIMIT, SPEC. S-34A

I hereby certify that this plan, specification or report was prepared by me or under my direct personal supervision and that I am a duly registered Professional Engineer under the laws of the State of Iowa.

Signed _____ Date _____
ROBERT A. DeLAMP, JR. Reg. No. 4938

ROBERT A. DeLAMP, JR. REGISTERED 4938 IOWA PROFESSIONAL ENGINEER

APPROVED
FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF ISSUE	REV. NO.	BY	CHECKED
12-11-69	CONFORMED TO CONSTRUCTION RECORD		CAV	
5-10-66	ISSUED FOR FIELD CONSTRUCTION			CLM
3-11-66	ISSUED FOR FIELD CONSTRUCTION BIDS			CLM

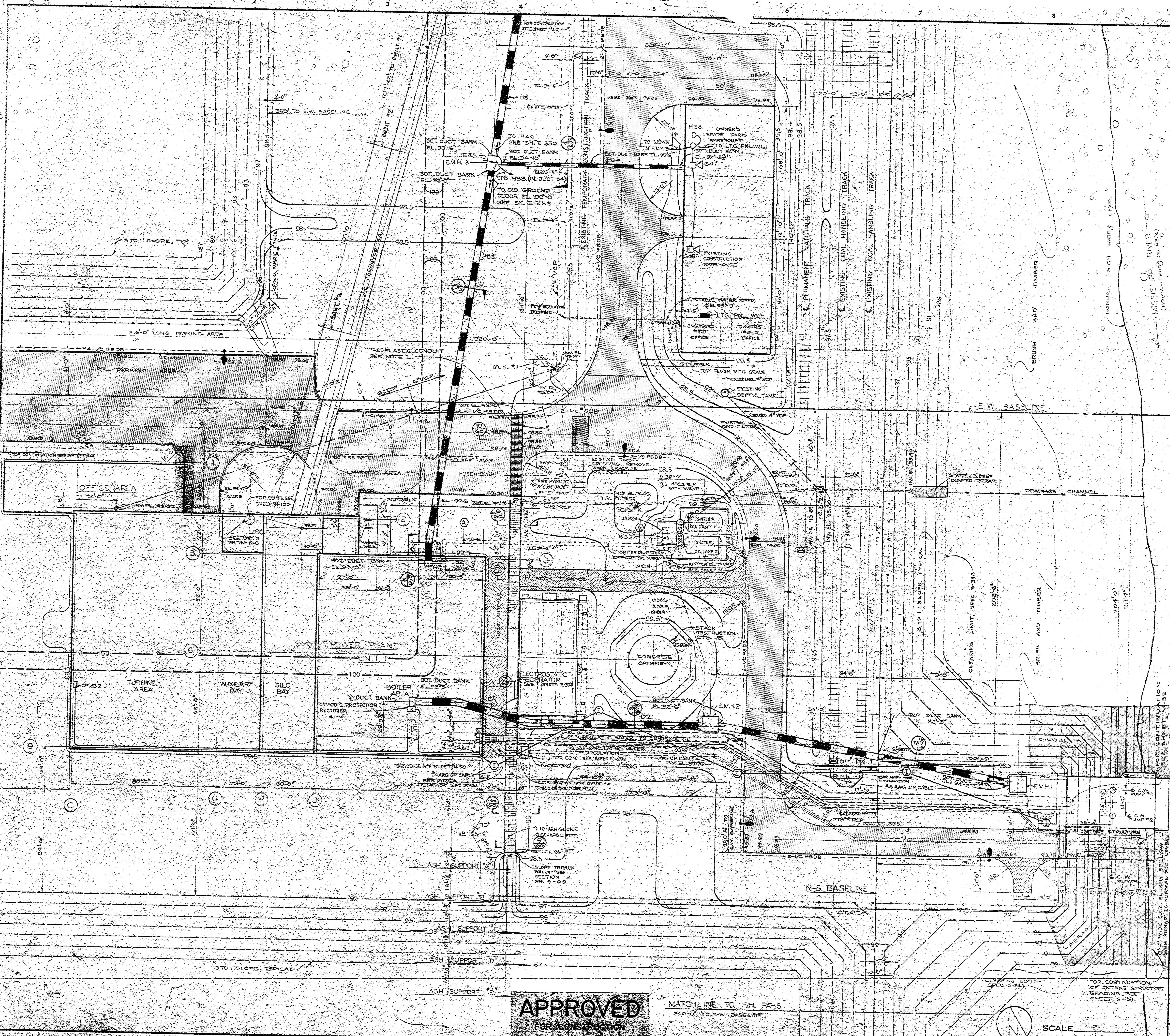
IOWA SOUTHERN UTILITIES COMPANY
CENTERVILLE, IOWA
BURLINGTON GENERATING STATION UNIT 1

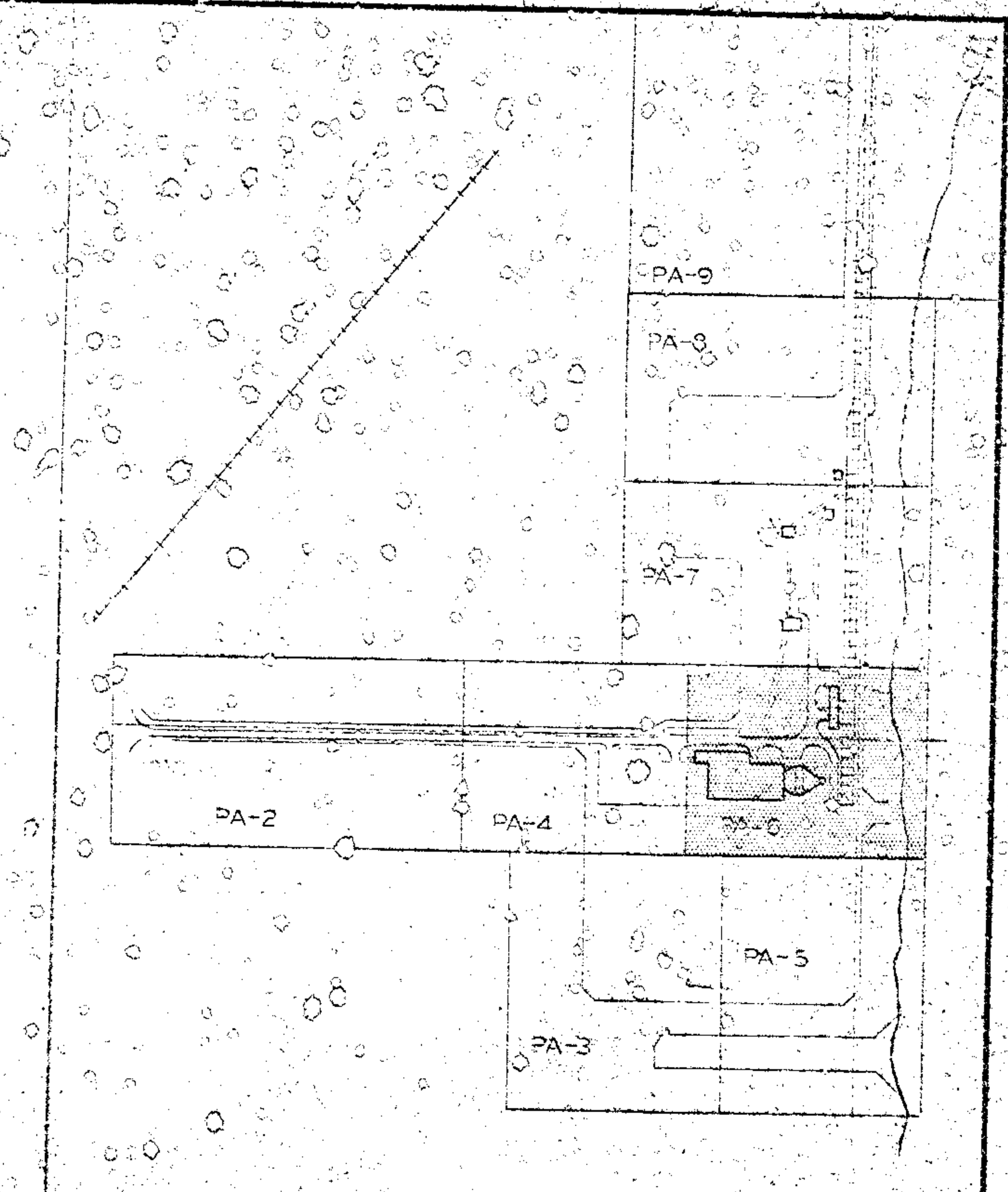
PLANT ARRANGEMENT
SITE LAYOUT
OUTFALL CANAL AREA

APPROVED FOR CONSTRUCTION	DEPT. HEAD	DES. ENGR.	CHECKED	DRAWN	PROJ. NO.
DATE 5-10-66	CLM	VHS	VHS	WTW DEC	3583

BLACK & VEATCH
CONSULTING ENGINEERS KANSAS CITY, MISSOURI

DRAWING NO. PA-5





SHEET LAYOUT

NOTE:
INSTALL 4/0 BARE COPPER GROUND CABLE BELOW THE ENTIRE LENGTH OF DUCT BANKS D1, D2, D3, & D5. CONNECT TO STATION GROUND SYSTEM AT THE INTAKE STRUCTURE, THE MAIN BUILDING AND THE COAL CRUSHER BUILDING.

LEGEND

- CONCRETE ENCASED DUCT BANK.
- ASPHALT PAVEMENT
- ROCK SURFACE
- RIP RAP
- STEEL GRATING
- PRECAST CONCRETE SLAB
- 6'-0" CHAIN LINK FENCE
- 5'-0" W-W FABRIC FENCE
- —99— EXISTING CONTOURS
- —99— FINISH CONTOURS
- CLEARING LIMIT, SPEC. S-34A
- RAILROAD TRACK
- C.B.#1 AREA DRAINAGE CATCH BASIN
- M.H.#1 SANITARY SEWER MANHOLE
- EM.H.1 ELECTRICAL MANHOLE
- W.P. WORK POINT
- R.C.P. REINFORCED CONCRETE PIPE
- C.I.S.P. CAST IRON SOIL PIPE
- V.C.P. VITRIFIED CLAY PIPE
- 2 / 22A — 250 WATT MERCURY VAPOR STREET LIGHTING LUMINAIRE. SUPERSCRIPT 2 DENOTES PANEL CIRCUIT NUMBER. SUBSCRIPT 22 DENOTES INSTALLATION NUMBER. LETTER A DENOTES INSTALLATION DETAIL. SEE DRAWING E-270 FOR DESCRIPTION.
- 2 / 10B — 400 WATT MERCURY VAPOR STREET LIGHTING LUMINAIRE. SUPERSCRIPT 2 DENOTES PANEL CIRCUIT NUMBER. SUBSCRIPT 10 DENOTES INSTALLATION NUMBER. LETTER B DENOTES INSTALLATION DETAIL. SEE DRAWING E-270 FOR DESCRIPTION.
- --2-1/C #6DB-- 2 SINGLE, NUMBER 6 A.W.G., DIRECT BURIAL CABLES.
- (I) IMPRESSED CURRENT ANODE INSTALLATION
- (A) SACRIFICIAL ANODE INSTALLATION

I hereby certify that this plan, specification or report was prepared by me or under my direct personal supervision and that I am a duly registered Professional Engineer under the laws of the State of Iowa.
Signed ... Date
ROBERT A. DeCAMP, P.E. Iowa Reg. No. 4938

ROBERT A. DeCAMP REGISTERED 4938 IOWA PROFESSIONAL ENGINEER

NOTE:
SEE SH. E-550 FOR INTERCOMMUNICATIONS SPEAKER AND HANDSET SCHEDULE.

DATE	REVISIONS AND RECORD OF ISSUE	REV. NO.	BY	CK.	APP.
12-11-69	CONFORMED TO CONSTRUCTION RECORDS		CAY		
5-23-67	ISSUED FOR CONTRACT SPECIFICATION S-428				[illegible]
4-24-67	ISSUED FOR BID - SPECIFICATION S-428				VHS
12-21-66	REVISED ASH SUPPORT DIMENSIONS	[illegible]	[illegible]	[illegible]	[illegible]
5-10-66	ISSUED FOR FIELD CONSTRUCTION				[illegible]
3-11-66	ISSUED FOR FIELD CONSTRUCTION BIDS				[illegible]

IOWA SOUTHERN UTILITIES COMPANY
CENTERVILLE, IOWA
BURLINGTON GENERATING STATION — UNIT 1

PLANT ARRANGEMENT
SITE LAYOUT
POWER PLANT AREA

APPROVED FOR CONSTRUCTION	DEPT. HEAD	DES. ENGR.	CHECKED	DRAWN	PROJ. NO.
BY R. A. DeCamp DATE 5-10-66	CLM	VHS	VHS	DLO	3[illegible]

BLACK & VEATCH
CONSULTING ENGINEERS — KANSAS CITY, MISSOURI
DRAWING NO. PA-6

APPROVED FOR CONSTRUCTION


NOTE:
SEE DWG. PA-7A FOR AS BUILT CONTOURS OF THIS AREA AND CROSS SECTIONAL SURVEY OF COAL STORAGE AREA.
ACTIVE STORAGE
EXHAUST FAN 12
EXHAUST FAN 11
EXHAUST FAN 10
APPROXIMATE LIMITS OF COAL STORAGE AREA
3 TO 1 SLOPE, TYPICAL
CRUSHER BLDG
LOCKER ROOM
COAL HANDLING CONTROL ROOM
PERMANENT MATERIALS TRACK
EXISTING COAL HANDLING TRACK
DRAINAGE CHANNEL
N-S BASELINE
MISSISSIPPI RIVER
(NORMAL POOL EL. 83.2)
NORMAL HIGH WATER LINE
BRUSH AND TIMBER
SCALE
SHEET LAYOUT
PA-2
PA-4
PA-6
PA-5
PA-3
PA-9
PA-8
LEGEND
CONCRETE ENCASED DUCT BANK
ASPHALT PAVEMENT
ROCK SURFACE
RIP RAP
RAILROAD TRACK
6'-0" CHAIN LINK FENCE
6'-0" W.W. FABRIC FENCE
EXISTING CONTOURS
FINISH CONTOURS
CLEARING LIMIT, SPEC. 5-34A
AREA DRAINAGE CATCH BASIN
SANITARY SEWER MANHOLE
WORK POINT
VITRIFIED CLAY PIPE
REINFORCED CONCRETE PIPE
NOTE:
SEE SH. E-550 FOR INTERCOMMUNICATIONS SPEAKER AND HANDSET SCHEDULE.
APPROVED
FOR CONSTRUCTION
12-11-69 CONFORMED TO CONSTRUCTION RECORDS
5-10-66 ISSUED FOR FIELD CONSTRUCTION
3-11-66 ISSUED FOR FIELD CONSTRUCTION BIDS
DATE
REVISIONS AND RECORD OF ISSUE
REV. NO.
CK
IOWA SOUTHERN UTILITIES COMPANY
CENTERVILLE, IOWA
BURLINGTON GENERATING STATION
UNIT
PLANT ARRANGEMENT
SITE LAYOUT
COAL HANDLING AREA
APPROVED FOR CONSTRUCTION
DATE 5-10-66
DEPT. HEAD
CLM
DES. ENGR.
VHS
CHECKED
VHS
DRAWN
WTM
PROJ. NO.
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MISSOURI
DRAWING NO.
PA-7

HEAVY TIMBER AND BRUSH
CLEARING LIMIT, SPEC. S-34A
CLEARING LIMIT
120'-0" TO E.W. BASELINE
118'3" TO E.W. BASELINE
110'-0"
25'-0"
48'-0"
10'-0"
8'-0"
EXCESS EXCAVATED MATERIALS DISPOSAL AREA.
3 TO 1 SLOPE, TYP.
N-S BASELINE
5'-0" W.W. FABRIC FENCE
TOP OF SLOPE
101'0" TO E.W. BASELINE
APPROXIMATE LIMITS OF COAL STORAGE AREA
NOTE: THE TEMPORARY CONSTRUCTION TRACK SHALL BE RELOCATED AND SHALL BECOME PERMANENT MATERIALS TRACK.
NOTE: SEE DWG. PA-7A FOR AS BUILT CONTOURS OF THIS AREA AND CROSS SECTIONAL SURVEY OF COAL STORAGE AREA.
APPROXIMATE LIMITS OF COAL STORAGE AREA
6'-0" CHAIN LINK FENCE
10' GATE-RELOCATE FROM CONSTRUCTION ENTRANCE
CLEARING LIMIT, SPEC. S-34A
EXISTING CABIN DO NOT REMOVE
BRUSH AND TIMBER
NORMAL HIGH WATER LINE
MISSISSIPPI RIVER (NORMAL POOL EL. 83.2)
3 TO 1 SLOPE, TYPICAL
CAR UNLOADING PANEL ENCLOSURE
COAL HANDLING TRACK
EXISTING COAL HANDLING TRACK
EXISTING TEMPORARY CONSTRUCTION TRACK
PERMANENT MATERIALS TRACK
DOZING PILE
CAR HAUL BLDG.
TRACK HOPPER & CAR SHAKER BLDG.
TO S-48 SEE SH. E-550
TO M-39 SEE SH. E-550
SEE SHEET PA-7
BENT NO. 7
S2011
S2012, S2013, S2014 TO EXHAUST FANS 10, 11 & 12 SEE SH. PA-7
48" R.C.P. ESCAPE TUNNEL
SPLASH BLOCK
SCALE 1"=20'
SHEET LAYOUT
PA-9
PA-8
PA-7
PA-2
PA-4
PA-6
PA-5
PA-3
LEGEND
ROCK SURFACE
EXISTING CONTOURS
FINISH CONTOURS
CLEARING LIMIT, SPEC. S-34A
6'-0" CHAIN LINK FENCE
5'-0" W.W. FABRIC FENCE
RAILROAD TRACK
NOTE: SEE SH. E-550 FOR INTERCOMMUNICATIONS SPEAKER AND HANDSET SCHEDULES.
ROBERT A. DE LANG REGISTERED 4912 IOWA PROFESSIONAL ENGINEER
12-11-69 CONFORMED TO CONSTRUCTION RECORDS
5-10-66 ISSUED FOR FIELD CONSTRUCTION
3-11-66 ISSUED FOR FIELD CONSTRUCTION BIDS
DATE REVISIONS AND RECORD OF ISSUE
IOWA SOUTHERN UTILITIES COMPANY
CENTERVILLE, IOWA
BURLINGTON GENERATING STATION UNIT 1
PLANT ARRANGEMENT SITE LAYOUT COAL STORAGE AREA
APPROVED FOR CONSTRUCTION
CLM VRS VPS
BLACK & VEATCH
CONSULTING ENGINEERS KANSAS CITY, MISSOURI
PA-8
30" X 42" = 8.75 SQ. FT.


LEGEND
EXISTING CONTOURS
FINISH CONTOURS
6'-0" CHAIN LINK FENCE
5'-0" W.W. FABRIC FENCE
RIGHT OF WAY
RAILROAD TRACK
EXISTING COAL HANDLING TRACK
N-S BASELINE
TOP OF SLOPE
C.B. & Q. R.R. MAIN LINE
PROPOSED C.B. & Q. RUN-AROUND TRACK
R.O.W.
EXISTING TULOMA GAS PRODUCTS CO. UNLOADING DOCK
SHEET LAYOUT
PA-2
PA-3
PA-4
PA-5
PA-6
PA-7
PA-8
PA-9
APPROVED FOR CONSTRUCTION
SCALE 1" = 20'-0"
12-11-69 CONFORMED TO CONSTRUCTION RECORDS
5-10-66 ISSUED FOR FIELD CONSTRUCTION
3-11-66 ISSUED FOR FIELD CONSTRUCTION BIDS
DATE
REVISIONS AND RECORD OF ISSUE
REV. NO.
BY
CK.
APP.
IOWA SOUTHERN UTILITIES COMPANY
CENTERVILLE, IOWA
BURLINGTON GENERATING STATION
UNIT 1
PLANT ARRANGEMENT
SITE LAYOUT
RAILROAD AREA
APPROVED FOR CONSTRUCTION
DATE 5-10-66
DEPT. HEAD CLM
DES. ENGR. VHS
CHECKED VHS
DRAWN DLO
PROJ. NO. 3849
DRAWING NO.
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MISSOURI

APPENDIX B – EDR Historical Aerial Photograph Package

Alliant Energy
Interstate Power and Light Company
Burlington Generating Station
Burlington, Iowa

History of Construction

Burlington Generating Station
4282 Sullivan Slough Road
Burlington, IA 52601

Inquiry Number: 4555570.4
March 08, 2016

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Date EDR Searched Historical Sources:

Aerial Photography March 08, 2016

Target Property:

4282 Sullivan Slough Road

Burlington, IA 52601

Year	***Scale***	***Details***	***Source***
1937	Aerial Photograph. Scale: 1"=1200'	Flight Year: 1937	DOT
1951	Aerial Photograph. Scale: 1"=1200'	Flight Year: 1951	USDA
1963	Aerial Photograph. Scale: 1"=1200'	Flight Year: 1963	USDA
1969	Aerial Photograph. Scale: 1"=1200'	Flight Year: 1969	USDA
1976	Aerial Photograph. Scale: 1"=750'	Flight Year: 1976	USGS
1983	Aerial Photograph. Scale: 1"=1200'	Flight Year: 1983	NHAP
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	USDA/NAIP
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	USDA/NAIP
2005	Aerial Photograph. Scale: 1"=500'	/DOQQ - acquisition dates: 2005	USGS/DOQQ
2005	Aerial Photograph. Scale: 1"=500'	/DOQQ - acquisition dates: 2005	USGS/DOQQ
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	USDA/NAIP
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	USDA/NAIP
2007	Aerial Photograph. Scale: 1"=500'	Flight Year: 2007	USDA/NAIP
2007	Aerial Photograph. Scale: 1"=500'	Flight Year: 2007	USDA/NAIP
2008	Aerial Photograph. Scale: 1"=500'	Flight Year: 2008	USDA/NAIP
2008	Aerial Photograph. Scale: 1"=500'	Flight Year: 2008	USDA/NAIP
2009	Aerial Photograph. Scale: 1"=500'	Flight Year: 2009	USDA/NAIP
2009	Aerial Photograph. Scale: 1"=500'	Flight Year: 2009	USDA/NAIP
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	USDA/NAIP

Year	*Scale*	*Details*	*Source*
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	USDA/NAIP
2011	Aerial Photograph. Scale: 1"=500'	Flight Year: 2011	USDA/NAIP
2011	Aerial Photograph. Scale: 1"=500'	Flight Year: 2011	USDA/NAIP
2012	Aerial Photograph. Scale: 1"=500'	Flight Year: 2012	USDA/NAIP
2012	Aerial Photograph. Scale: 1"=500'	Flight Year: 2012	USDA/NAIP


INQUIRY #: 4555570.4
YEAR: 1937
= 1200'
N
EDR


INQUIRY #: 4555570.4
YEAR: 1951
= 1200'
N
EDR


INQUIRY #: 4555570.4
YEAR: 1963
= 1200'
N
EDR


INQUIRY #: 4555570.4
YEAR: 1969
= 1200'
N
EDR


INQUIRY #: 4555570.4
YEAR: 1976
= 750'
N
EDR


INQUIRY #: 4555570.4
YEAR: 1983
= 1200'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2005
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2005
= 500'
N
EDR

INQUIRY #: 4555570.4

YEAR: 2005

= 500'

N

EDR


INQUIRY #: 4555570.4
YEAR: 2005
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2006
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2006
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2007
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2007
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2008
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2008
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2009
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2009
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2010
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2010
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2011
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2011
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2012
= 500'
N
EDR


INQUIRY #: 4555570.4
YEAR: 2012
= 500'
N
EDR

APPENDIX C – EDR Historical Topographic Map Report

Alliant Energy
Interstate Power and Light Company
Burlington Generating Station
Burlington, Iowa

History of Construction

Burlington Generating Station
4282 Sullivan Slough Road
Burlington, IA 52601

Inquiry Number: 4555570.3
March 04, 2016

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

03/04/16

Site Name:
Burlington Generating Station
4282 Sullivan Slough Road
Burlington, IA 52601
EDR Inquiry # 4555570.3

Client Name:
Environmental Site Assessors
932 North Wright Street, Suite 1(
Naperville, IL 60563
Contact: Mark W Loerop

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Environmental Site Assessors were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

Site Name: Burlington Generating Station
Address: 4282 Sullivan Slough Road
City,State,Zip: Burlington, IA 52601
P.O.# 154.018.012.001
Project: BGS Historical Docs

Coordinates:

Latitude: 40.741579 40° 44' 30" North
Longitude: -91.118788 -91° 7' 8" West
UTM Zone: Zone 15 North
UTM X Meters: 658833.42
UTM Y Meters: 4511772.65
Elevation: 520.00' above sea level

Maps Provided:

2012, 2013
1964
1937
1932, 1934

Topo Sheet Thumbnails

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2012, 2013 Source Sheets

Lomax
2012
7.5-minute, 24000

Dallas City
2012
7.5-minute, 24000

Burlington
2013
7.5-minute, 24000

West Burlington
2013
7.5-minute, 24000

1964 Source Sheets

Lomax
1964
7.5-minute, 24000
Aerial Photo Revised 1962

Burlington
1964
7.5-minute, 24000
Aerial Photo Revised 1962

Dallas City
1964
7.5-minute, 24000
Aerial Photo Revised 1962

West Burlington
1964
7.5-minute, 24000
Aerial Photo Revised 1962

1937 Source Sheets

Lomax
1937
15-minute, 62500

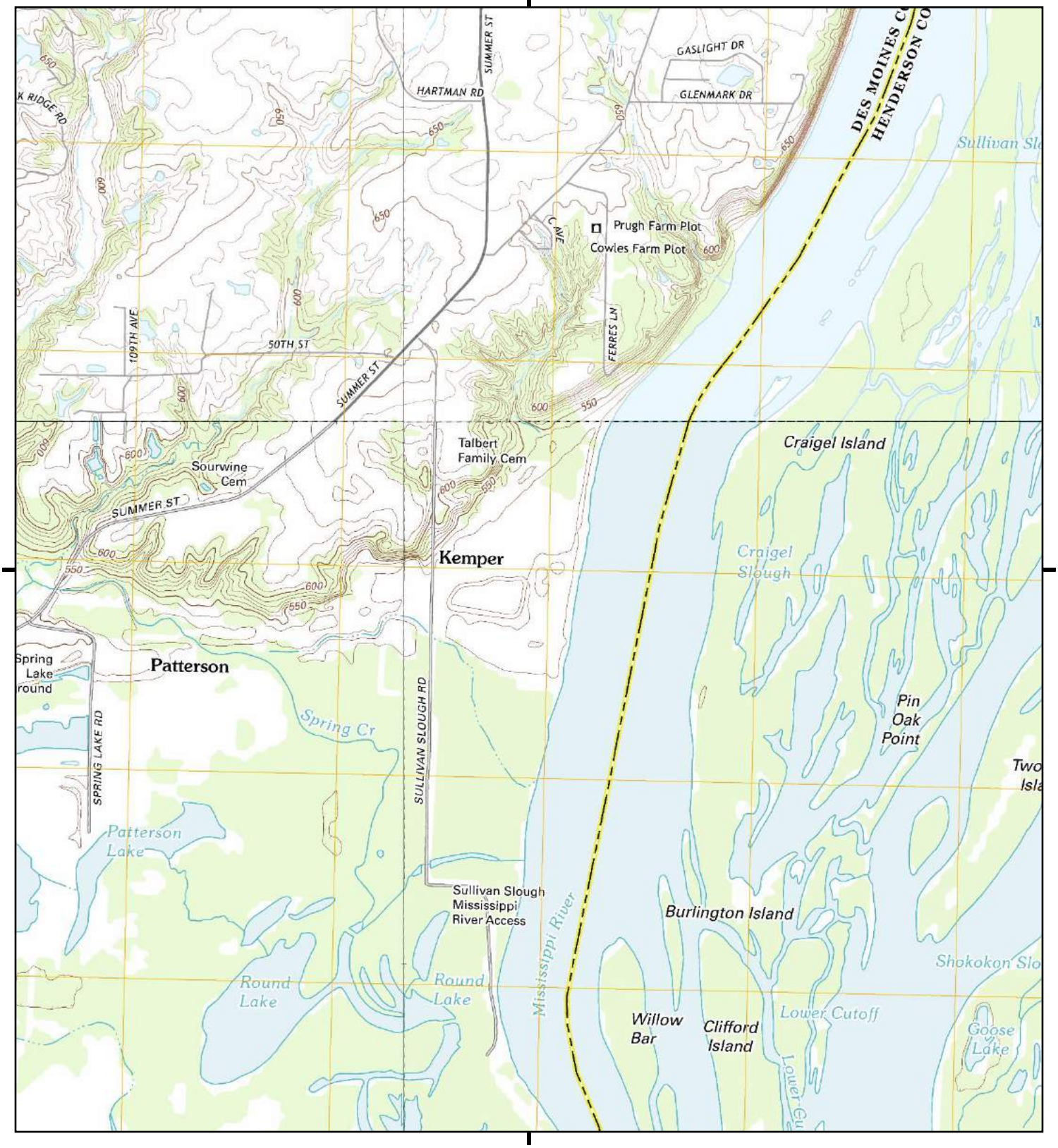
1932, 1934 Source Sheets

Lomax
1932
15-minute, 62500

Burlington
1934
15-minute, 62500

Historical Topo Map

2012, 2013



This report includes information from the following map sheet(s).

Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Lomax, 2012, 7.5-minute

NE, Burlington, 2013, 7.5-minute

SW, Dallas City, 2012, 7.5-minute

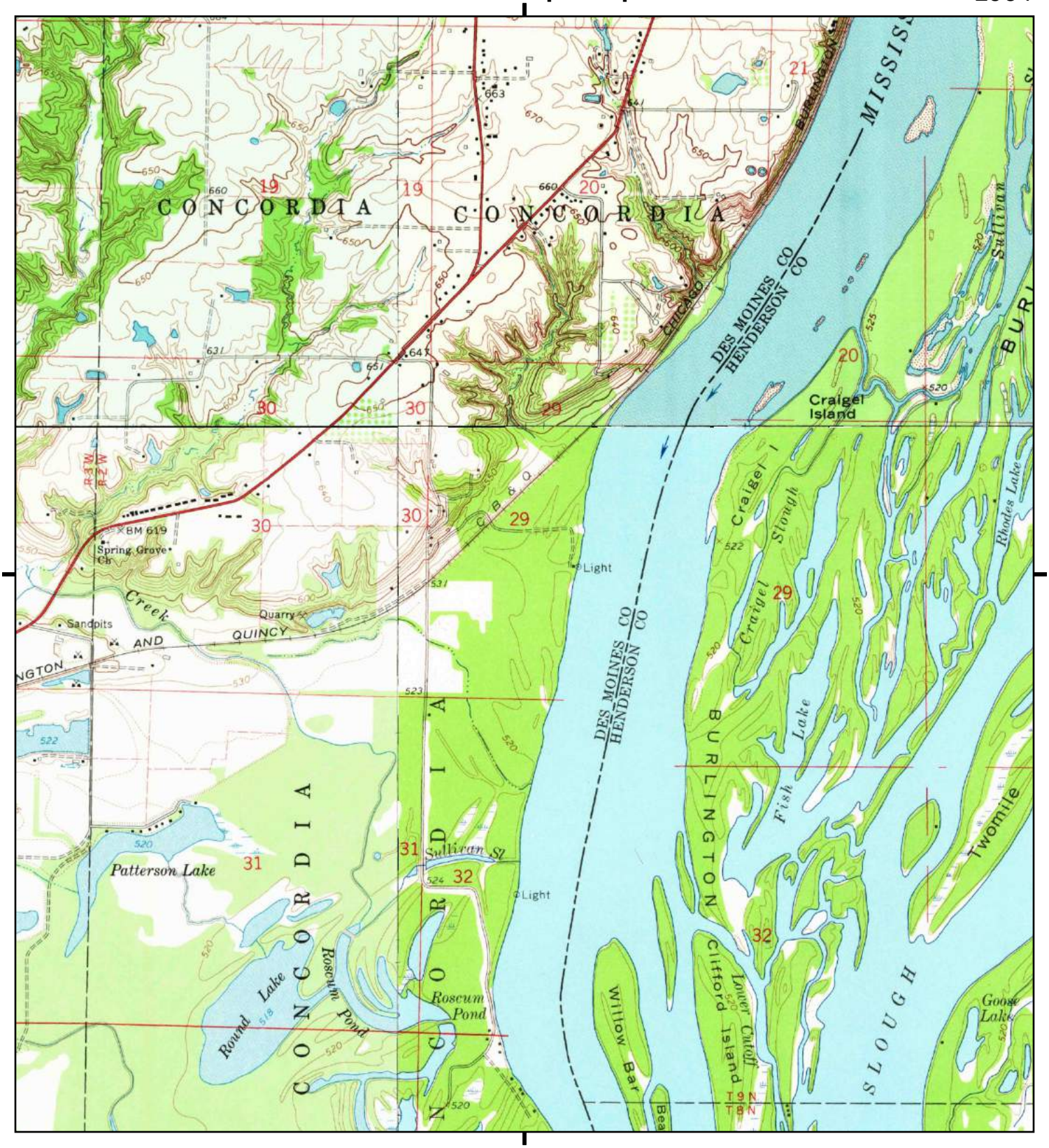
NW, West Burlington, 2013, 7.5-minute

SITE NAME: Burlington Generating Station
ADDRESS: 4282 Sullivan Slough Road
Burlington, IA 52601
CLIENT: Environmental Site Assessors

N

Historical Topo Map

1964



This report includes information from the following map sheet(s).

Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Lomax, 1964, 7.5-minute

NE, Burlington, 1964, 7.5-minute

SW, Dallas City, 1964, 7.5-minute

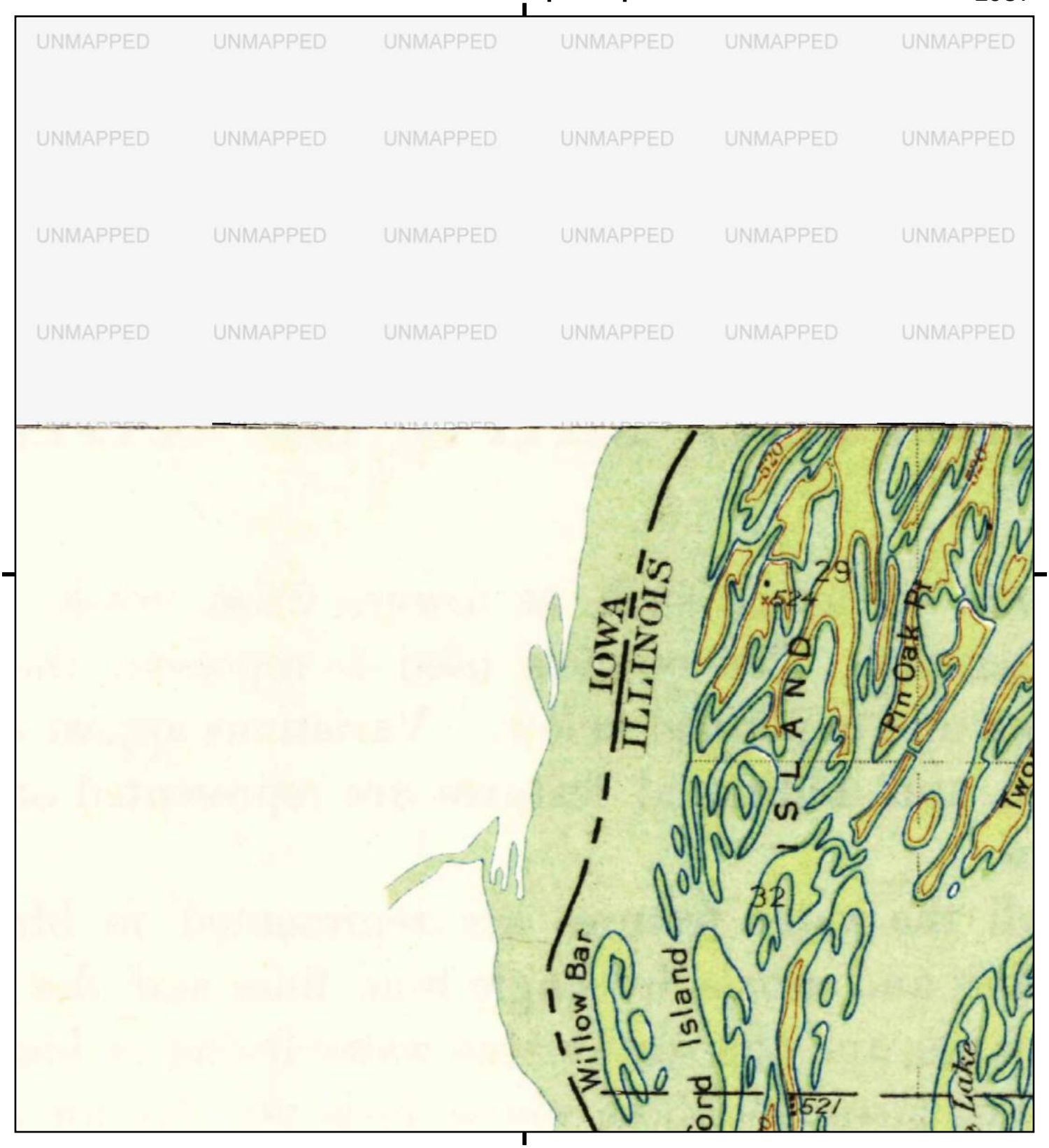
NW, West Burlington, 1964, 7.5-minute

SITE NAME: Burlington Generating Station
ADDRESS: 4282 Sullivan Slough Road
Burlington, IA 52601
CLIENT: Environmental Site Assessors

N

Historical Topo Map

1937



This report includes information from the following map sheet(s).

Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

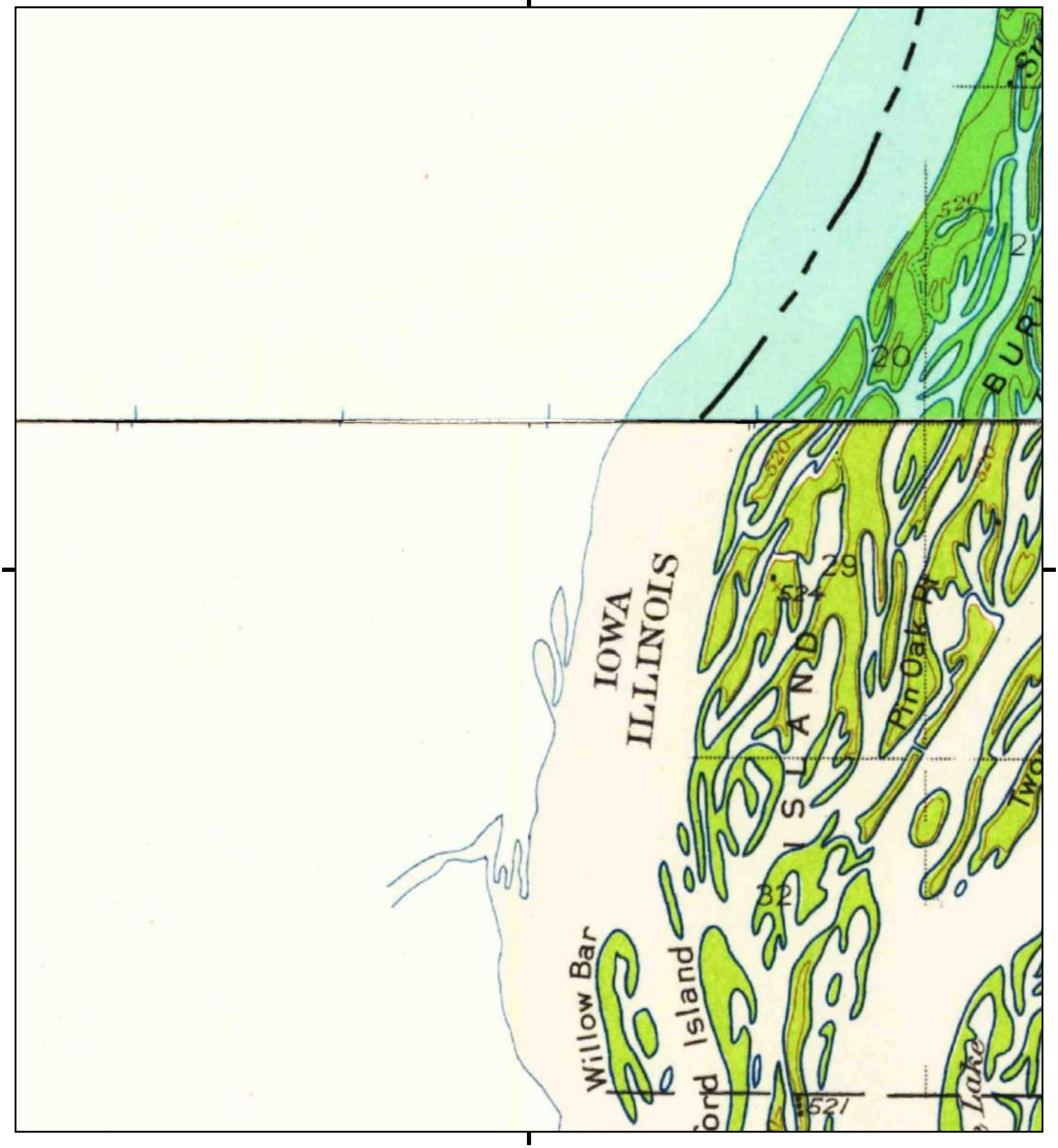
TP, Lomax, 1937, 15-minute

SITE NAME: Burlington Generating Station
ADDRESS: 4282 Sullivan Slough Road
Burlington, IA 52601
CLIENT: Environmental Site Assessors

N

Historical Topo Map

1932, 1934



This report includes information from the following map sheet(s).

Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Lomax, 1932, 15-minute

N, Burlington, 1934, 15-minute

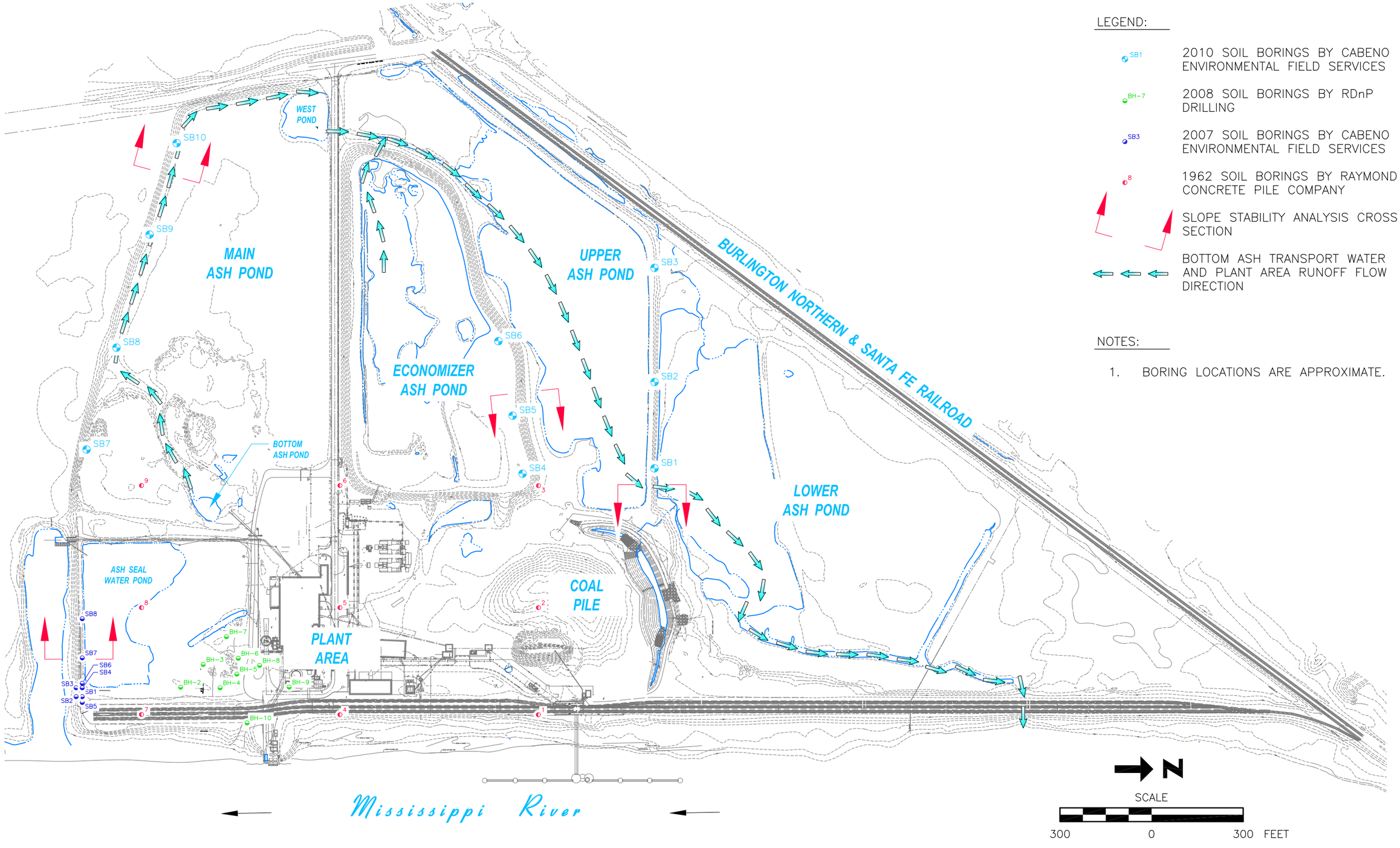
SITE NAME: Burlington Generating Station
ADDRESS: 4282 Sullivan Slough Road
Burlington, IA 52601
CLIENT: Environmental Site Assessors

N

APPENDIX D – Geoprobe Soil Borings – 1962, 2007, 2008, and 2010

Alliant Energy
Interstate Power and Light Company
Burlington Generating Station
Burlington, Iowa

History of Construction



LEGEND:

- SB1 — 2010 SOIL BORINGS BY CABENO ENVIRONMENTAL FIELD SERVICES
- BH-7 — 2008 SOIL BORINGS BY RDnP DRILLING
- SB3 — 2007 SOIL BORINGS BY CABENO ENVIRONMENTAL FIELD SERVICES
- 8 — 1962 SOIL BORINGS BY RAYMOND CONCRETE PILE COMPANY
- SLOPE STABILITY ANALYSIS CROSS SECTION
- BOTTOM ASH TRANSPORT WATER AND PLANT AREA RUNOFF FLOW DIRECTION

NOTES:

1. BORING LOCATIONS ARE APPROXIMATE.

REV	DATE	BY	DESCRIPTION
5			
4			
3			
2			
1			

aether dbs
www.aetherdbs.com

SCALE:	AS SHOWN
DATE:	01-21-11
DRAWN BY:	MM
CHKD. BY:	TCW
APPROVED:	01-21-11

CLIENT / LOCATION

ALLIANT ENERGY
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

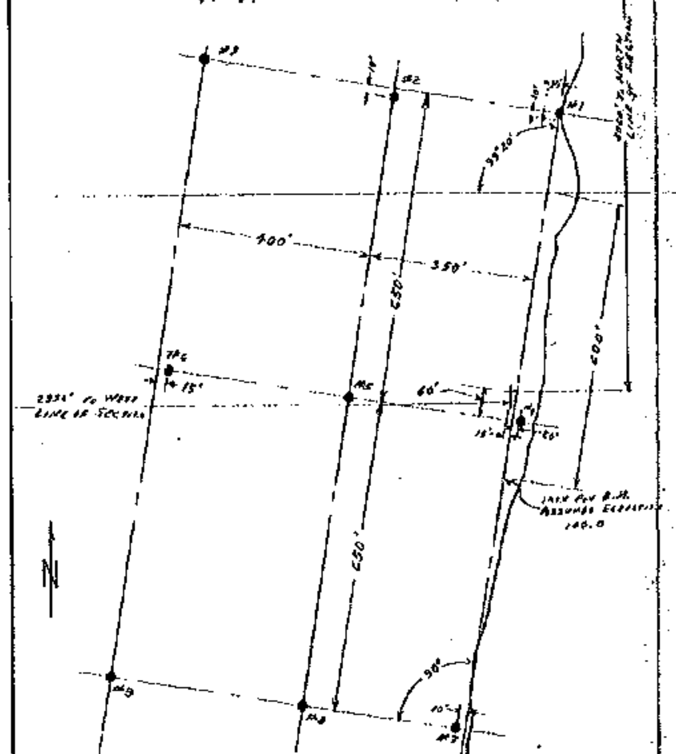
DRAWING DESCRIPTION

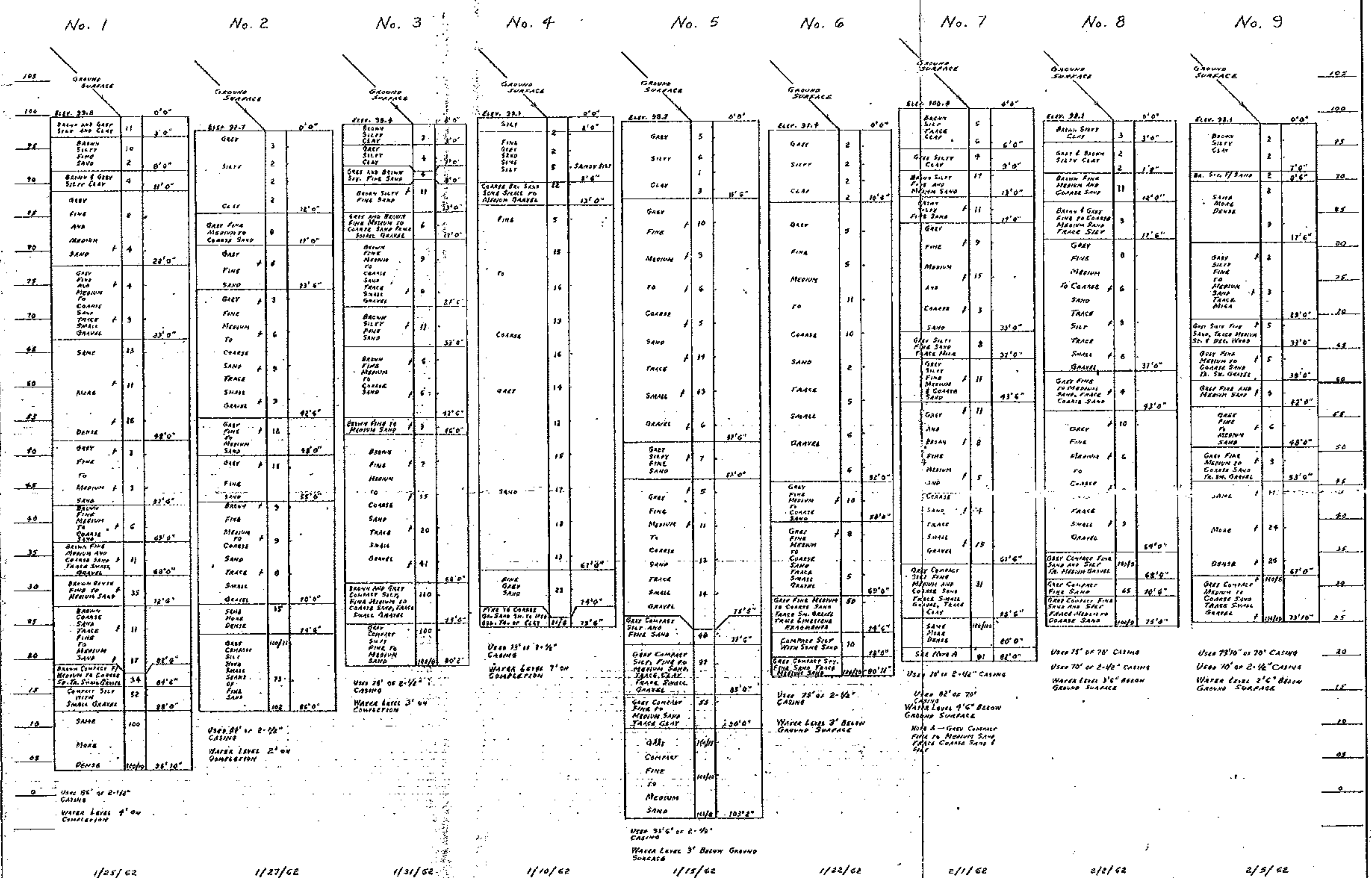
SITE PLAN

JOB 154.002.009

SHT. 1

DWG. SITE PLAN





Figures in right hand column shown as fractions — Numerator - No. of blows / Denominator - Penetration in inches

† Indicates wash sample recovered

Classifications are made by visual inspection. Figures in right hand column indicate number of blows required to drive 2" O.D. sampling pipe one foot, using 140-lb. weight falling 30 inches.

References:
See D-467 for boring locations.
Test Boring Report - February 23, 1962, by Raymond Concrete Pile Company, GSW Division. Job No. C8-948-KC Sheets 1 through 4

IOWA SOUTHERN UTILITIES CO. CENTERVILLE, IOWA	
Proposed Burlington Plant Site Test Boring Reports	
SCALE 1" = 5' vertical	DATE 3-15-62
SKETCH DWN. DWN	TRCD LLA CHKD
D-487	APPROVED

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Hard Hat **COORDINATES:** *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Alnt - Burlington **BORING NO.: *SB-1***

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Lorep*
DATE BEGAN: *8-7-07*
DATE FINISHED: *8-7-07*
GROUND SURFACE ELEVATION: *100.36*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	PID READINGS (PPM)	PID vs. DEPTH	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	3.5'/5'				2.75 2.0 4.0		0 -5		ASH; well graded; fine to coarse grained; dry. CLAY; dark grayish brown; low to high plasticity; moist; trace sand, gravel and organic matter. @ 4.5' and 5.0' are thin (1/16" thick) sand seams, wet.
	SP2	5'/5'				1.0 1.0 1.25 1.0		-10		SAND; black; medium to coarse grained; graded; wet.
	SP3	5'/5'				1.25 2.0		-15		CLAY; black; high plasticity; moist; trace to some organic matter. Bottom of boring @ 15'. Boring advanced w/ track mounted Geoprobe Model 6610DT using Macrocore soil sampling system (60"long x 1.5" wide). Boring backfilled to groundsurface w/ bentonite chips and hydrated on 8-7-07.
								-20		

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Hard Hat

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Alnt - Burlington

BORING NO.: *SB-2*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	PID READINGS (PPM)	PID vs. DEPTH	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	3'/4'				2.5		0		ASH; well graded; fine to coarse grained; dry.
						2.75				CLAY; dark grayish brown; low to high plasticity; moist; trace sand, gravel and organic matter.
						2.75				@ 3' and 4' are a thin 1/16" thick sand seams, wet, trace satl deopsit in sand.
	SP2	2'/2'				2.75		-5		
						2.75				Bottom of boring @ 6'.
										Boring advanced w/ track mounted Geoprobe Model 6610DT using Macrocore soil sampling system (60"long x 1.5" wide).
								-10		1-inch PVC temp. well installed to 6-feet bgs w/ 5' screen on 8-7-07. TOC elevation = 102.98
								-15		
								-20		

LOGGED BY: *John Noyes*

EDITED BY: *John Noyes*

CHECKED BY: *Mark Lorep*

DATE BEGAN: *8-7-07*

DATE FINISHED: *8-7-07*

GROUND SURFACE ELEVATION: *99.26*

BORING LOG

CABENO

Environmental Field Services, LLC

CLIENT: Hard Hat

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: AInt - Burlington

BORING NO.: *SB-3*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Lorep*
DATE BEGAN: *8-7-07*
DATE FINISHED: *8-7-07*
GROUND SURFACE ELEVATION: *99.47*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	PID READINGS (PPM)	PID vs. DEPTH	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	4'/5'				4.0 3.5 3.0		0 -5 -10 -15 -20		ASH; well graded; fine to coarse grained; dry. CLAY; dark grayish brown; low to high plasticity; moist to wet; trace sand, gravel and organic matter. @ 1.5' water is present and confined to an approximate 1-inch seam. @ 3.5' to 4.0' are three 1/16-inch thin sand seams, wet. Bottom of boring @ 5'. Boring advanced w/ track mounted Geoprobe Model 6610DT using Macrocore soil sampling system (60"long x 1.5" wide). 1-inch PVC temp. well installed to 5-feet bgs w/ 5' screen on 8-7-07. TOC elevation = 101.07

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Hard Hat

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Alnt - Burlington

BORING NO.: *SB-4*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	PID READINGS (PPM)	PID vs. DEPTH	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	4'/5'				1.0		0		ASH; well graded; fine to coarse grained; dry.
						0.5				CLAY; dark grayish brown; low to high plasticity; moist; trace sand, gravel and organic matter.
								-5		SAND, GRAVEL & ASH; brown to black; fine to coarse grained; graded; wet; trace to some silt and clay.
	SP2	4'/5'				0.5				CLAY; dark grayish brown; low to high plasticity; moist; trace sand, gravel and organic matter.
						1.0				
						1.5				
						2.0		-10		Bottom of boring @ 10'.
										Boring advanced w/ track mounted Geoprobe Model 6610DT using Macrocore soil sampling system (60"long x 1.5" wide).
								-15		1-inch PVC temp. well installed to 10-feet bgs w/ 5' screen on 8-7-07. TOC elevation = 102.22
								-20		

LOGGED BY: *John Noyes*

EDITED BY: *John Noyes*

CHECKED BY: *Mark Lorep*

DATE BEGAN: *8-7-07*

DATE FINISHED: *8-7-07*

GROUND SURFACE ELEVATION: *101.21*

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Hard Hat

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Alnt - Burlington

BORING NO.: *SB-5*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	PID READINGS (PPM)	PID vs. DEPTH	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
								0		**LOGGED BY:** *John Noyes* **EDITED BY:** *John Noyes* **CHECKED BY:** *Mark Lorep* **DATE BEGAN:** *8-7-07* **DATE FINISHED:** *8-7-07* **GROUND SURFACE ELEVATION:** *99.76*
	SP1	4'/5'				3.0				ASH; well graded; fine to coarse grained; dry.
						1.5		-5		CLAY; dark grayish brown; low to high plasticity; moist; trace sand, gravel and organic matter. @ 4.5' is a 2-inch brown, fine sand, moist.
	SP2	4'/5'				1.25				
						1.0				
						0.5				
						1.5		-10		SAND; black; med to coarse grained; graded; wet.
	SP3	5'/5'				2.0				CLAY; black; high plasticity; some (high) organic matter.
						2.0		-15		Bottom of boring @ 15'. Boring advanced w/ track mounted Geoprobe Model 6610DT using Macrocore soil sampling system (60"long x 1.5" wide).
								-20		

BORING LOG

CABENO
Environmental Field Services, LLC

CLIENT: Hard Hat
PROJECT: Alnt - Burlington

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*
BORING NO.: *SB-6*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	PID READINGS (PPM)	PID vs. DEPTH	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE
▽ ▽	SP1 SP2	4'/5' 4'/5'				2.5 2.5 2.5 2.5 2.5 2.0		0 -5 -10 -15 -20	

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Lorep*
DATE BEGAN: *8-7-07*
DATE FINISHED: *8-7-07*
GROUND SURFACE ELEVATION: *102.28*

DESCRIPTION

ASH; well graded; fine to coarse grained; dry.

CLAY; dark grayish brown; low to high plasticity; moist; trace sand, gravel and organic matter.

@ 4.5' and 5' is a 1-inch brown, fine sand, wet.

SAND; black; med to coarse grained; graded; wet.

Bottom of boring @ 10'.

Boring advanced w/ track mounted Geoprobe Model 6610DT using Macrocore soil sampling system (60"long x 1.5" wide).

Boring backfilled w/ bentonite chips from 10' bgs to 5' bgs. 1-inch PVC screen set to 5' bgs on 8-7-07. TOC Elevation = 104.92.

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Hard Hat

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Alnt - Burlington

BORING NO.: *SB-7*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	PID READINGS (PPM)	PID vs. DEPTH	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	4'/5'						0		CLAY; dark brown to black; non-plastic to low plasticity; dry to moist; trace sand, gravel and ash.
	SP2	4'/5'						-5		Interbeded SAND & CLAY
								-10		Bottom of boring @ 10'.
								-15		Boring advanced w/ track mounted Geoprobe Model 6610DT using Macrocore soil sampling system (60"long x 1.5" wide).
										1-inch PVC screen set to 10' bgs w/ 5' screen on 8-7-07. TOC Elevation = 105.02.
								-20		

LOGGED BY: *John Noyes*

EDITED BY: *John Noyes*

CHECKED BY: *Mark Lorep*

DATE BEGAN: *8-7-07*

DATE FINISHED: *8-7-07*

GROUND SURFACE ELEVATION: *101.90*

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Hard Hat

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Aint - Burlington

BORING NO.: *SB-8*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Lorep*
DATE BEGAN: *8-7-07*
DATE FINISHED: *8-7-07*
GROUND SURFACE ELEVATION: *101.62*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	PID READINGS (PPM)	PID vs. DEPTH	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	4'/5'				2.5 2.25		0 – 5		CLAY; dark brown to black; non-plastic to low plasticity; dry to moist; trace sand, gravel and ash.
▽	SP2	4'/5'				2.25		5 – 10		SAND; 1st 1.5-inches stained orange-red then grades gray to black; fine to coarse grained; well graded; wet.
								10		Bottom of boring @ 10'.
								15		Boring advanced w/ track mounted Geoprobe Model 6610DT using Macrocore soil sampling system (60"long x 1.5" wide).
								20		1-inch PVC screen set to 10' bgs w/ 5' screen on 8-7-07. TOC Elevation = 104.60.

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Hard Hat

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Alnt - Burlington

BORING NO.: *SB-9*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Lorep*
DATE BEGAN: *8-7-07*
DATE FINISHED: *8-7-07*
GROUND SURFACE ELEVATION: *102.10*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	PID READINGS (PPM)	PID vs. DEPTH	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	4'/5'				0.5 1.25 1.0 1.0 0.5 0.5		0 -5		CLAY; dark brown to black; non-plastic to low plasticity; dry to moist; trace sand, gravel and ash. @ 4.5' is a wet seam, approx. 1-inch thick.
	SP2	4'/5'				0 0 1.0 1.25		-10		@ 7' is a wet seam, approx. 1.5-inch thick. Bottom of boring @ 10'. Boring advanced w/ track mounted Geoprobe Model 6610DT using Macrocore soil sampling system (60"long x 1.5" wide). 1-inch PVC screen set to 10' bgs w/ 5' screen on 8-7-07. TOC Elevation = 103.00.
								-15		
								-20		

HARD HAT SERVICES ™
Engineering, Construction and Management Solutions

BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-2**
LOGGED BY LES
PAGE No. 1 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 534.13
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/11/2008 FINISH 12/12/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
													CL	Frozen ground
	SS-1	2.0	4.0	2	3	4	4	14.0		0.75	4'3"	529.88		Black and brown mottled SILTY CLAY, little fine to medium sand, medium plasticity, medium stiff, wet
5	SS-2	4.0	6.0	1	6	5	3	17.0					ML	Grey SILT, trace fine sand, medium dense, moist
	SS-3	6.0	8.0	1	8	15	7	17.5						medium dense
	SS-4	8.0	10.0	1	6	50/5		18.0						very dense
10														
	SS-5	13.0	15.0	1	1	1	1	13.0	49	0.75	13'5"	520.71	CH	Dark brown and black mottled CLAY, trace silt, high plasticity, medium stiff, wet
15														
	SS-6	18.0	20.0	2	2	3	3	15.0	48	0.25 0.50				soft (LL=52, PI=27)
20														
	SS-7	23.0	25.0	4	5	7	12	20.0			23'6"	510.63	SP	Brown fine to medium SAND, medium dense, wet
25														
	SS-8	28.0	30.0	3	12	17	18	9.0						brownish-grey
30														
	SS-9	33.0	35.0	8	10	11	12	11.5						
35														
	SS-10	38.0	40.0	7	7	10	12	10.0						some coarse sand and wood pieces
40														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

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BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-2**
LOGGED BY LES
PAGE No. 2 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 534.13
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/11/2008 FINISH 12/12/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														Brownish-grey fine to medium sand, some coarse sand, medium dense, wet (cont.)
	SS-11	43.0	45.0	3	6	12	14	15.5					SP	2" of black silt at 44'1"
45											46'6"	487.63		
	SS-12	48.0	50.0	6	7	8	12	16.0						Brownish-grey fine to coarse SAND, medium dense, wet
50														
	SS-13	53.0	55.0	10	11	12	19	21.0					SW	
55														
	SS-14	58.0	60.0	15	22	32	42	24.0						medium to coarse sand, trace fine sand and fine gravel, very dense
60											60'	474.13		EOB 60' - Sand was causing hole to collapse and would have needed to be cased to 60' to continue.
65														
70														
75														
80														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

BORING LOG

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PROJECT No. 154.002.008.001
BORING No. BH-B-1 **(BH-3)**
LOGGED BY LES
PAGE No. 1 of 2

PROJECT NAME Alliant Energy - Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa
DRILLER RDnP Drilling - Chris DATE: START 7/15/2008 FINISH 7/21/2008

DEPTH	SAMPLE No.	INTERVAL FROM	INTERVAL TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	USCS SOIL TYPE	SOIL DESCRIPTION
	SS-1	0.0	2.0	5	10	10	12	12	23				Brown and black silty clay FILL, medium dense, dry
	SS-2	2.0	4.0	10	11	11	15	9.5		2.0			Coarse sand and fine gravel FILL, trace grey fines, medium dense, dry
5	SS-3	4.0	6.0	5	10	2	2	10	14	4.0		FILL	some silt
	SS-4	6.0	8.0	1	10	16	12	22		6.0			Grey-black sand and gravel FILL with silt, medium dense wet.
	SS-5	8.0	10.0	6	10	22	32	24	24		10.0		
10	SS-6	10.0	12.0	3	8	3	2	14					Grey sandy SILT, trace coarse sand, loose, saturated
	SS-7	12.0	14.0	1	0	1	0	18	50				Grey SILT, little fine sand, very loose, saturated
15	SS-8	14.0	16.0	Rod Weight				17				ML	
	SS-9	18.0	20.0	1	1	1	1	16	33				trace low plasticity clay, trace fine sand
20													
											22'6"		
	SS-10	23.0	25.0	1	2	2	1	18				CL	Dark grey SILTY CLAY, trace fine sand, medium to high plasticity, soft, wet
25													
											26.5		
	SS-11	28.0	30.0	1	0	0	0	3	18				Grey fine to medium grained SAND, trace coarse sand, very loose, saturated
30													
	SS-12	33.0	35.0	5	8	12	14	11				SP	medium dense
35													
	SS-13	38.0	40.0	8	10	11	12	11	13				
40													

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

BORING LOG

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PROJECT No. 154.002.008.001
BORING No. BH-B-1 **(BH-3)**
LOGGED BY LES
PAGE No. 2 of 2

PROJECT NAME Alliant Energy - Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa
DRILLER RDnP Drilling - Chris DATE: START 7/15/2008 FINISH 7/21/2008

DEPTH	SAMPLE No.	INTERVAL FROM	INTERVAL TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	USCS SOIL TYPE	SOIL DESCRIPTION
													Grey fine to medium SAND, trace coarse sand, medium dense, saturated
	SS-14	43.0	45.0	5	10	14	22	11					
45													
	SS-15	48.0	50.0	9	14	16	16	12	15				
50													
	SS-16	53.0	55.0	8	12	14	15	11				SP	
55													
	SS-17	58.0	60.0	10	11	18	24	10	13				several pieces of coarse grained gravel at 58.5'
60													
	SS-18	63.0	65.0	15	24	26	36	10					dense
65											66.5		
	SS-19	68.0	70.0	32	32	38		12	9				Grey fine to coarse SAND and fine grained gravel, very dense, saturated
70												SW	
	SS-20	73.0	75.0	32	75/3			4					
75											76.5		
	SS-21	78.0	80.0	50	100/3			4	8		79.5	GP	Fine GRAVEL with fine to coarse sand, very dense, saturated Spoon bounced at 79.5'
80													EOB at 80'

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

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BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-4**
LOGGED BY LES
PAGE No. 1 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 534.43
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/2/2008 FINISH 12/3/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNTS 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														Frozen ground
	SS-1	2.0	4.0	3	4	5	15	16.0					FILL	Black and brown silty clay FILL, some fine sand, dry
5	SS-2	4.0	6.0	9	8	11	12	17.0						Black and brown fine to coarse sand and fine gravel FILL, trace fines, wet
	SS-3	6.0	8.0	10	5	12	15	20.0			6'6"	527.93		Grey SILT, little fine sand, medium dense, saturated
	SS-4	8.0	10.0	2	2	3	20	24.0					ML	loose 4" fine sand seam at 9'6"
10											11'6"	522.93		Grey SILTY-CLAY, trace fine sand, medium plasticity, soft, moist to wet
	SS-5	13.0	15.0	2	2	3	4	14.0	50	2.00			CL	
15														
	SS-6	18.0	20.0	7	9	8	11	15.0			18'4"	516.10		Grey-brown fine to coarse SAND, medium dense, wet
20														
	SS-7	23.0	25.0	10	11	15	15	12.0	18					
25													SP	
	SS-8	28.0	30.0	6	10	12	14	11.0						
30														
	SS-9	33.0	35.0	6	7	9	11	11.0	19					trace fine gravel
35											36'6"	497.93		Brown fine to coarse SAND, little fine gravel, trace silt, medium dense, wet
	SS-10	38.0	40.0	7	9	7	10	10.0					SW	
40														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

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BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-4**
LOGGED BY LES
PAGE No. 2 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 534.43
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/2/2008 FINISH 12/3/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														(cont.) Brown fine to coarse SAND, little fine gravel, medium dense, wet
	SS-11	43.0	45.0	5	6	6	8	11.0	14					
45														
	SS-12	48.0	50.0	12	12	16	19	10.0						
50														
	SS-13	53.0	55.0	8	9	11	14	12.0	13				SW	
55														
	SS-14	58.0	60.0	10	8	10	13	12.0						
60														
	SS-15	63.0	65.0	18	21	32	50/5	16.0	11					very dense
65											64'6"	469.93		
														Grey silty CLAY, trace fine sand, medium plasticity, hard, wet
	SS-16	68.0	70.0	21	32	42	44	24.0		+4.5				
70													CL	
	SS-17	73.0	75.0	10	17	22	23	20.0	25					
75											75'	459.43		EOB 75'
80														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

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BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-5**
LOGGED BY LES
PAGE No. 1 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 534.71
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/4/2008 FINISH 12/5/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														Frozen ground
	SS-1	2.0	4.0	15	19	22	23	12.0						Black and brown sand and gravel FILL, some fines, wet
5	SS-2	4.0	6.0	10	19	34	50/3	16.0					FILL	
	SS-3	6.0	8.0	32	32	22	8	18.0						Brown-grey silt with sand FILL
	SS-4	8.0	10.0	9	12	23	14	20.0						6" brown-red fine to coarse sand FILL
10											10'	524.71		
	SS-5	10.0	12.0	1	2	4	1	24.0					ML	Grey SILT, little fine sand, loose, wet
											13'	521.71		
	SS-6	13.0	15.0	1	1	2	3	21.0	36					Mottled green, black, and light grey SILTY CLAY, little fine sand, trace silt and wood pieces, medium stiff, wet
15														
	SS-7	18.0	20.0	2	2	3	3	13.0	34	1.00			CL	
20														
	SS-8	23.0	25.0	5	7	7	9	14.5			23'2"	511.54		
25														Black and brown fine to medium SAND, trace coarse sand, medium dense, wet 23'7" grey
	SS-9	28.0	30.0	3	4	6	7	13.0	19					
30														
	SS-10	33.0	35.0	7	7	9	11	12.0					SP	
35														
	SS-11	38.0	40.0	7	10	11	14	14.0	22					5" fine sand seam 2" coarse sand and fine gravel seam
40														

Drilled with Dietrich -120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

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BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-5**
LOGGED BY LES
PAGE No. 2 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 534.71
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/4/2008 FINISH 12/5/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														(cont.) Grey fine to medium SAND, trace coarse sand, wet
	SS-12	43.0	45.0	12	15	22	26	13.5						dense
45														
	SS-13	48.0	50.0	10	12	12	15	12	17				SP	medium dense
50														
	SS-14	53.0	55.0	5	15	21	15	13						dense, 53'6" - 1" gravel piece
55														
	SS-15	58.0	60.0	6	8	11	15	10	12		58'7"	476.13		medium dense
60														Grey fine to coarse SAND, some fine gravel, very dense
	SS-16	63.0	65.0	50/0				0					SW	
65														(rig was grinding heavily to get from 65' to 68')
	SS-17	68.0	70.0	50/4				4						
70											70'	464.71		EOB 70'
75														
80														

Drilled with Dietrich -120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

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BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-6**
LOGGED BY LES
PAGE No. 1 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 534.33
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/4/2008 FINISH 12/5/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														Frozen ground
	SS-1	2.0	4.0	10	11	15	17	17.0						Brown silty sand FILL, trace medium sand, medium dense
5	SS-2	4.0	6.0	1	3	5	11	13.0					FILL	
	SS-3	6.0	8.0	50/5				7.5						(possibly gravel inhibiting sampling)
	SS-4	8.0	10.0	41	50/3			5.5						
10											10'	524.33		
	SS-5	10.0	12.0	3	2	1	4	20.0	49					Brownish-grey SILT, trace fine sand, very loose, saturated
	SS-6	13.0	15.0	3	4	4	5	24.0	53				ML	loose
15											16'6"	517.83		
	SS-7	18.0	20.0	1	1	1	2	17.0	49	0.50				Brownish-grey SILTY CLAY, trace fine sand, soft, wet
20													CL	
	SS-8	23.0	25.0	1	3	4	5	16.0			24'	510.33		
25														Brown fine to medium SAND, trace coarse sand, medium dense, wet
	SS-9	28.0	30.0	6	7	9	11	15.5	18					
30													SP	
	SS-10	33.0	35.0	10	11	14	14	12.0						
35											36'6"	497.83		
	SS-11	38.0	40.0	6	8	9	12	12.5	9					Brown fine to coarse SAND, little fine gravel, medium dense, wet
40													SW	

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

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BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-6**
LOGGED BY LES
PAGE No. 2 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 534.33
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/4/2008 FINISH 12/5/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
											42'6"	491.83	SW	Brown fine to coarse SAND, little fine gravel, medium dense, wet (cont.)
	SS-12	43.0	45.0	8	10	14	17	12.0						Brown fine to medium sand, trace fine sand, medium dense to dense, wet (cont.)
45														
	SS-13	48.0	50.0	8	9	12	14	12.0	14					little coarse sand
50													SP	
	SS-14	53.0	55.0	10	17	17	15	12.5						
55														
	SS-15	58.0	60.0	10	12	14	14	10.0	14					
60											62' 6"	472.00		
	SS-16	63.0	65.0	17	31	36	42	22.0	14	4.5+ 4.5+			CL	Grey SILTY CLAY, little fine to medium sand, medium plasticity, hard, wet 1" fine to medium sand seam at 63'6" 1" gravel piece at 6'8"
65														
	SS-17	68.0	70.0	21	50/3			9.0		4.5+				
70											70'	464.33		EOB 70'
75														
80														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

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BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-7**
LOGGED BY LES
PAGE No. 1 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 536.51
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/5/2008 FINISH 12/8/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														Frozen ground
	SS-1	2.0	4.0	6	7	10	12	22.5		1.00			FILL	Black sand, gravel, and silt FILL 6" alternating brown and black fine sand and silt at 3' 6"grey clay, medium stiff, moist at 4'
5	SS-2	4.0	6.0	1	3	10	14	15.0		0.75				
	SS-3	6.0	8.0	10	31	21	33	18.0			6'	530.51		Dark grey SILT, some fine sand, very dense, wet
	SS-4	8.0	10.0	15	21	18	15	17.0						
10	SS-5	10.0	12.0	10	22	32	44	21.0					ML	trace fine sand
	SS-6	13.0	15.0	3	4	1	5	23.0	67					loose
15														
											16'6"	520.01		
	SS-7	18.0	20.0	1	2	1	2	24.0					CL	Grey SILTY CLAY, trace fine sand, very soft, wet
20														
											23'6"	513.01		
	SS-8	23.0	25.0	1	2	4	12	16.0	19				SP-SC	Grey fine to medium SAND with clay, loose, wet
25														
											26'6"	510.01		
	SS-9	28.0	30.0	2	5	8	8	18.0						Grey fine to medium SAND, medium dense, wet
30														
	SS-10	33.0	35.0	8	14	16	15	12.0	17				SP	trace coarse sand
35														
	SS-11	38.0	40.0	8	14	10	8	12.0						medium dense
40														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

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BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-7**
LOGGED BY LES
PAGE No. 2 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 536.51
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/5/2008 FINISH 12/8/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														Grey fine to medium SAND, trace coarse sand medium dense, wet
	SS-12	43.0	45.0	5	8	10	11	12.0	15					
45														
	SS-13	48.0	50.0	8	10	15	18	14.0					SP	
50														
	SS-14	53.0	55.0	10	12	15	16	10.0	15					
55											56'6"	480.01		Brown fine to coarse SAND, trace fine gravel, medium dense, wet
	SS-15	58.0	60.0	8	11	15	17	24.0						
60													SW	
	SS-16	63.0	65.0	18	23	50/4		10.0	7					very dense
65											65'	471.51		EOB 65'
70														
75														
80														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

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BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-8**
LOGGED BY LES
PAGE No. 1 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa SURFACE ELEVATION 534.72
DRILLER RDnP Drilling - Kris Norwick DATE: START 12/15/2008 FINISH 12/17/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" 6"	6" 12"	12" 18"	18" 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														Frozen ground
	SS-1	2.0	4.0	8	12	10	12	18.0						Brown and grey mottled silty clay FILL, little fine to coarse sand, medium dense, frozen
5	SS-2	4.0	6.0	3	4	6	6	16.0		1.75			FILL	
	SS-3	6.0	8.0	3	5	7	10	10.0						fine gravel pieces mixed in clay
	SS-4	8.0	10.0	3	4	6	9	15.0	17	2.50				
10	SS-5	10.0	12.0	4	5	7	4	14.0	23	3.00	10'6"	524.22		Grey SILT, trace fine sand, medium dense to loose, wet
	SS-6	13.0	15.0	2	3	3	3	8.0	26				ML	alternating silt and brown silty clay, stiff
15											16'6	518.22		
	SS-7	18.0	20.0	1	2	3	2	10.0	34	1.25			CL	Grey SILTY CLAY, medium plasticity, medium stiff, mois to wet (LL=46, PI=24)
20														
											23'3"	511.47		
	SS-8	23.0	25.0	5	6	7	7	12.0						Brown fine to medium SAND, loose, wet
25														
	SS-9	28.0	30.0	2	5	4	5	24.0	20					
30													SP	
	SS-10	33.0	35.0	2	3	4	5	12.0						trace coarse sand
35														
	SS-11	38.0	40.0	4	5	5	7	11.5	12					
40														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

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BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-8**
LOGGED BY LES
PAGE No. 2 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa SURFACE ELEVATION 534.72
DRILLER RDnP Drilling - Kris Norwick DATE: START 12/15/2008 FINISH 12/17/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														Brown fine to medium SAND, trace coarse sand, medium dense, wet (cont.)
	SS-12	43.0	45.0	9	10	11	15	11.0						
45													SP	
	SS-13	48.0	50.0	14	17	9	7	13.0	16					
50														
											49'6"	485.22		
	SS-14	53.0	55.0	4	8	7	6	13.0						Brown fine to coarse SAND, trace fine gravel, medium dense, wet
55														
	SS-15	58.0	60.0	8	15	19	22	15.0	8					dense
60													SW	
	SS-16	63.0	65.0	5	15	24	26	17.0						little fine gravel
65														
											66'6"	468.22		
	SS-17	68.0	70.0	48	50/4			13.0	14				CL	Grey sandy SILTY CLAY, hard, moist to wet
70											70'	464.72		EOB 70'
75														
80														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

HARD HAT SERVICES ™
Engineering, Construction and Management Solutions

BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-9**
LOGGED BY LES
PAGE No. 1 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 534.67
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/17/2008 FINISH 12/18/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														Frozen ground
	SS-1	2.0	4.0	3	4	2	2	14.0		2.50				Grey and brown mottled silty clay FILL, some fine to medium sand, very stiff, moist
5	SS-2	4.0	6.0	3	4	6	5	17.0		4.00			FILL	
	SS-3	6.0	8.0	4	5	5	8	17.0		2.50				Alternating grey, brown, and orange clay and silt
	SS-4	8.0	10.0	4	5	10	10	17.0		2.00	8'11"	525.75		
10	SS-5	10.0	12.0	5	7	9	12	16.0		4.00			CL	Grey SILTY CLAY, trace fine sand, medium plasticity, very stiff, moist
											13'	521.67		
	SS-6	13.0	15.0	3	4	6	6	21.0						Dark grey CLAY, high plasticity, stiff, wet
15														
	SS-7	18.0	20.0	3	3	4	5	21.0	51	1.00				(LL=64, PI=34)
20													CH	
	SS-8	23.0	25.0	5	6	8	9	0.0						
25														(hole is taking a lot of water)
											24'6"	510.17		
	SS-9	28.0	30.0	8	10	12	14	10.0	25					Grey fine to medium SAND, medium dense, wet
30														
	SS-10	33.0	35.0	8	15	19	22	16.0						trace coarse sand, dense
35													SP	
	SS-11	38.0	40.0	10	16	17	19	11.0	18					
40														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

HARD HAT SERVICES™
Engineering, Construction and Management Solutions

BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-9**
LOGGED BY LES
PAGE No. 2 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa SURFACE ELEVATION
DRILLER RDnP Drilling - Kris Norwick DATE: START 12/17/2008 FINISH 12/18/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														Grey fine to medium SAND, trace coarse sand, dense, wet
	SS-12	43.0	45.0	10	17	24	29	8.0						trace fine gravel
45														
	SS-13	48.0	50.0	8	16	20	21	12.0	17				SP	
50														
	SS-14	53.0	55.0	9	11	15	19	13.0						
55														
											56'6"	478.17		Grey-brown fine to coarse SAND, trace fine gravel, dense, wet
	SS-15	58.0	60.0	10	12	18	17	16.0	17					
60													SW	
	SS-16	63.0	65.0	12	15	24	26	15.0						dense
65														
											66'6"	468.17		
	SS-17	68.0	70.0	37	50/4			10.0					CL	Grey CLAY, little fine to medium sand, medium plasticity, hard, moist to wet
70											70'	464.67		EOB 70'
75														
80														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

HARD HAT SERVICES ™
Engineering, Construction and Management Solutions

BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-10**
LOGGED BY LES
PAGE No. 1 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 531.92
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/12/2008 FINISH 12/15/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														Frozen ground
	SS-1	2.0	4.0	4	5	5	4	13.0	17	2.00				Grey and brown mottled SILTY CLAY, trace fine sand, medium plasticity, stiff, moist
5	SS-2	4.0	6.0	3	4	5	6	15.0	15	2.50				little fine to coarse sand, very stiff
	SS-3	6.0	8.0	4	4	5	6	15.0	13	2.50			CL	
	SS-4	8.0	10.0	3	6	8	8	15.0	24	2.50 1.50				Brown, silt content increasing, thin brown silt seams
10														
	SS-5	13.0	15.0	1	2	3	4	15.0		0.75 1.00	13'	518.92		Dark grey CLAY, high plasticity, medium stiff, wet
15														
	SS-6	18.0	20.0	4	6	5	7	13.5		1.25				stiff
20													CH	
	SS-7	23.0	25.0	3	4	5	5	6.0		1.00				
25														
	SS-8	28.0	30.0	8	9	11	12	0.0			29'	502.92		Grey-brown fine to medium SAND, medium dense, wet
30														
	SS-9	33.0	35.0	6	8	5	5	10.0						
35														
	SS-10	38.0	40.0	8	9	11	12	11.0						trace coarse sand
40														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

HARD HAT SERVICES™
Engineering, Construction and Management Solutions

BORING LOG

PROJECT No. 154.002.008.001
BORING No. **BH-10**
LOGGED BY LES
PAGE No. 2 of 2

PROJECT NAME Alliant Energy - December 2008 Baghouse Geotechnical Investigation
BORING LOCATION Burlington, Iowa — SURFACE ELEVATION 531.92
DRILLER RDnP Drilling - Kris Norwick — DATE: START 12/12/2008 FINISH 12/15/2008

DEPTH	SAMPLE No.	INTERVAL (ft) FROM	TO	BLOW COUNT 0" to 6"	6" to 12"	12" to 18"	18" to 24"	REC (in)	WC (%)	qu (TSF)	CONTACT DEPTH	ELEV. (MSL)	USCS SOIL TYPE	SOIL DESCRIPTION
														Grey-brown fine to medium SAND, trace coarse sand, medium dense, wet (cont.)
	SS-11	43.0	45.0	3	6	9	15	15.0						
45														dense
	SS-12	48.0	50.0	8	15	21	30	15.0						
50													SP	
	SS-13	53.0	55.0	50/0				0.0						(spoon bouncing, possibly on a cobble or boulder)
55														
	SS-14	58.0	60.0	14	17	17	15	16.0						trace fine gravel
60														
	SS-15	63.0	65.0	50/1				0.0			64'	467.92		
65													CL	Grey CLAY, little fine sand, hard, moist to wet
	SS-16	68.0	70.0	32	50/3			10.0		4.5+				(spoon bouncing)
70											70'	461.92		EOB 70'
75														
80														

Drilled with Dietrich-120
Method: auger and mud rotary
Hole was backfilled with bentonite slurry

BORING LOG

CABENO

Environmental Field Services, LLC

CLIENT: Aether dbs

PROJECT: Burlington, IA

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

BORING NO.: *SB1*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *12-16-10*
DATE FINISHED: *12-16-10*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	4.5'/5'		4.5 4.0 2.75 2.5		0 -5		GRAVEL; white; well graded; fine to coarse grained; wet/frozen. (Fill) CLAY; brown to olive; stiff to hard; low to high plasticity; moist; trace organics. (CL)
	SP2	5'/5'		1.75 2.0 2.0 1.5		-10		
	SP3	5'/5'		2.0 1.5 1.5 1.75		-15		CLAY; olive to black; soft to firm; high plasticity; moist; some organics. (CL)
	SP4	5'/5'		1.75 1.5 1.0 1.5		-20		@ 20' grades wet.
	SP5	5'/5'		1.5 1.5 1.0 0.5 0		-25 -30		SAND; black to gray; well graded; fine to coarse grained; wet; trace silt. (SW) Bottom of boring @ 22.5'. Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. 1-inch PVC temp well set to 20'bgs. 1-hr W.L. = 10.1'bgs. 24-hr W.L. = 9.54'bgs. Temp well removed and boring backfilled to groundsurface w/ bentonite chips on 12-17-10.

CABENO

Environmental Field Services, LLC

BORING LOG

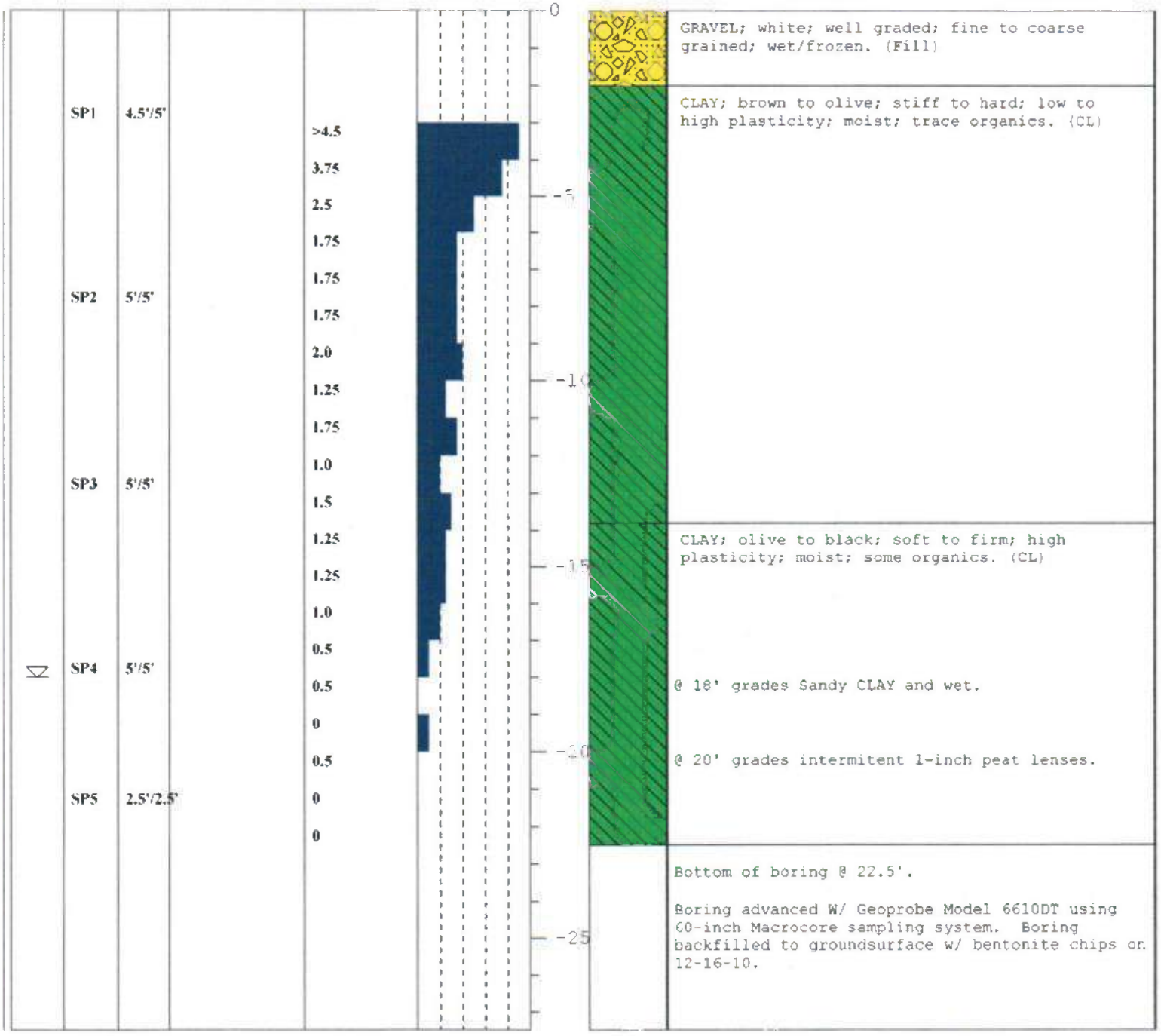
CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB2*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *12-16-10*
DATE FINISHED: *12-16-10*
GROUND SURFACE ELEVATION:



BORING LOG

CABENO
Environmental Field Services, LLC

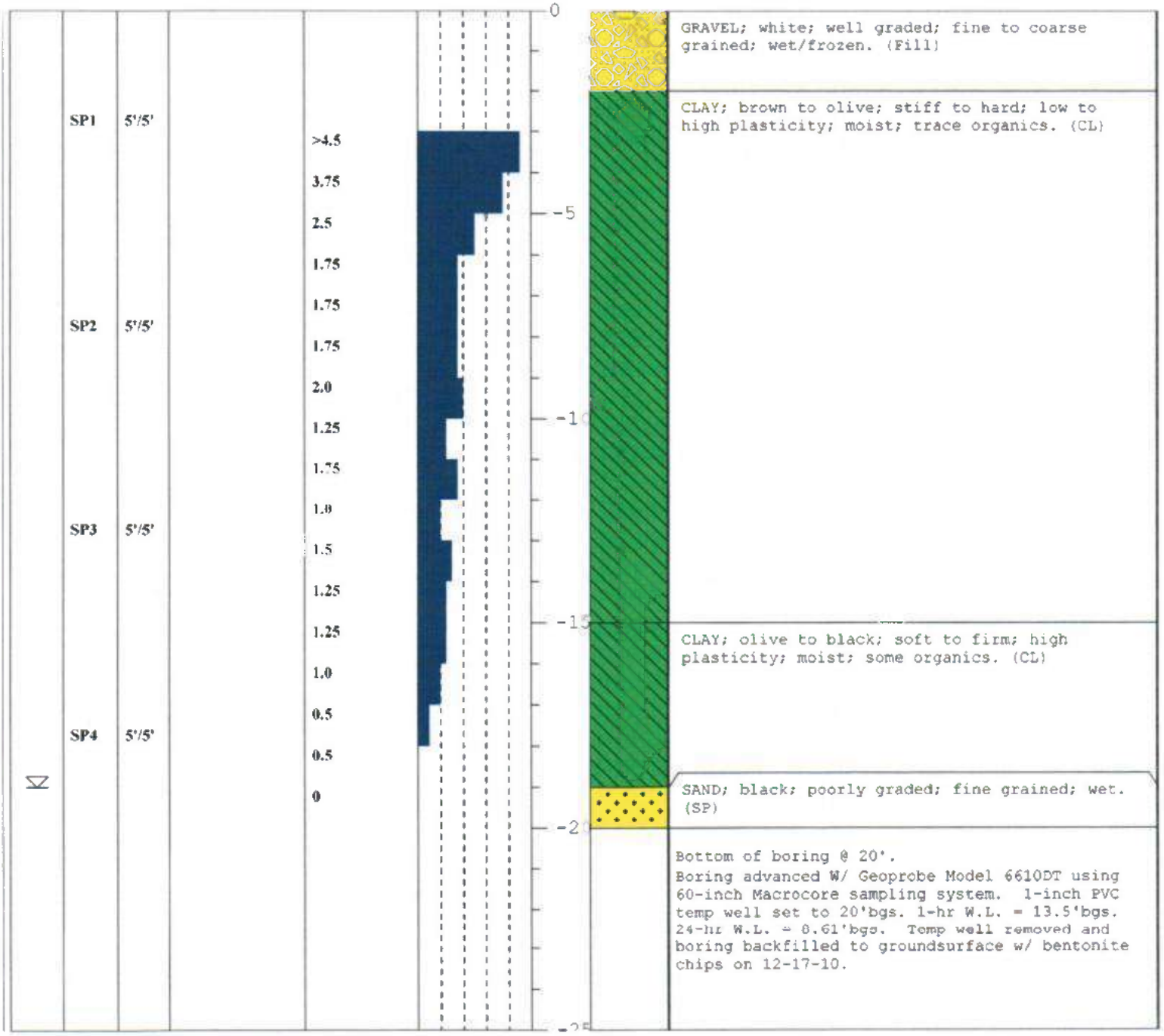
CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB3*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *12-16-10*
DATE FINISHED: *12-16-10*
GROUND SURFACE ELEVATION:



CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB4*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *12-17-10*
DATE FINISHED: *12-17-10*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	5'/5'				0		ASH; yellow to gray; soft; moist to wet. (Fill)
						-5		(ash is wet but holds form in core, when handled or tapped will liquify)
	SP2	5'/5'				-10		
	SP3	5'/5'				-15		Bottom of boring @ 15'. Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. 1-inch PVC temp well set to 15'bgs. 1-hr W.L. = dry. 24-hr W.L. = dry. Temp well removed and boring backfilled to groundsurface w/ bentonite chips on 12-17-10.
						-20		

BORING LOG

CABENO
Environmental Field Services, LLC

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB5*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	2.5'/5'				0		ASH; yellow to gray; soft; moist to wet. (Fill)
						-5		(ash is wet but holds form in core, when handled or tapped will liquify)
	SP2	4'/5'				-10		
	SP3	3'/5'				-15		Bottom of boring @ 15'. Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. 1-inch PVC temp well set to 15'bgs. 1-hr W.L. = dry. 24-hr W.L. = 15.0'bgs. Temp well removed and boring backfilled to groundsurface w/ bentonite chips on 12-17-10.
						-20		

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *12-17-10*
DATE FINISHED: *12-17-10*
GROUND SURFACE ELEVATION:

BORING LOG

CABENO

Environmental Field Services, LLC

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB6*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *12-17-10*
DATE FINISHED: *12-17-10*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
	SP1	5'/5'		4.0 2.0 3.0 2.75 2.75 2.75		0 -5		CLAY; yellowish brown; very stiff to hard; low to high plasticity; moist (top 2' frozen); trace sand & gravel. (Fill) @ 5' bgs grades olive.
	SP2	5'/5'		2.75 2.75 2.5 3.0 4.5		-10		@ 10' bgs grades brown and it appears to grade from Fill to Native soils.
	SP3	5'/5'		3.5 3.0 2.5 2.5 2.0		-15		
⊠	SP4	5'/5'		1.0 0.5 0		-20		Sandy CLAY; black; soft; low plasticity; wet; some organics. (SC) Bottom of boring @ 20' Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. 1-inch PVC temp well set to 20'bgs. 1-hr W.L. = 15.1'bgs. 24-hr W.L. = 15.1'bgs. Temp well removed and boring backfilled to groundsurface w/ bentonite chips on 12-17-10.
						-25		

CABENO

Environmental Field Services, LLC

BORING LOG

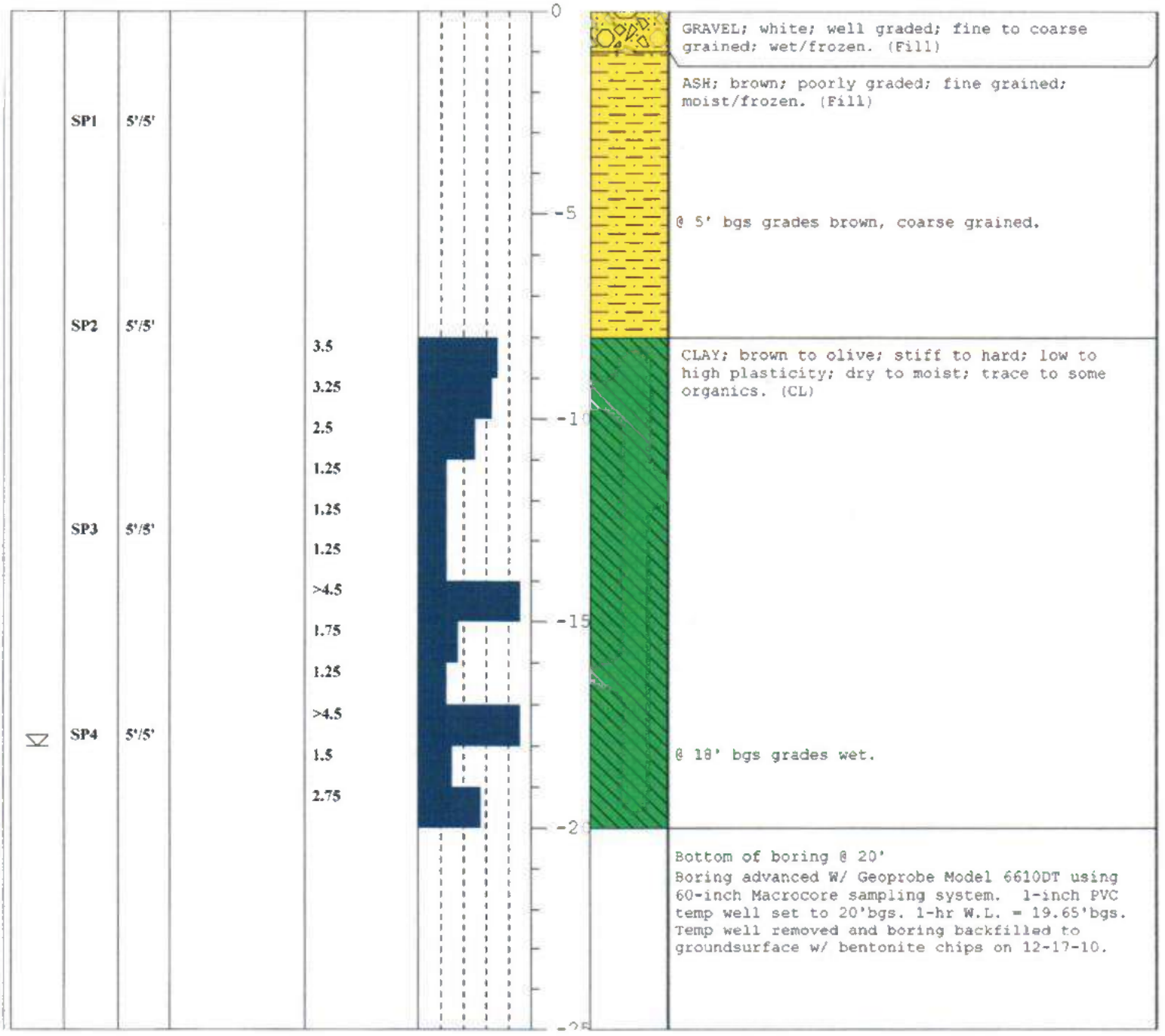
CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB7*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *12-17-10*
DATE FINISHED: *12-17-10*
GROUND SURFACE ELEVATION:



CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB8*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *12-17-10*
DATE FINISHED: *12-17-10*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
						0		GRAVEL; white to gray; well graded; fine to coarse grained; wet/frozen. (Fill)
	SP1	5'/5'		3.0				ASH; olive to brown; poorly graded; fine grained; moist. (Fill)
				2.0		-5		CLAY; brown to olive; stiff to very stiff; low to high plasticity; dry to moist; trace to some organics. (CL)
	SP2	5'/5'		2.75				
				2.75				
				2.5				
				1.0		-10		
				2.25				
				2.75				
	SP3	5'/5'		3.0				
				2.0				
				2.5		-15		
				1.5				
				1.75				
▽	SP4	5'/5'		1.0				@ 18' bgs grades wet.
				1.0		-20		Bottom of boring @ 20'
						-25		Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 12-17-10.

BORING LOG

CABENO

Environmental Field Services, LLC

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB9*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *12-17-10*
DATE FINISHED: *12-17-10*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	4.5'/5'		2.75 2.75 3.25 3.75		0 -5		ASH; brown; poorly graded; fine grained; moist/frozen. (Fill) CLAY; brown to olive; stiff to very stiff; low to high plasticity; dry to moist; trace to some organics. (~~Fill~~) CL
	SP2	5'/5'		1.5 2.0 2.5 1.75		-10		
	SP3	5'/5'		2.25 1.75 1.25 2.0 2.25		-15		SAND; gray; poorly graded; medium grained; wet; trace to some silt. (SP)
	SP4	5'/5'				-20		Bottom of boring @ 20' Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. 1-inch PVC temp well set to 16'bga. 1-hr W.L. = 14.45'bgs. Temp well removed and boring backfilled to groundsurface w/ bentonite chips on 12-17-10.
						-25		

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB10*

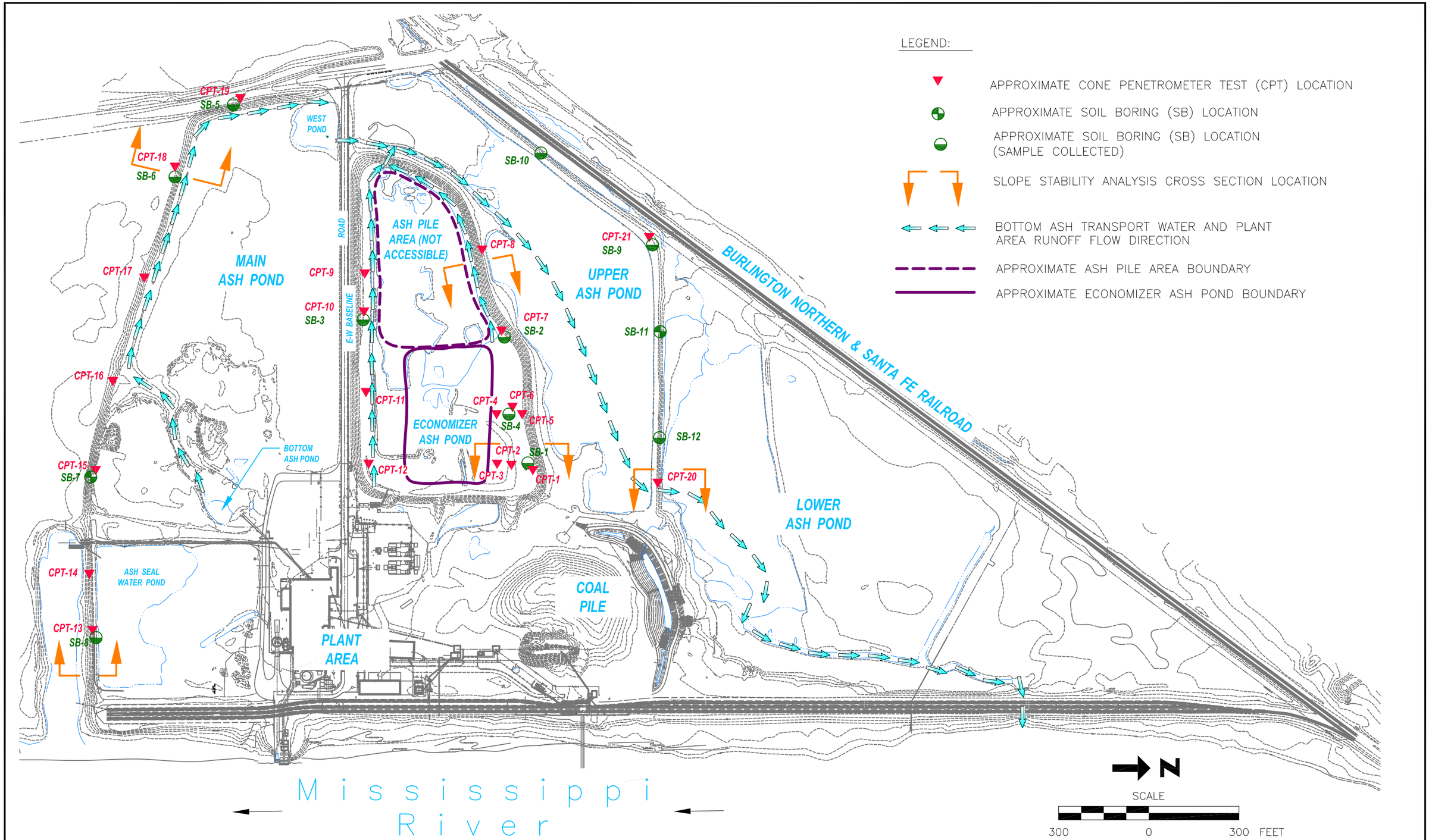
LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *12-17-10*
DATE FINISHED: *12-17-10*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TSF)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	5'/5'		3.0 3.0 3.0 2.75 2.5 2.0		0 -5		CLAY; brown to olive; stiff to very stiff; low to high plasticity; dry to moist; trace to some organics. ~~(Fill)~~ CL
	SP2	5'/5'		2.0 1.5 1.25 1.5 1.5		-10		
	SP3	5'/5'		1.75 1.75		-15		SAND; gray; well graded; fine to medium grained; wet; trace to some silt. (SW)
	SP4	5'/5'				-20		Bottom of boring @ 20' Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 12-17-10.

APPENDIX E – Geoprobe Soil Borings and CPT Borings – 2011

Alliant Energy
Interstate Power and Light Company
Burlington Generating Station
Burlington, Iowa

History of Construction



REV	DATE	BY	DESCRIPTION
5			
4			
3			
2			
1			

aetherdbs
www.aetherdbs.com

SCALE:	AS SHOWN
DATE:	5-31-11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	TJH

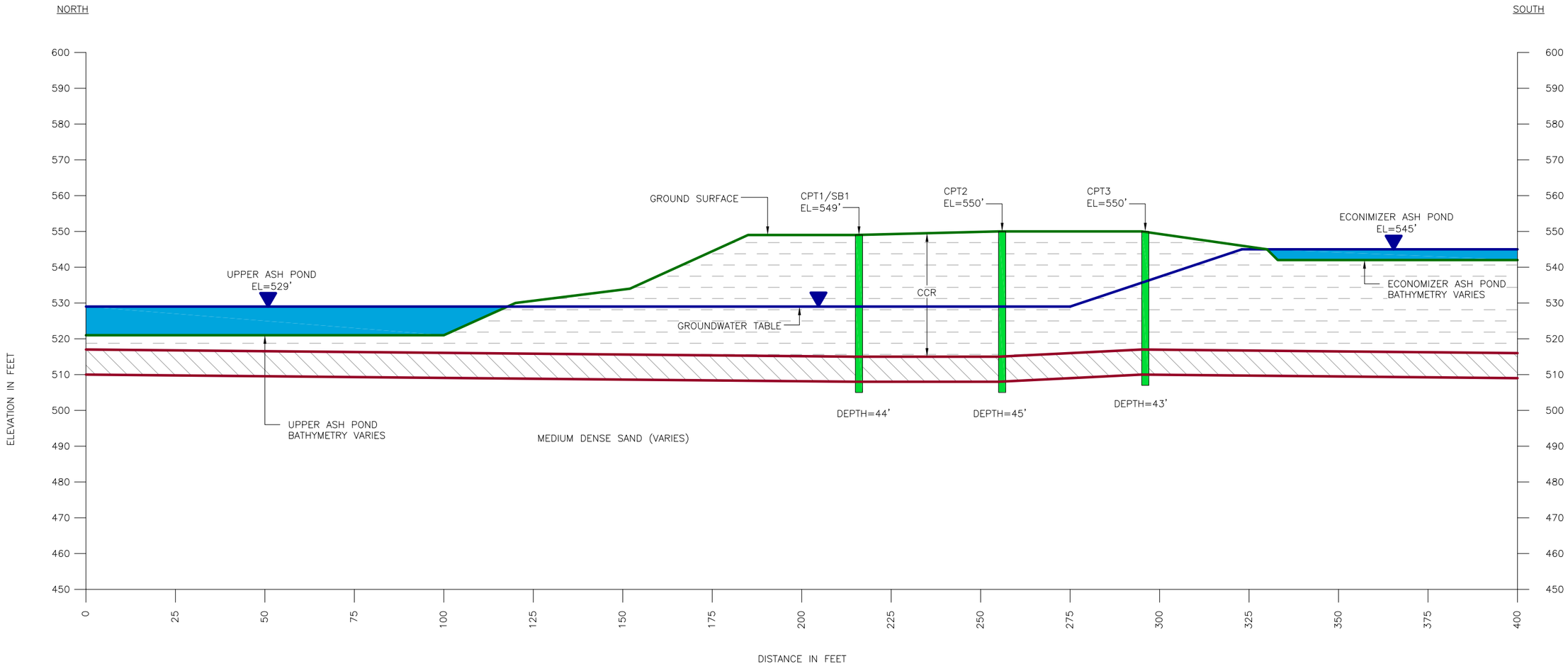
CLIENT / LOCATION

ALLIANT ENERGY
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION

CPT AND SB LOCATIONS

JOB 154.002.009.002
SHT. 1
DWG. FIGURE 1



LEGEND:

- TOP OF WATER
- TOP OF GROUND SURFACE
- COAL COMBUSTION RESIDUALS (CCR)
- NATIVE CLAY

CROSS–SECTION

0 15 30

SCALE IN FEET

REV	DATE	BY	DESCRIPTION
5			
4			
3			
2			
1			

aetherdbs
www.aetherdbs.com

SCALE:	AS SHOWN
DATE:	5–31–11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	TJH

CLIENT / LOCATION

ALLIANT ENERGY
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION

ECONOMIZER ASH POND CROSS–SECTION

JOB 154.002.009.002

SHT. 2

DWG. FIGURE 2

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB1 (CPT1)*

page 1 of 1

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-11-11*
DATE FINISHED: *05-11-11*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
	SP1	2.5'/5'				0		ASH; brown; poorly graded; fine grained; moist. (Fill) .
	SP2	5'/5'				-5		ECONOMIZER CCR
	SP3	5'/5'				-10		@ 14' grades dark gray to black.
⊠	SP4	5'/5'				-15		
	SP5	0'/5'				-20		Clayey SILT; black to gray; non-plastic to low plasticity; moist to wet; some organic matter. (OL) @ too soft for pocket penn from 19.5' to 31', no hammer required to push sampler.
	SP6	5'/5'				-25		SB-1A
	SP7	1.5'/5'	2.75 2.75 3.25 3.75 1.5			-30		FLYASH CCR SB-1B
	SP8	5'/5'				-35		CLAY; gray to black; high plasticity; soft to firm; moist; trace organic. (OH) SB-1C SB-1D SB-1E
						-40		Sandy SILT; gray; non-plastic; wet. (ML) SAND; gray; well graded; fine to coarse grained; rounded to sub-rounded; wet. (SW) Bottom of boring @ 40' Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 05-11-11.
						-45		

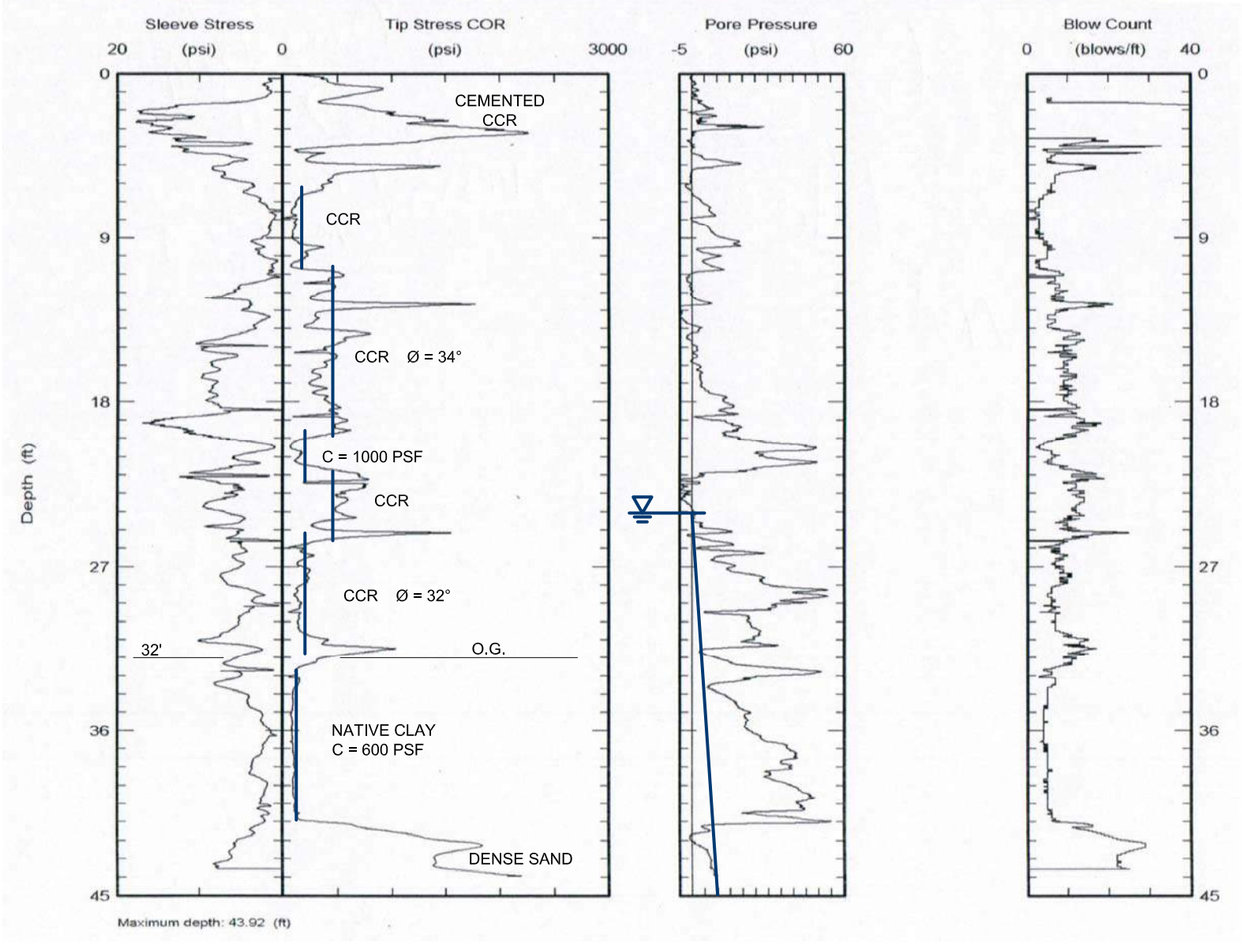
SAMPLE LOACTIONS

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Northing:
Easting:
Elevation:

Date: 09/May/2011
Test ID: cpt1
Project: Alliant

Client: Aetherdbs
Job Site: Burlington



NOTICE	REV	DATE	BY	DESCRIPTION
THIS DRAWING IS THE PROPERTY OF AETHER DBS AND IS NOT TO BE REPRODUCED, CHANGED, OR COPIED IN ANY FORM OR MANNER WITHOUT PRIOR WRITTEN PERMISSION. ALL RIGHTS RESERVED.	6			
	4			
	3			
	2			
	1			

aether dbs
www.aetherdbs.com

SCALE:	AS SHOWN
DATE:	5-31-11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	TJH

CLIENT / LOCATION

ALLIANT ENERGY
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION

CPT AND SB CORRELATION

JOB 154.002.009.002
SHT. 3
DWG. FIGURE 3

Boring Log Legend

Sample
No: (Number) Soil samples are numbered consecutively from the ground surface. Core samples are numbered consecutively from the first core run.

Type: A= Auger Cuttings CR= Core Run MS= Modified Spoon PB= Pitcher Barrel
PT= Piston Tube ST= Shelby Tube SS= Split Spoon (2" O.D.) WC= Wash Cuttings

Interval: The depth of sampling interval in feet below ground surface

Blow Count
The number of blows required to drive a 2-inch O.D. split-spoon sampler with a 140 pound hammer falling 30-inches. When appropriate, the sampler is driven 18 inches and blow counts are reported for each 6-inch interval. The sum of blow counts for the last two 6-inch intervals is designated as the standard penetration resistance (N) expressed as blows per foot.

Recovery in Inches
The length of sample recovered by the sampling device.

U.S.C.S. Soil Type
The Unified Soil Classification System symbol for recovered soil samples determined by visual examination or laboratory tests. Refer to ASTM D2487-69 for a detailed description of procedure and symbols. Underlined symbols denote classifications based on laboratory tests (i.e. ML), all others are based on visual classification only.

Percent Moisture
Natural moisture content of sample expressed as percent of dry weight.

q_u TSF
Unconfined compressive strength in tons per square foot obtained by hand penetrometer. Laboratory compression test values are indicated by underlining.

Contact Depth
The contact depth between soil layers is interpreted from significant changes in recovered samples and observations during drilling. Actual changes between soil layers often occur gradually and the contact depths shown on the boring logs should be considered as approximate.

Soil Description and Remarks
Soil descriptions include consistency or density, color, predominant soil types and modifying constituents.

Cohesive Soils			Cohesionless Soils	
Consistency	q_u (TSF)	Blows/ft.	Density	Blows/ft.
Very Soft	less than 0.25	0-1	Very Loose	4 or less
Soft	0.25 to 0.50	2-4	Loose	5 to 10
Medium Stiff	0.50 to 1.00	5-8	Medium Dense	11 to 30
Stiff	1.00 to 2.00	9-15	Dense	30 to 50
Very Stiff	2.00 to 4.00	15-30	Very Dense	Over 50
Hard	more than 4.00	Over 30		

Particle Size Description

Boulder =	Larger than 12 inches
Cobble =	3 to 12 inches
Gravel =	0.187 to 3 inches
Sand =	0.074 to 4.76 mm
Silt and Clay =	smaller than 0.074 mm

Definition of Terms

Trace =	5 to 12 percent by weight
Some =	12 to 30 percent by weight
And =	Approximately equal fractions
( ) =	Driller's observation

Piezo.
(Piezometer) Screened interval of the piezometer installation is denoted by cross-hatching.

General Note
The boring log and related information depicted subsurface conditions only at the specified locations and date indicated. Soil conditions and water levels at other locations may differ from conditions occurring at these boring locations. Also the passage of time may result in a change in the conditions at these boring locations.

Soil Test Boring Refusal
Defined as any material causing a blow count greater that 50 blows/6 inches. Such material may include bedrock, "floating" rock slabs, boulders, dense gravel seams, hard pan clay, or cemented soils. Refusal is usually indicated in fractional notation showing number of blows as the numerator and inches of penetration as the denominator.

BORING LOG

CABENO
Environmental Field Services, LLC

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB1 (CPT1)*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-11-11*
DATE FINISHED: *05-11-11*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
∇	SP1	2.5'/5'				0		ASH; brown; poorly graded; fine grained; moist. (Fill)
	SP2	5'/5'				-5		
	SP3	5'/5'				-10		
	SP4	5'/5'				-15		@ 14' grades dark gray to black.
	SP5	0'/5'				-20		Clayey SILT; black to gray; non-plastic to low plasticity; moist to wet; some organic matter. (OL) @ too soft for pocket penn from 19.5' to 31', no hammer required to push sampler.
	SP6	5'/5'				-25		
	SP7	1.5'/5'		2.75 2.75 3.25 3.75 1.5		-30		CLAY; gray to black; high plasticity; soft to firm; moist; trace organic. (OH)
	SP8	5'/5'				-35		Sandy SILT; gray; non-plastic; wet. (ML)
						-40		SAND; gray; well graded; fine to coarse grained; rounded to sub-rounded; wet. (SW)
						-45		Bottom of boring @ 40' Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 05-11-11.

BORING LOG

CABENO

Environmental Field Services, LLC

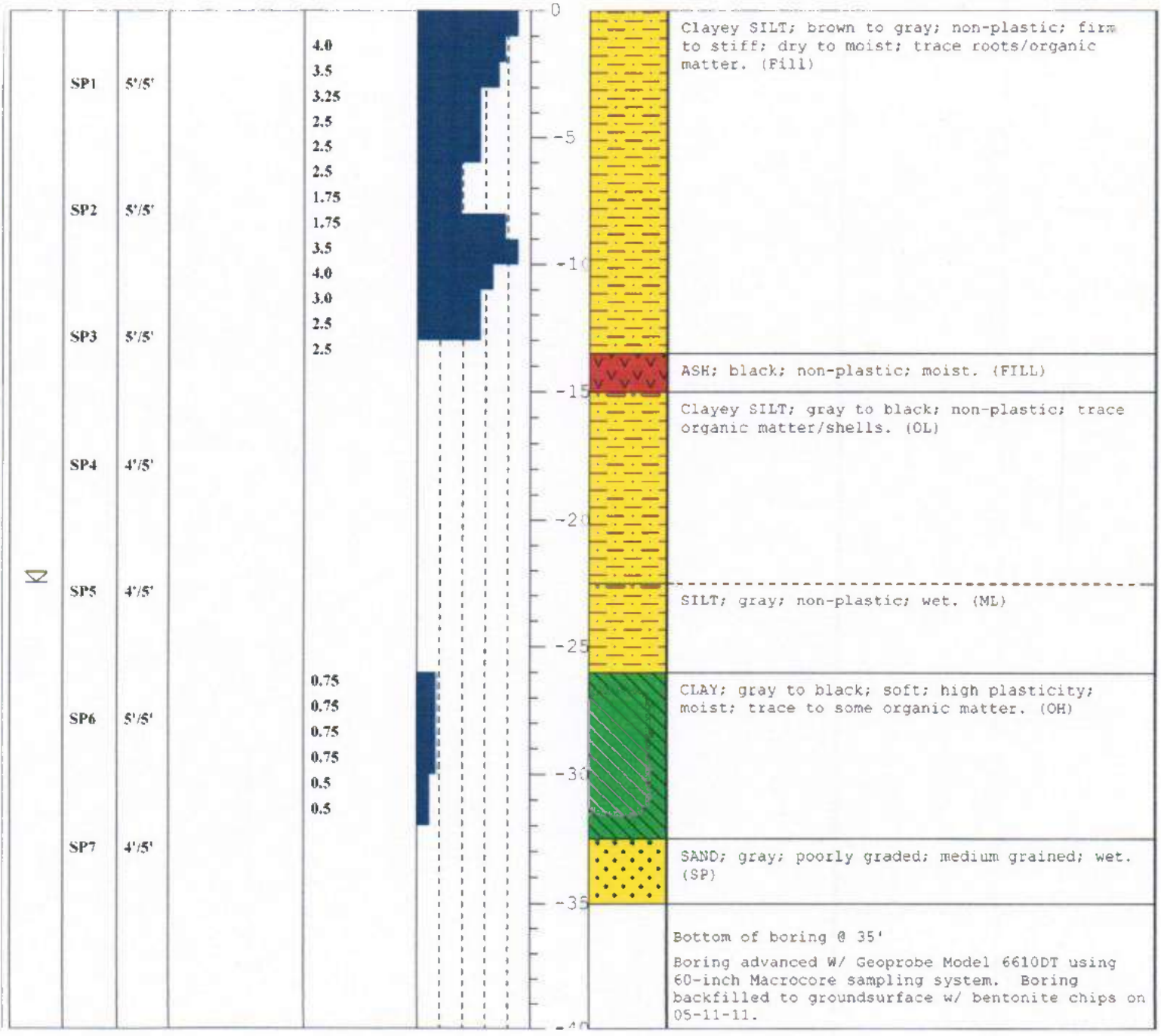
CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* / *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB2 (CPT7)*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-11-11*
DATE FINISHED: *05-11-11*
GROUND SURFACE ELEVATION:



BORING LOG

CABENO

Environmental Field Services, LLC

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB3 (CPT10)*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-11-11*
DATE FINISHED: *05-11-11*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	3.5'/5'		2.25 2.25 2.25 2.25 2.25 2.0		0		ASH; brown; non-plastic; moist. (FILL)
	SP2	5'/5'		0.75 1.25 1.0 2.75 1.5		-5		Clayey SILT; brown to gray; non-plastic; firm to stiff; dry to moist; trace roots/organic matter. (Fill)
	SP3	5'/5'		2.0 2.0		-10		ASH; gray; non-plastic; moist. (FILL)
	SP4	5'/5'				-15		Silty SAND; dark gray to light gray; poorly graded; fine grained; wet. (SP)
	SP5	5'/5'				-20		
	SP6	5'/5'		2.0 2.5 0.5 0.5		-25		SILT; gray; non-plastic; wet. (ML)
	SP7	5'/5'		0.75 1.0 1.0 1.25		-30		Silty CLAY; gray to black; soft; low plasticity; moist; trace to some organic matter. (OH)
	SP8	5'/5'		1.0 1.0 1.0		-35		SAND; gray; poorly graded; fine grained; wet. (SP)
						-40		Bottom of boring @ 40' Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 05-11-11.

BORING LOG

CABENO

Environmental Field Services, LLC

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB4 (CPT6)*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-11-11*
DATE FINISHED: *05-11-11*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
	SP1	4.5'/5'		2.25 3.25 3.0		0		Clayey SILT; brown to gray; non-plastic; firm to stiff; dry to moist; trace roots/organic matter. (Fill)
	SP2	5'/5'				-5		ASH; gray; non-plastic; moist. (FILL)
	SP3	5'/5'				-10		
	SP4	5'/5'				-15		
▽	SP5	3.5'/5'				-20		
	SP6	4'/5'				-25		SILT; gray; non-plastic; wet. (ML)
	SP7	5'/5'		1.25 1.25 1.25 1.25		-30		CLAY; gray to black; low to high plasticity; wet; some organic matter. (OL/OH)
						-35		SAND; gray; poorly graded; fine grained; wet. (SP)
						-40		Bottom of boring @ 35' Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 05-11-11.

BORING LOG

CABENO
Environmental Field Services, LLC

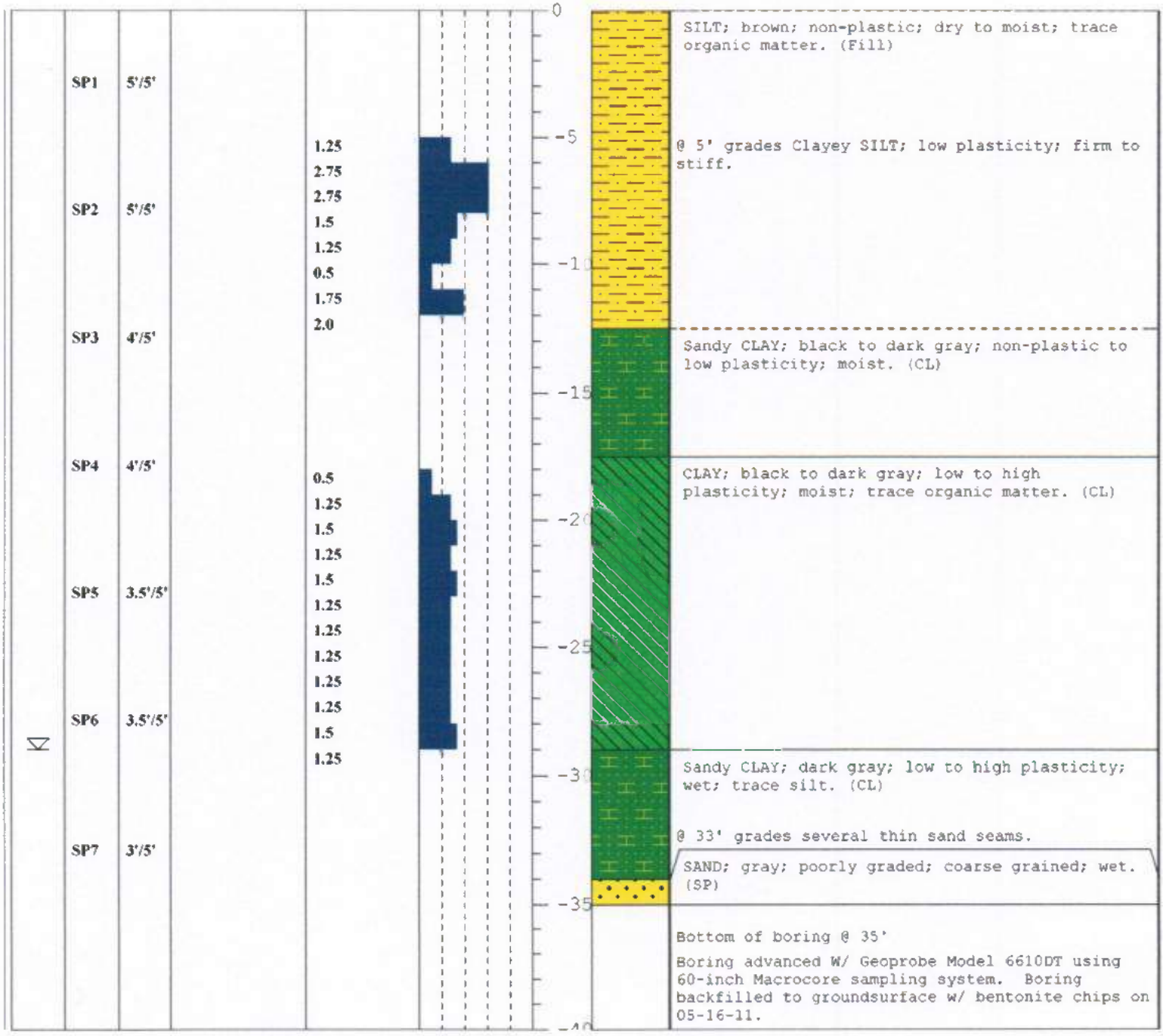
CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB5 (cpt19)*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-16-11*
DATE FINISHED: *05-16-11*
GROUND SURFACE ELEVATION:



CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB6 (cpt18)*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-16-11*
DATE FINISHED: *05-16-11*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	5'/5'		2.5		0		SILT; brown; non-plastic; dry to moist; trace organic matter (FILL)
				2.0		-5		@ 5' grades Clayey SILT; low plasticity; very stiff.
	SP2	5'/5'		3.5				
				3.5				
				4.0		-10		CLAY; gray to olive; low to high plasticity; stiff to very stiff; moist; trace organic matter (Fill)
				2.25				
				2.25				
	SP3	5'/5'		2.5				
				2.5				
				2.5		-15		Clayey SAND; gray; poorly graded; medium grained; wet. (SP)
				2.5				
				1.5				
	SP4	4.5'/5'		0.5				CLAY; gray to olive; high plasticity; very soft to firm; moist to wet. (CL)
				1.5		-20		@ 19' is a thin 1" sand seam, wet.
				2.25				
				1.25				
				1.25				
	SP5	2.5'/5'		1.0				
				0.5				
				1.5		-25		
				1.0				
				0				
	SP6	3.8'/5'		0				
				0				
	SP7	2.5'/2.5'				-30		SAND; gray; well graded; fine to coarse grained; wet. (SW)
						-35		Bottom of boring @ 32.5'
								Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 05-16-11.

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB7 (cpt15)*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-16-11*
DATE FINISHED: *05-16-11*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	3.8'/5'		2.5		0		ASH; gray; fine grained; moist. (Fill)
				3.75		-5		CLAY; black; low plasticity; stiff to very stiff; moist; trace organic matter (Fill)
	SP2	5'/5'		>4.5				
				1.75				
				1.5		-10		
				1.25				
	SP3	5'/5'		1.75				
				4.0				
				4.25		-15		
				4.5				
				4.5				
	SP4	5'/5'		>4.5				@ 18' grades (OH)
				3.0				@ 19' is a 6-inch SAND seam; fine grained; wet.
				2.0		-20		@ 20' grades high plasticity.
				3.0				SAND; gray; poorly graded; fine grained; wet. (SW)
	SP5	3'/5'		3.5		-25		Bottom of boring @ 25'
						-30		Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 05-16-11.

BORING LOG

CABENO
Environmental Field Services, LLC

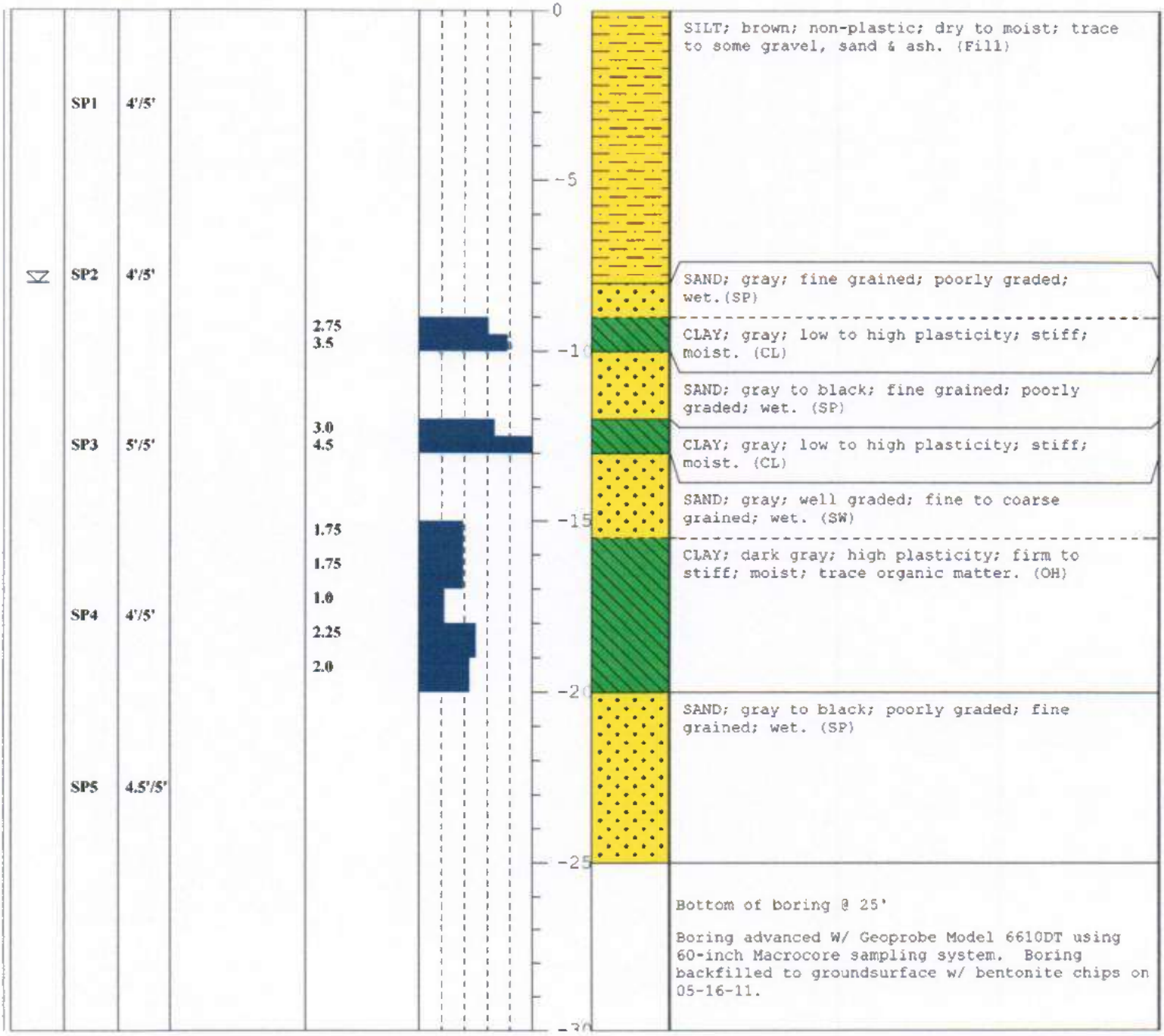
CLIENT: Aether dbs

PROJECT: Burlington, IA

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

BORING NO.: *SB8 (cpt13)*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-16-11*
DATE FINISHED: *05-16-11*
GROUND SURFACE ELEVATION:



CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB9 (cpt21)*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-16-11*
DATE FINISHED: *05-16-11*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	2.5'/5'		1.5		0		SILT; brown; non-plastic; dry to moist; trace organic matter. (Fill)
				1.5		-5		CLAY:gray to olive; low to high plasticity; moist; trace organics. (OH)
	SP2	4'/5'		1.75				
				1.5		-10		
				1.5				
				1.75				
	SP3	4.5'/5'		1.25				
				1.0				
				1.25		-15		
				1.5				
				1.0				
	SP4	5'/5'		1.25				
				1.5		-20		
				1.0				
				0.75				
				0.75				
	SP5	3.5'/5'		0.5				
				0.5		-25		SAND; gray; fine grained; poorly graded; wet. (SP)
								Bottom of boring @ 25'
						-30		Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 05-16-11.

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB10*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-16-11*
DATE FINISHED: *05-16-11*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
▽	SP1	2.5'/5'		>4.5 3.5 3.25 1.25 1.75 2.0		0 -5		Silty CLAY; brown; low plasticity; firm to very stiff; moist; trace organics and gravels. (CL - OH)
	SP2	4'/5'		2.0 1.75 1.5 2.75		-10		
	SP3	4.5'/5'		2.5 2.0 2.5 1.75 0.5		-15		
	SP4	5'/5'		1.0 2.5 2.25 2.75 3.25		-20		
	SP5	3.5'/5'		2.5 2.5 2.25		-25		SAND; gray to brown; well graded; fine to coarse grained; wet. (SW) CLAY; gray; high plasticity; moist. (CL) LIMESTONE; gray; thinly bedded; highly weathered. (Bedrock) Bottom of boring @ 25' Boring advanced W/ Geoprobe Model 6610DT using
	SP6	2'/3'				-30		

BORING LOG

CABENO

Environmental Field Services, LLC

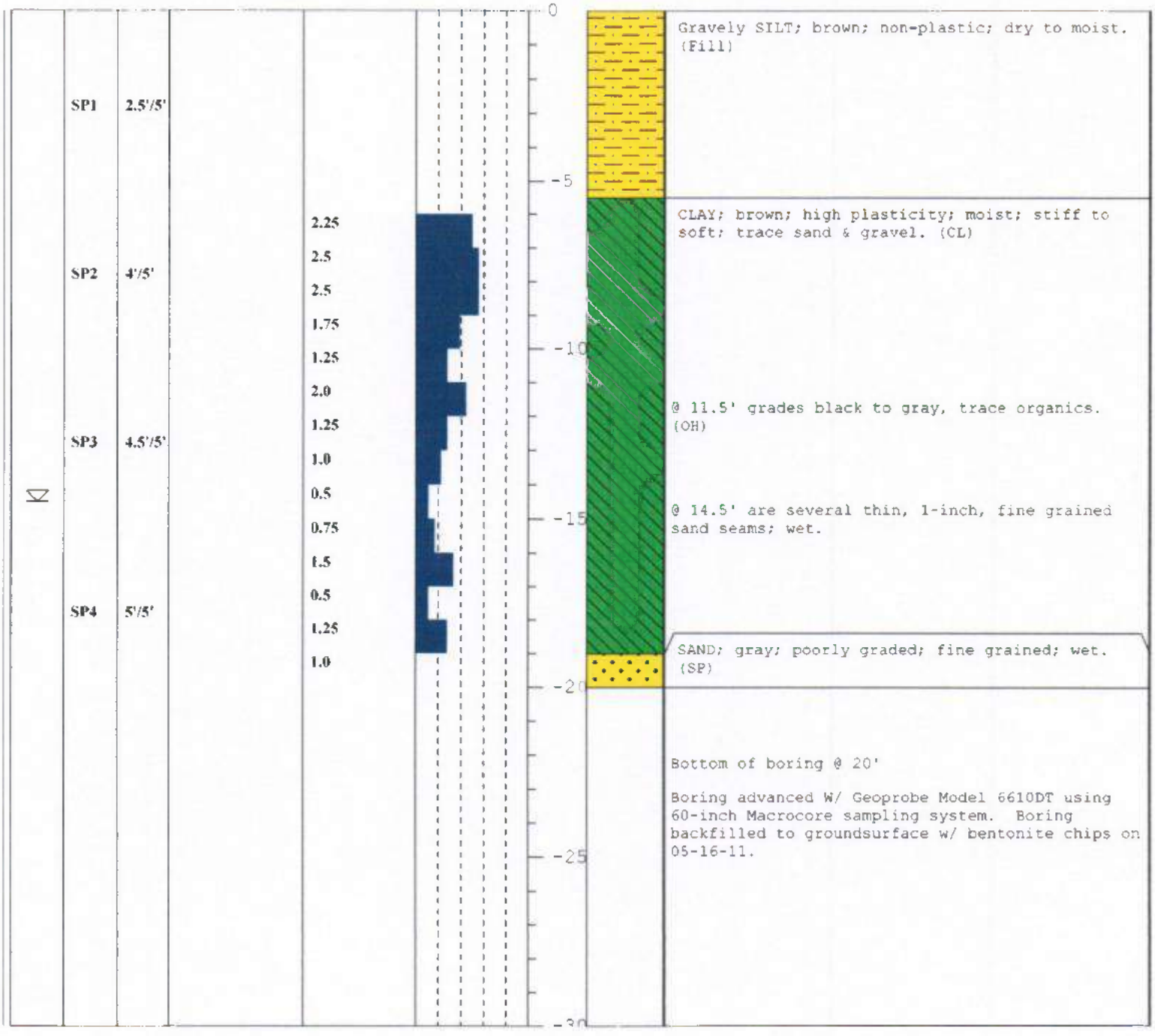
CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB11*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-16-11*
DATE FINISHED: *05-16-11*
GROUND SURFACE ELEVATION:



BORING LOG

CABENO
Environmental Field Services, LLC

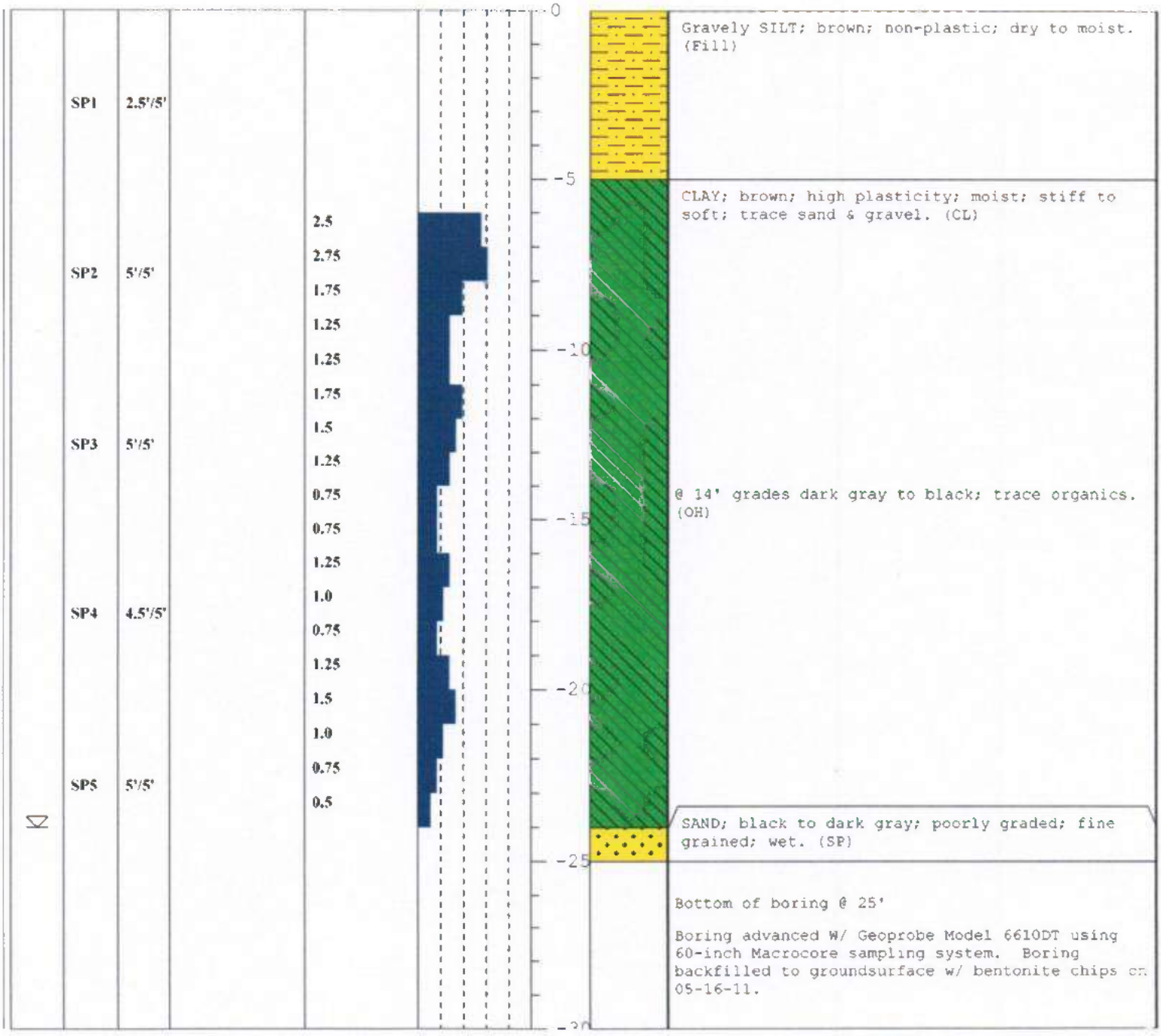
CLIENT: Aether dbs

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Burlington, IA

BORING NO.: *SB12*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *05-16-11*
DATE FINISHED: *05-16-11*
GROUND SURFACE ELEVATION:



CONE PENETROMETER TEST (CPT)

CPT I.D.	LOCATION	GROUND ELEVATION (FT)
CPT-1	Economizer Ash Pond	548.78
CPT-2	Economizer Ash Pond	550.34
CPT-3	Economizer Ash Pond	549.91
CPT-4	Economizer Ash Pond	549.65
CPT-5	Economizer Ash Pond	549.74
CPT-6	Economizer Ash Pond	550.57
CPT-7	Economizer Ash Pond	545.78
CPT-8	Economizer Ash Pond	546.26
CPT-9	Economizer Ash Pond	549.48
CPT-10	Economizer Ash Pond	549.42
CPT-11	Economizer Ash Pond	547.86
CPT-12	Economizer Ash Pond	548.25
CPT-13	Ash Seal Water Pond	534.22
CPT-14	Ash Seal Water Pond	533.67
CPT-15	Main Ash Pond	536.75
CPT-16	Main Ash Pond	534.84
CPT-17	Main Ash Pond	534.52
CPT-18	Main Ash Pond	533.89
CPT-19	Main Ash Pond	535.32
CPT-20	Upper Ash Pond	530.47
CPT-21	Upper Ash Pond	530.42

Applied Research Associates, Inc.
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802-763-8348
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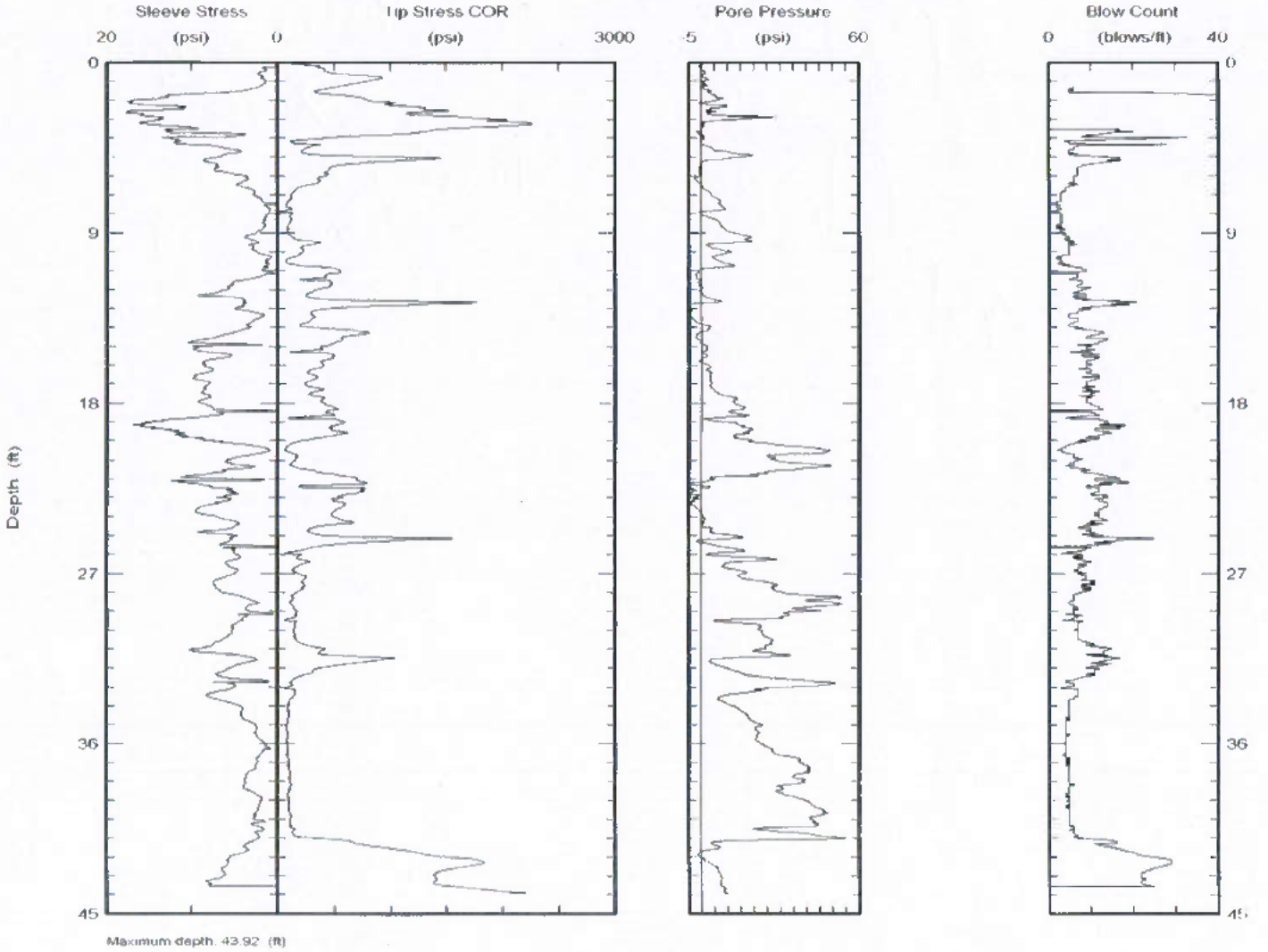
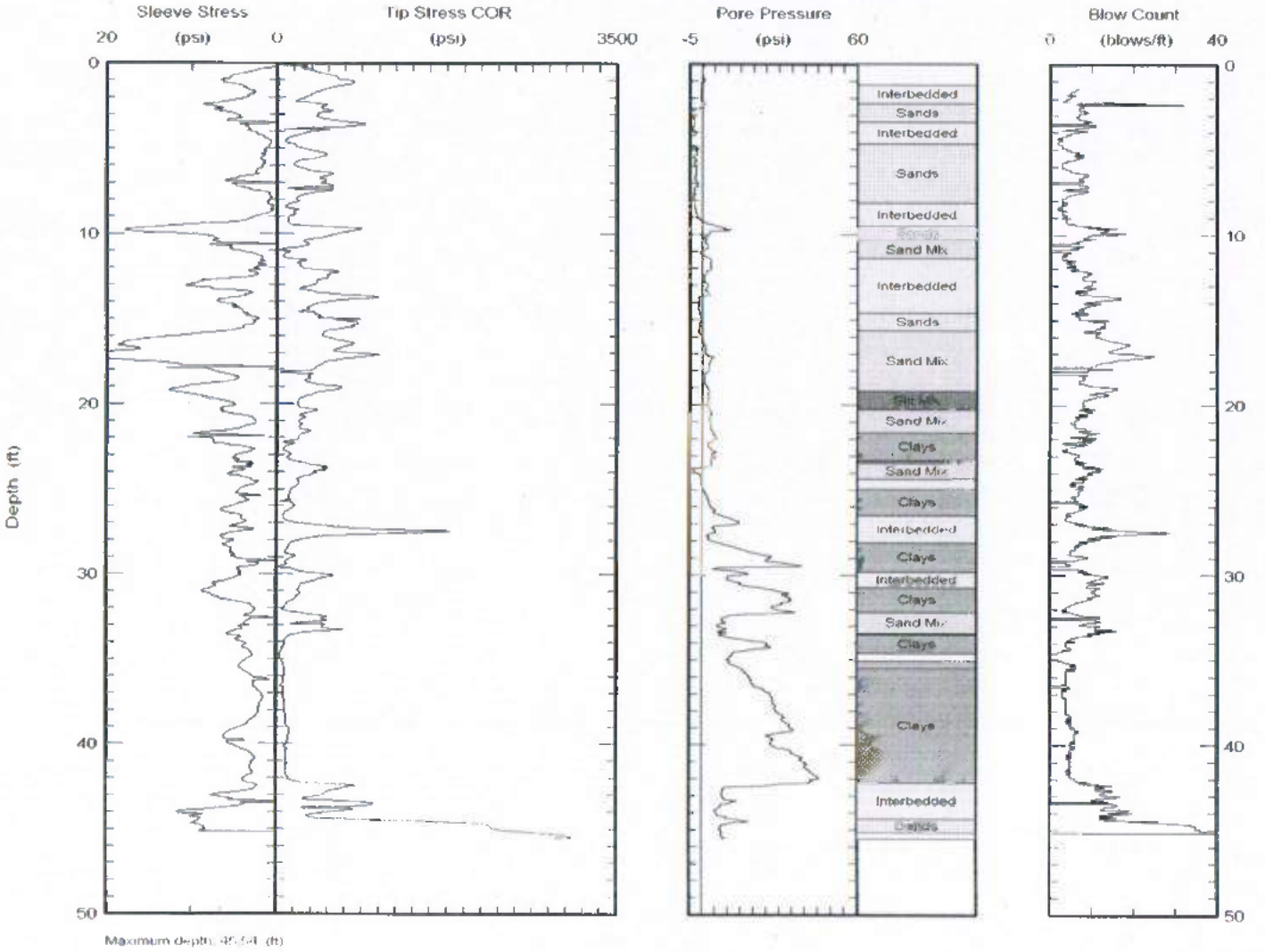
www ara.com

Northing:	Date: 09/May/2011
Easting:	Test ID: cpt1
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned ara.com
www.ara.com

Northing:	Date: 09/May/2011
Easting:	Test ID: cpt2
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



Applied Research Associates, Inc.
South Royalton, VT 05068
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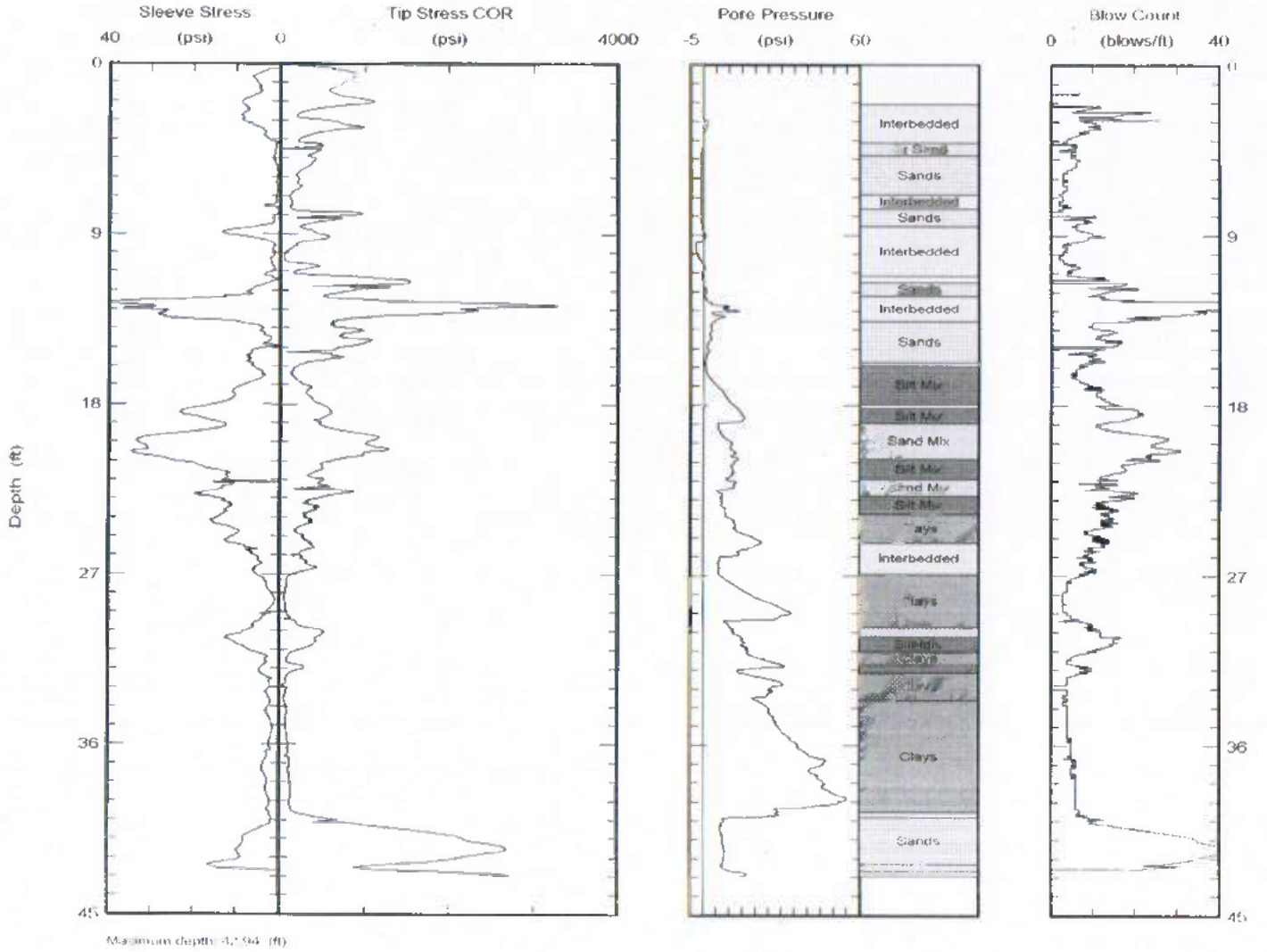
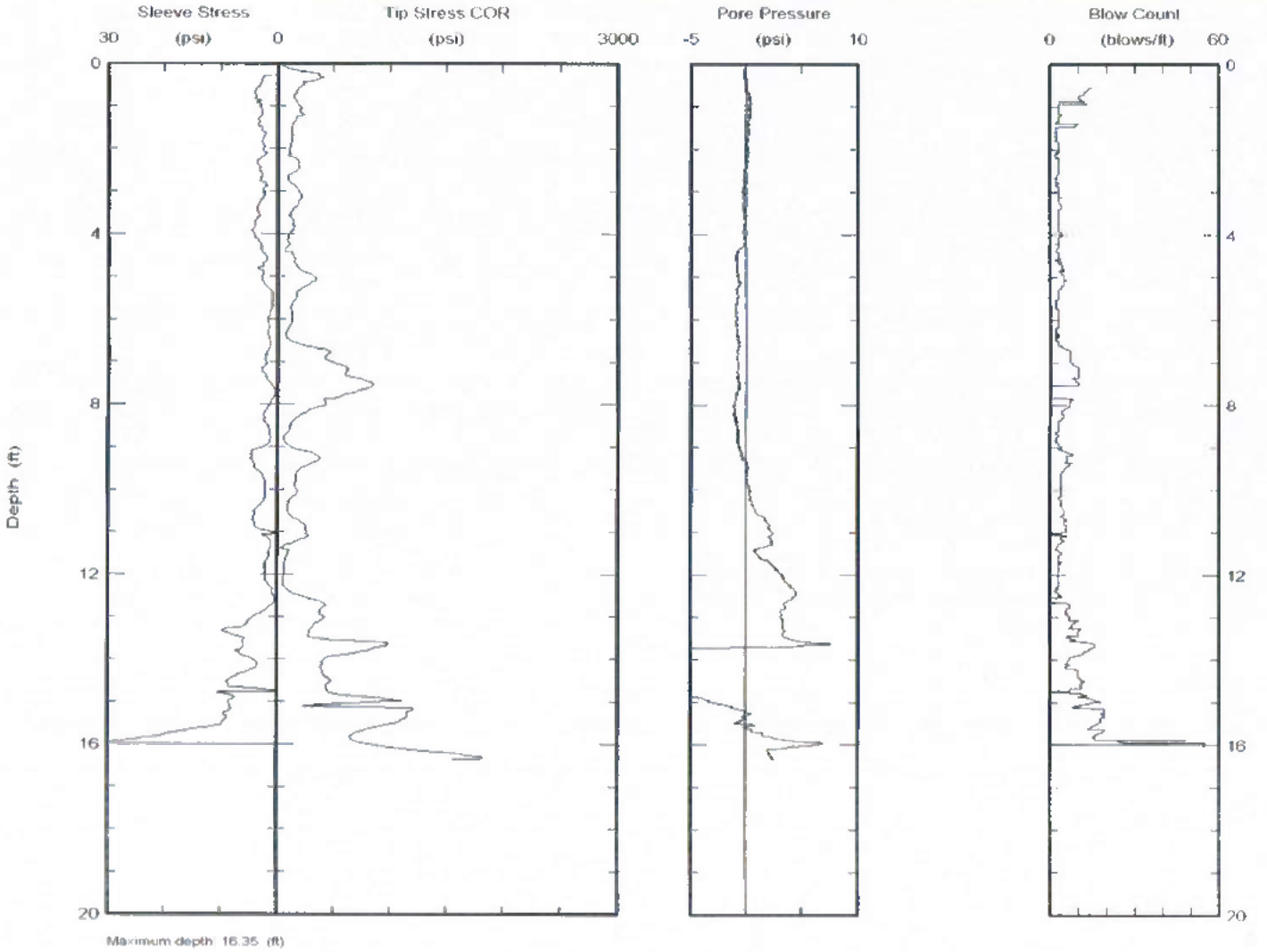
www.ara.com

Northing:	Date: 09/May/2011
Easting:	Test ID: cpt3
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



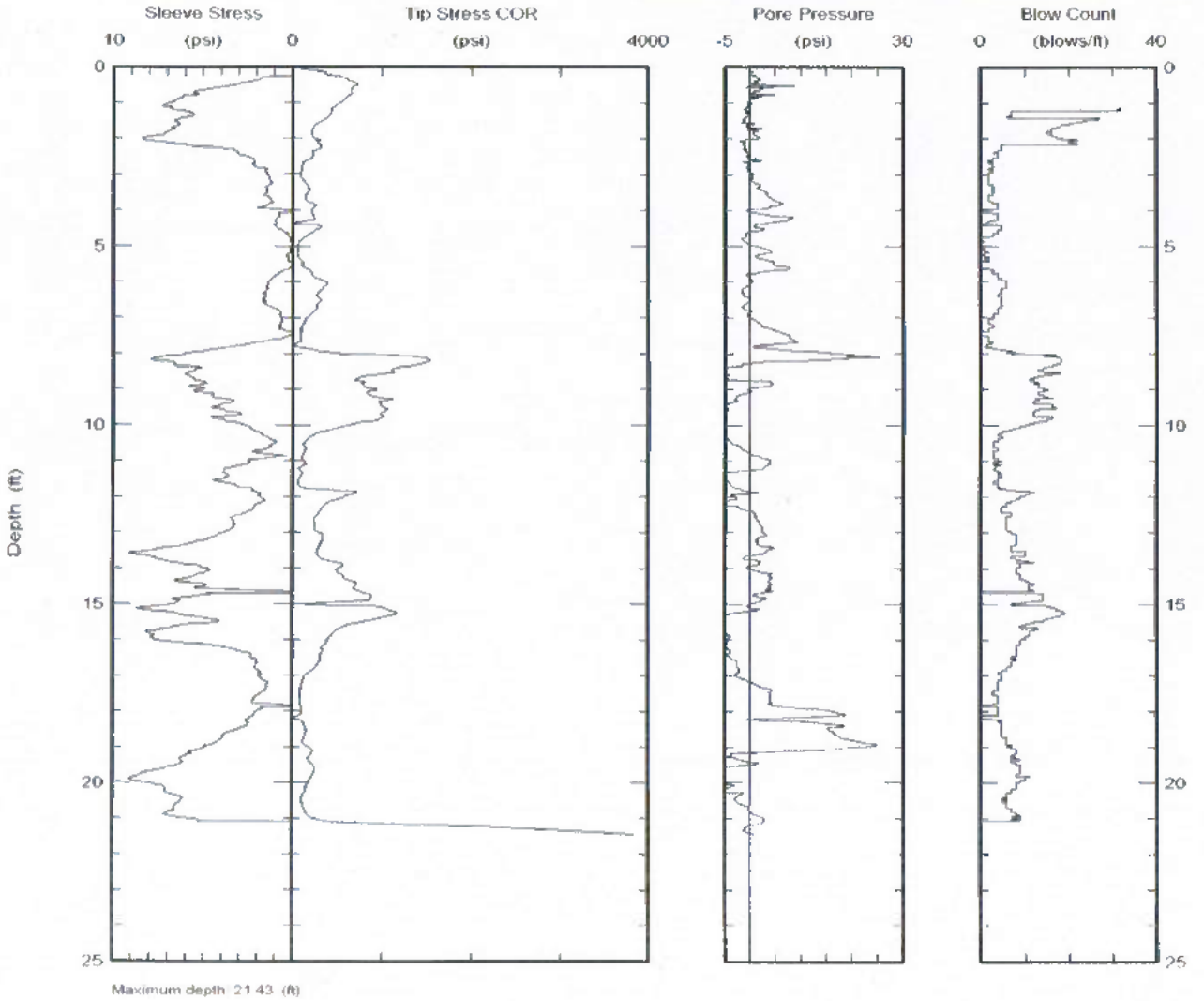
Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Northing:	Date: 09/May/2011
Easting:	Test ID: cpt4
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



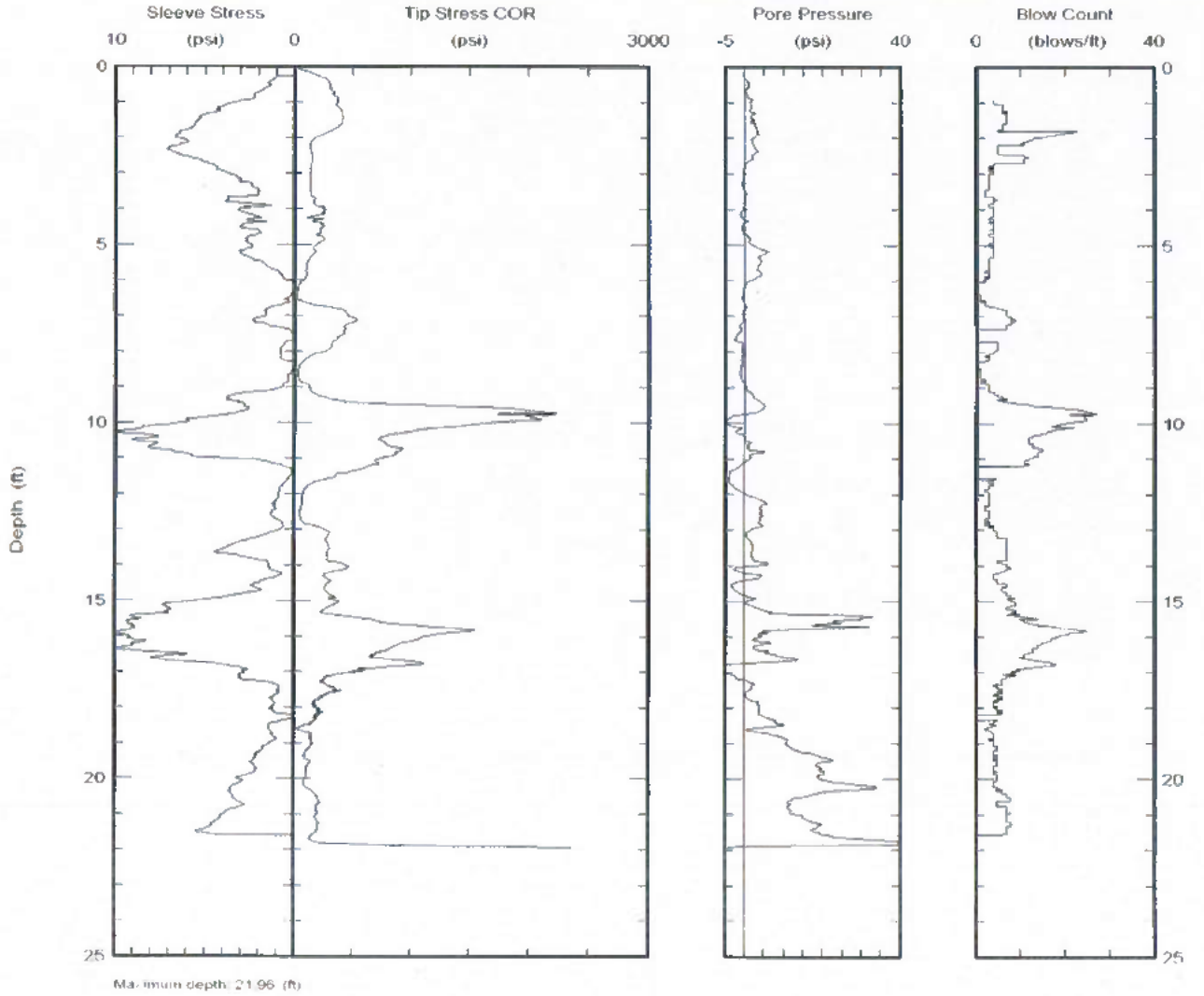
Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Northing:	Date: 10/May/2011
Easting:	Test ID: cpt5
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Northing:	Date: 10/May/2011
Easting:	Test ID: cpt6
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



Applied Research Associates, Inc.
South Royalton, VT 05068
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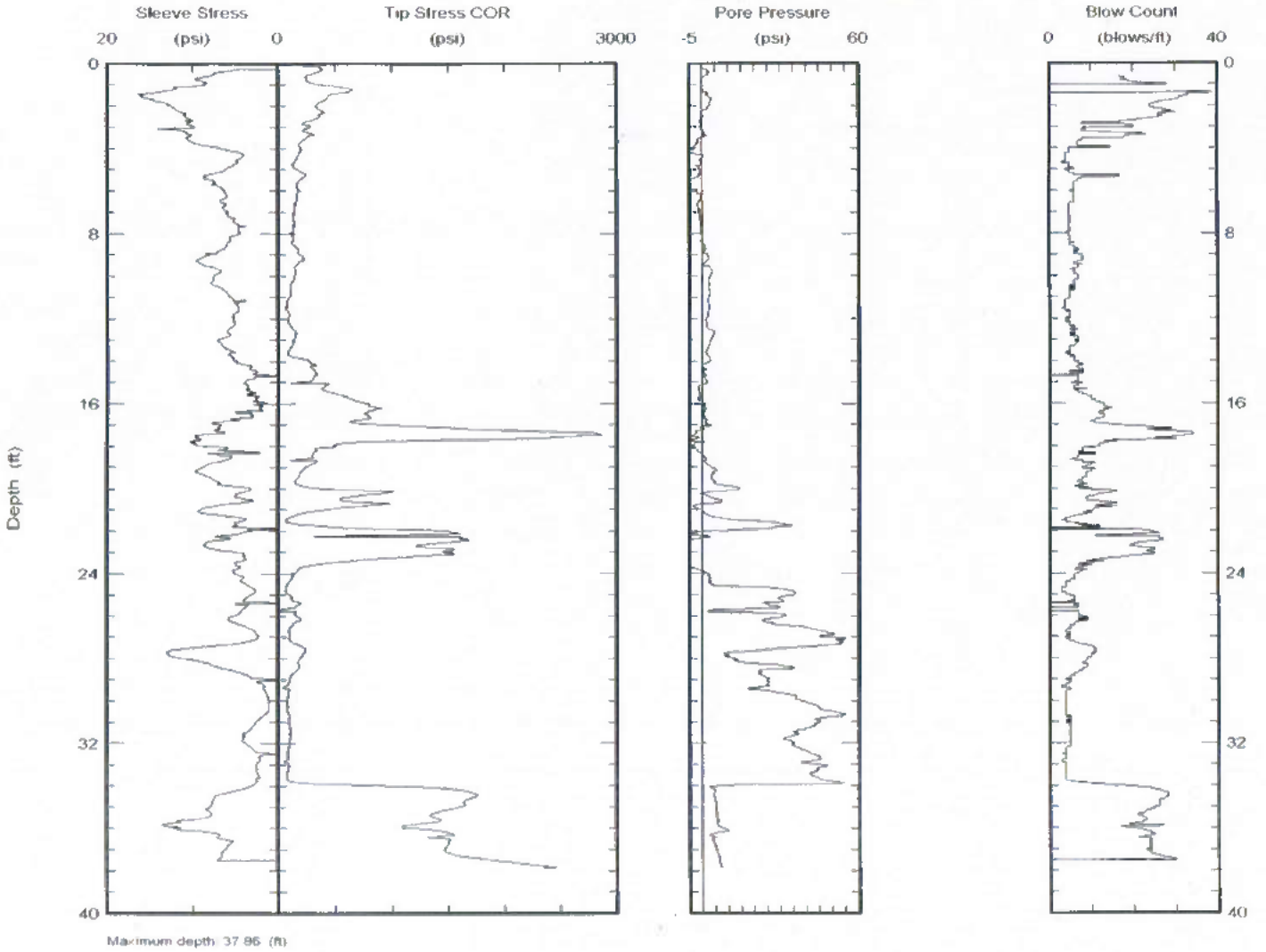
cpt@ned.ara.com
www.ara.com

Northing:	Date: 10/May/2011
Easting:	Test ID: cpt7
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



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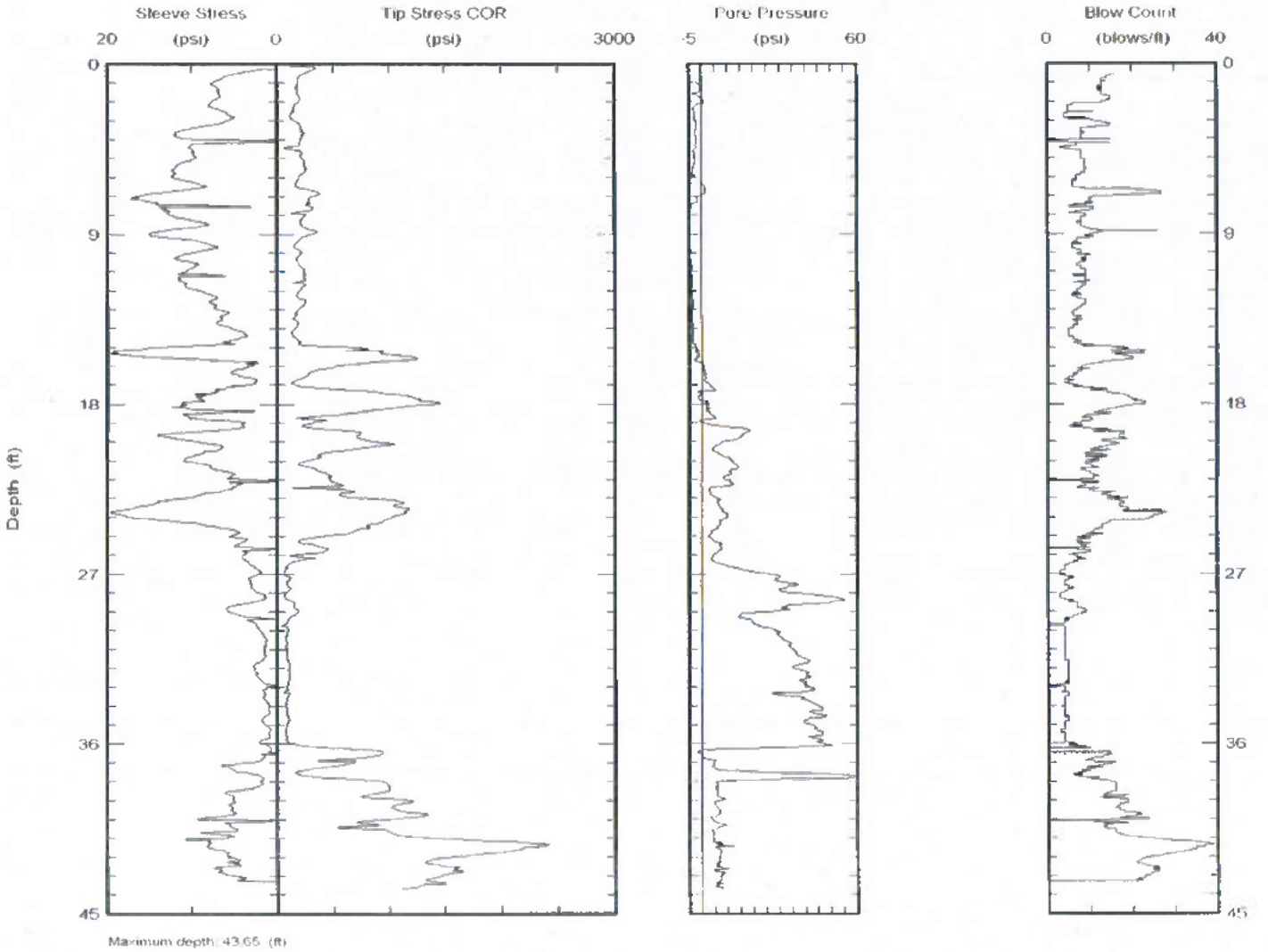
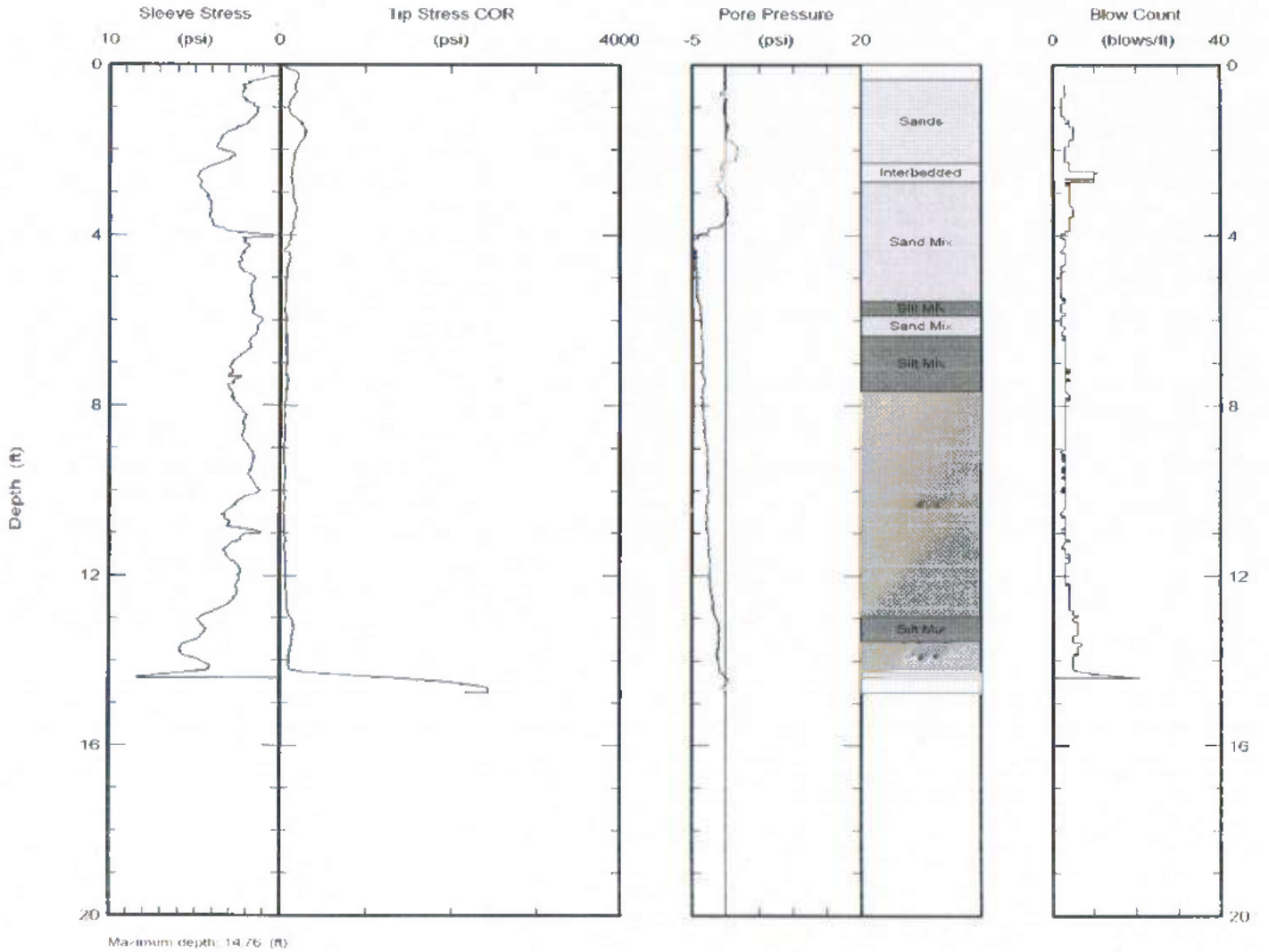
cpt@ned.ara.com
www.ara.com

Northing:	Date: 10/May/2011
Easting:	Test ID: cpt8
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



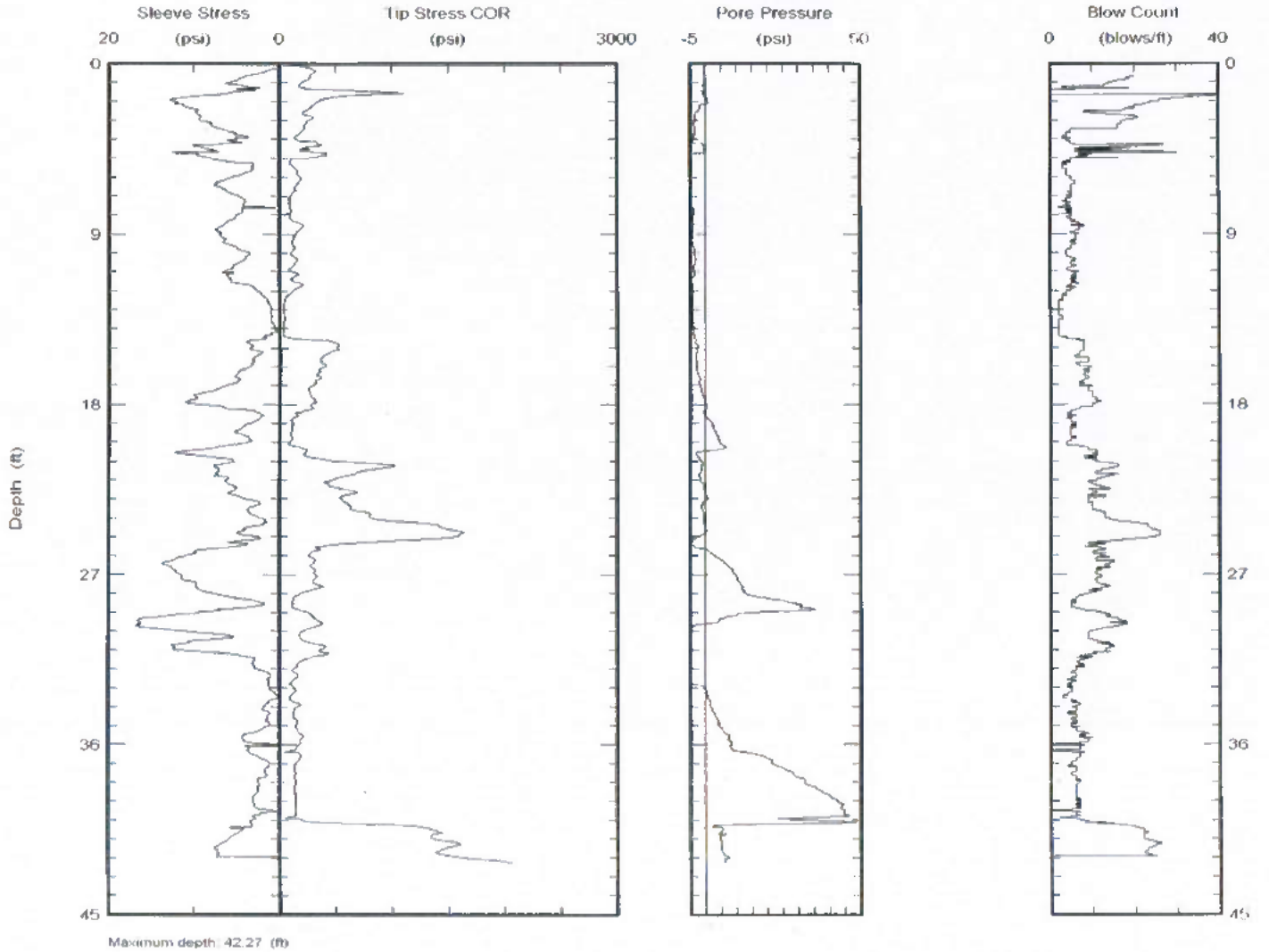
Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Northing:	Date: 10/May/2011
Easting:	Test ID: cpt9
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



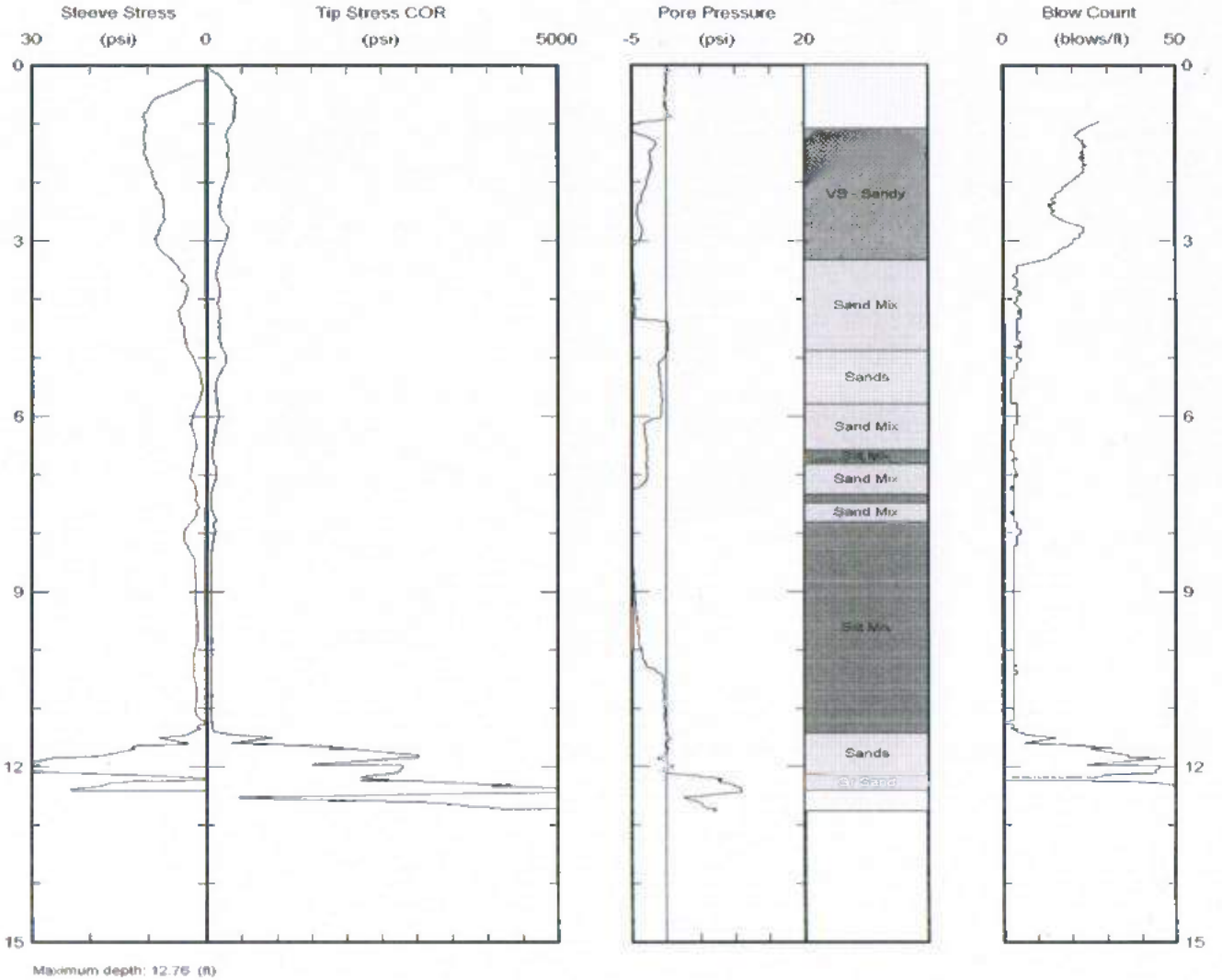
Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Northing:	Date: 10/May/2011
Easting:	Test ID: cpt10
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Northing:	Date: 10/May/2011
Easting:	Test ID: cpt11
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



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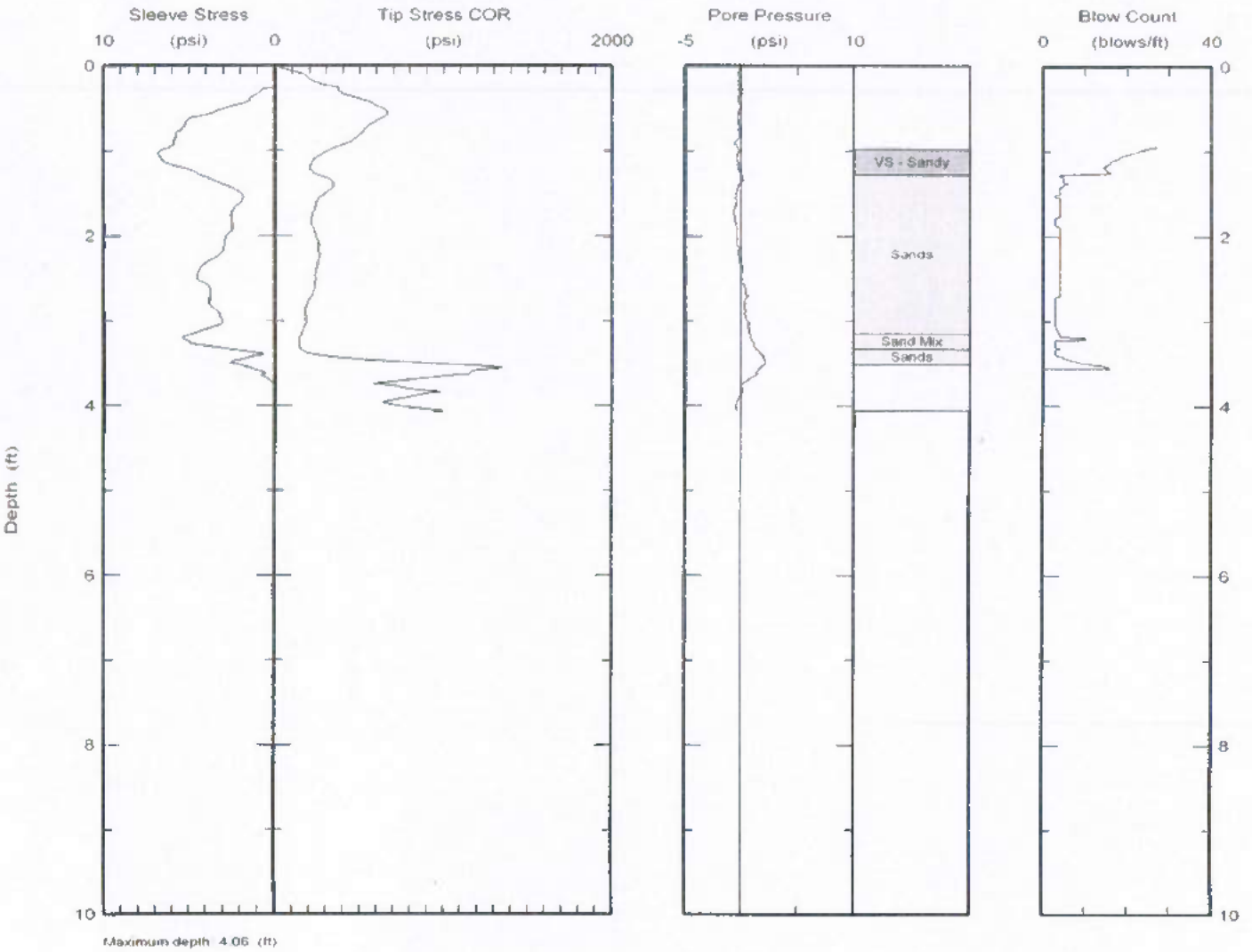
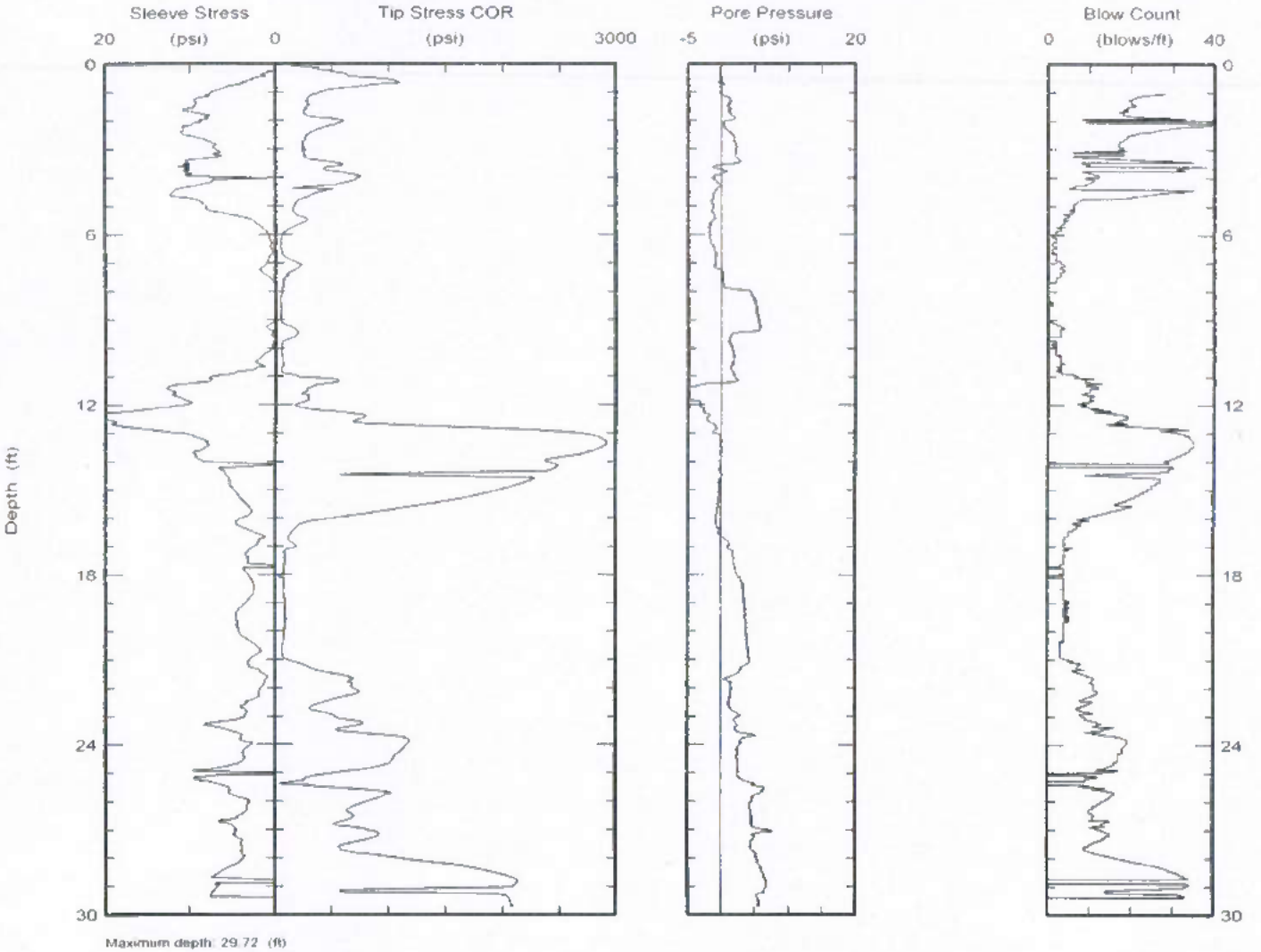
802-763-8348
cpt@ned.ara.com
www.ara.com

Northing:	Date: 10/May/2011
Easting:	Test ID: cpt12
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



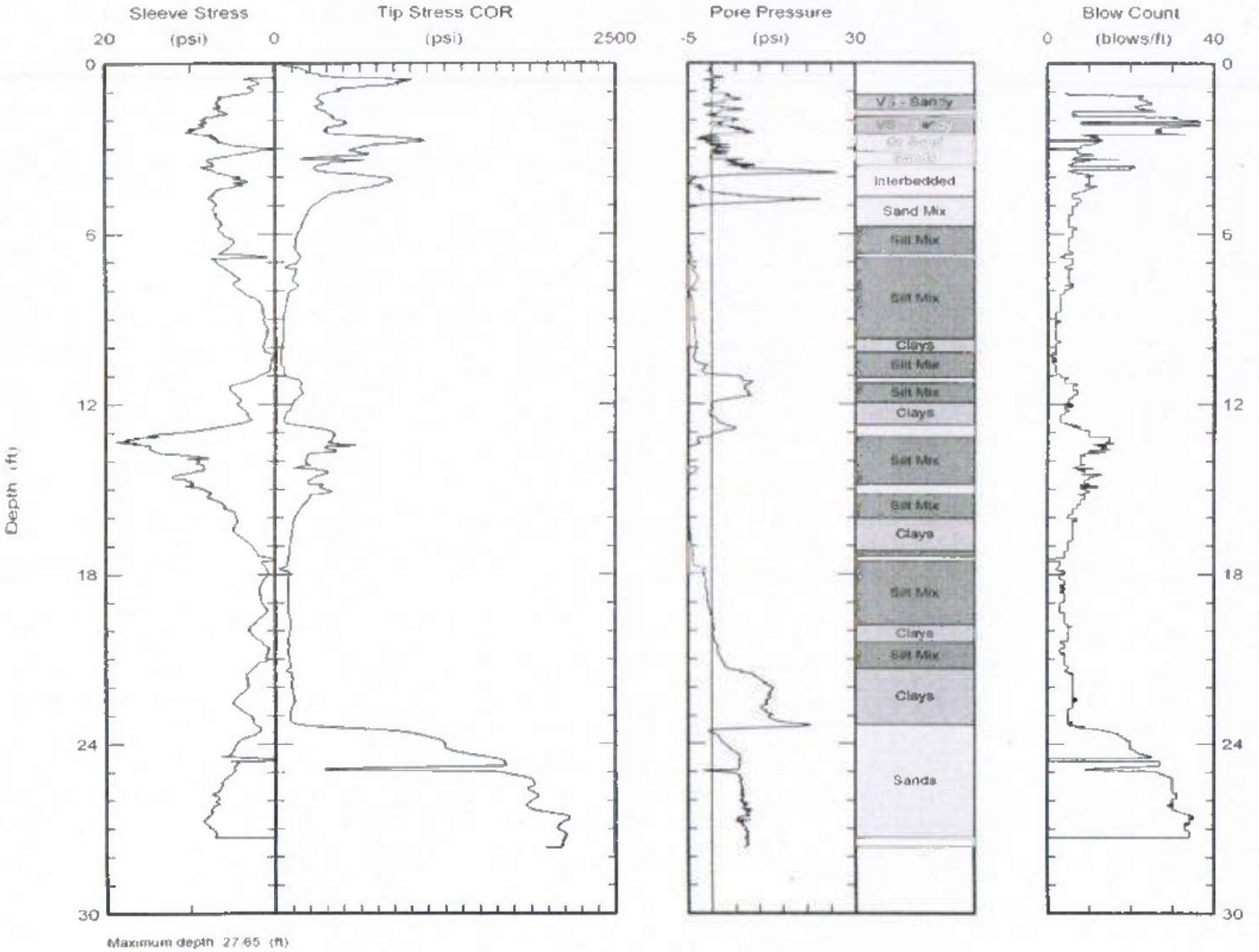
Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Northing:	Date: 10/May/2011
Easting:	Test ID: cpt13
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Northing:	Date: 15/May/2011
Easting:	Test ID: cpt14
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



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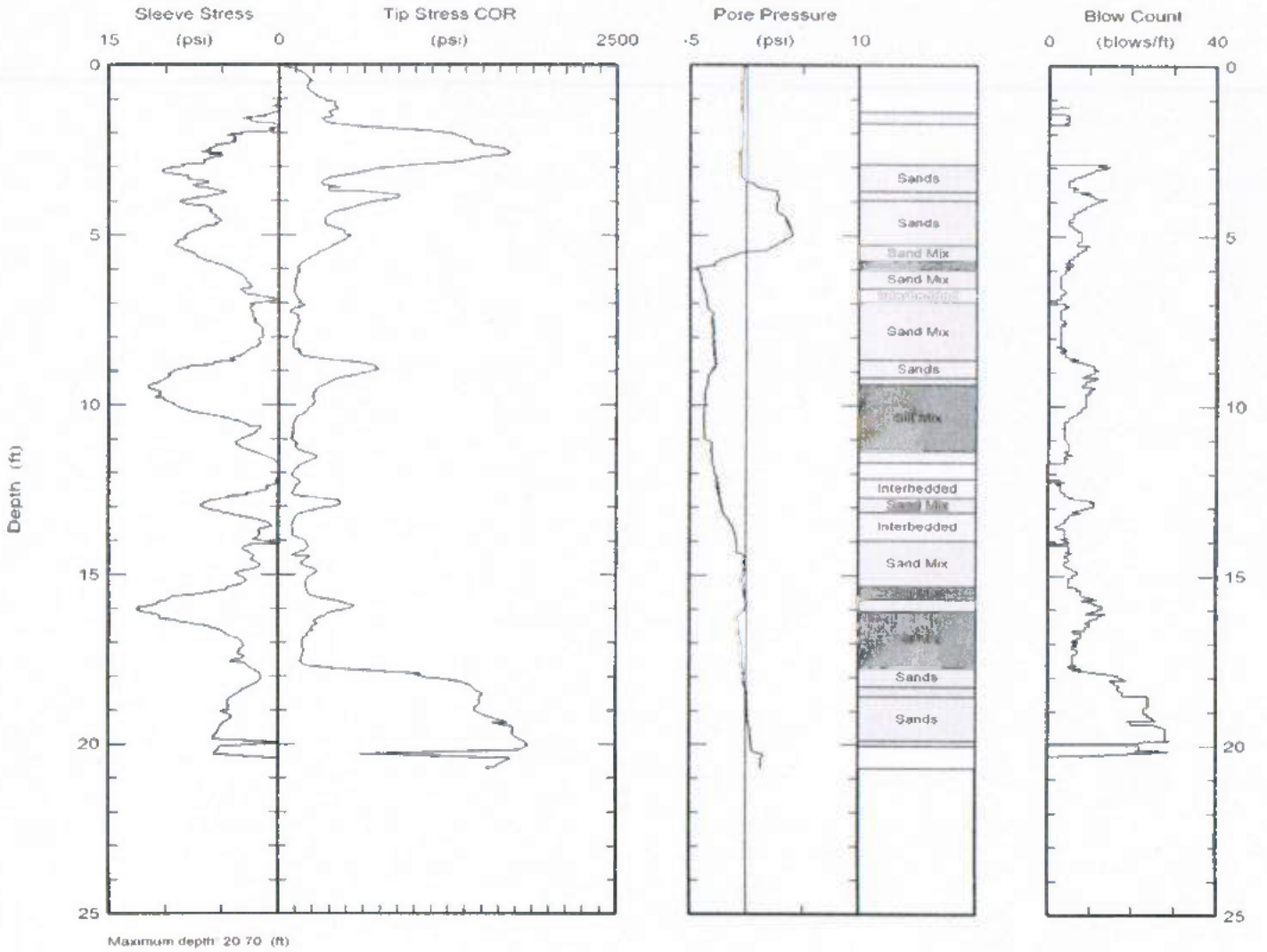
Northing:
Easting:
Elevation:

Date: 15/May/2011
Test ID: cpt15
Project: Alliant

Client: Aetherdbs
Job Site: Burlington



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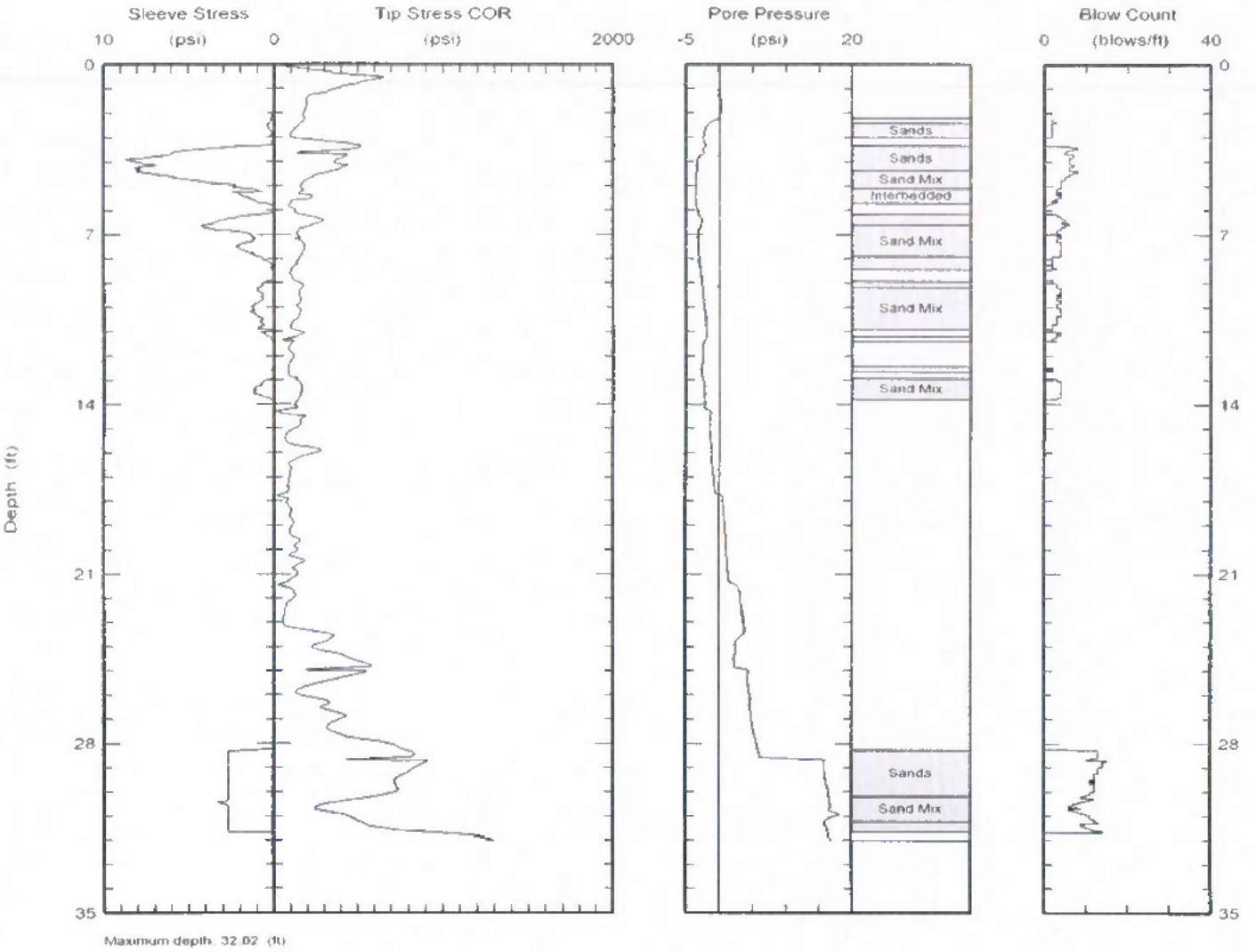
802-763-8348
cpt@ned.ara.com
www.ara.com

Northing:	Date: 15/May/2011
Easting:	Test ID: cpt16
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	



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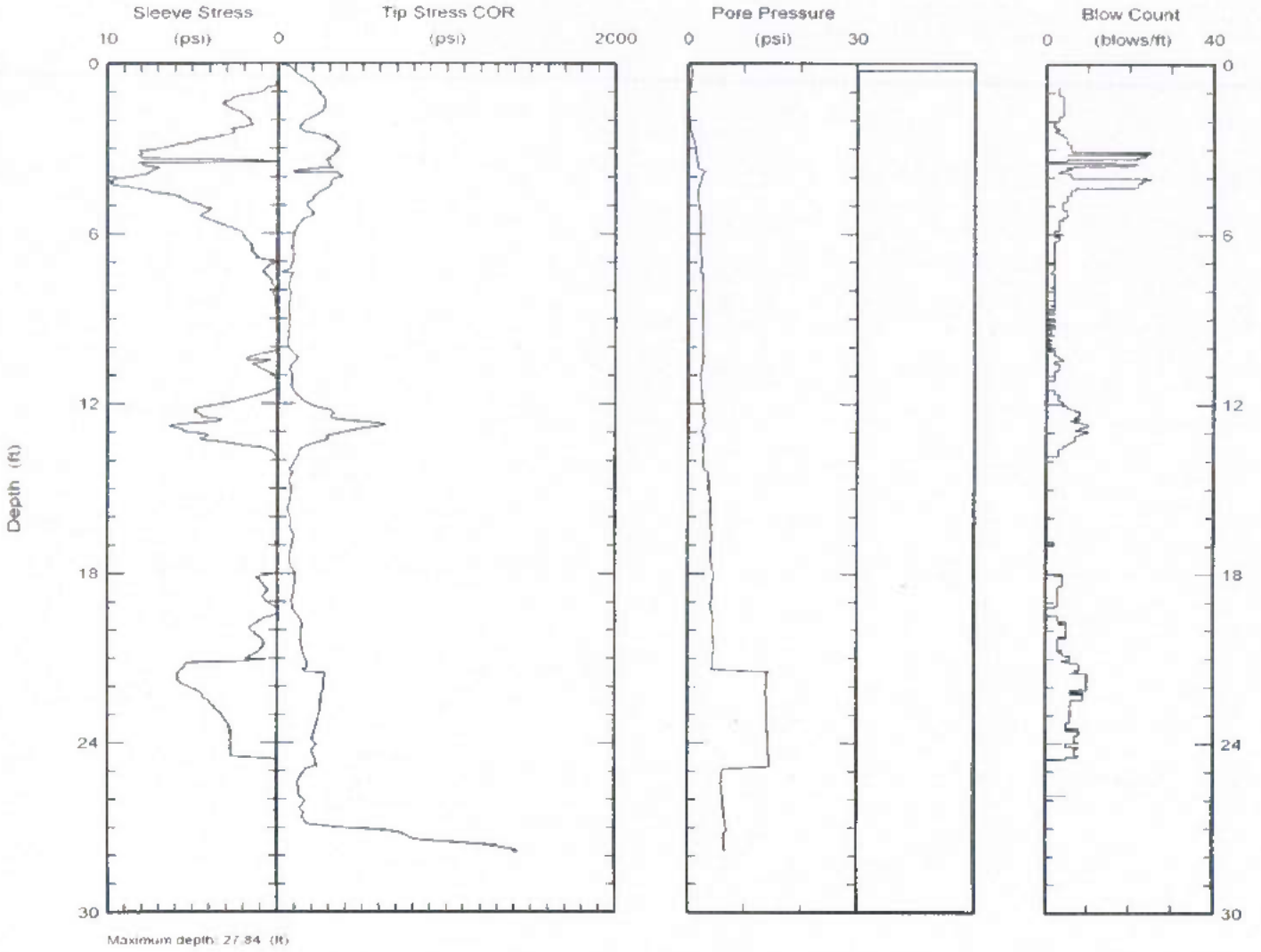
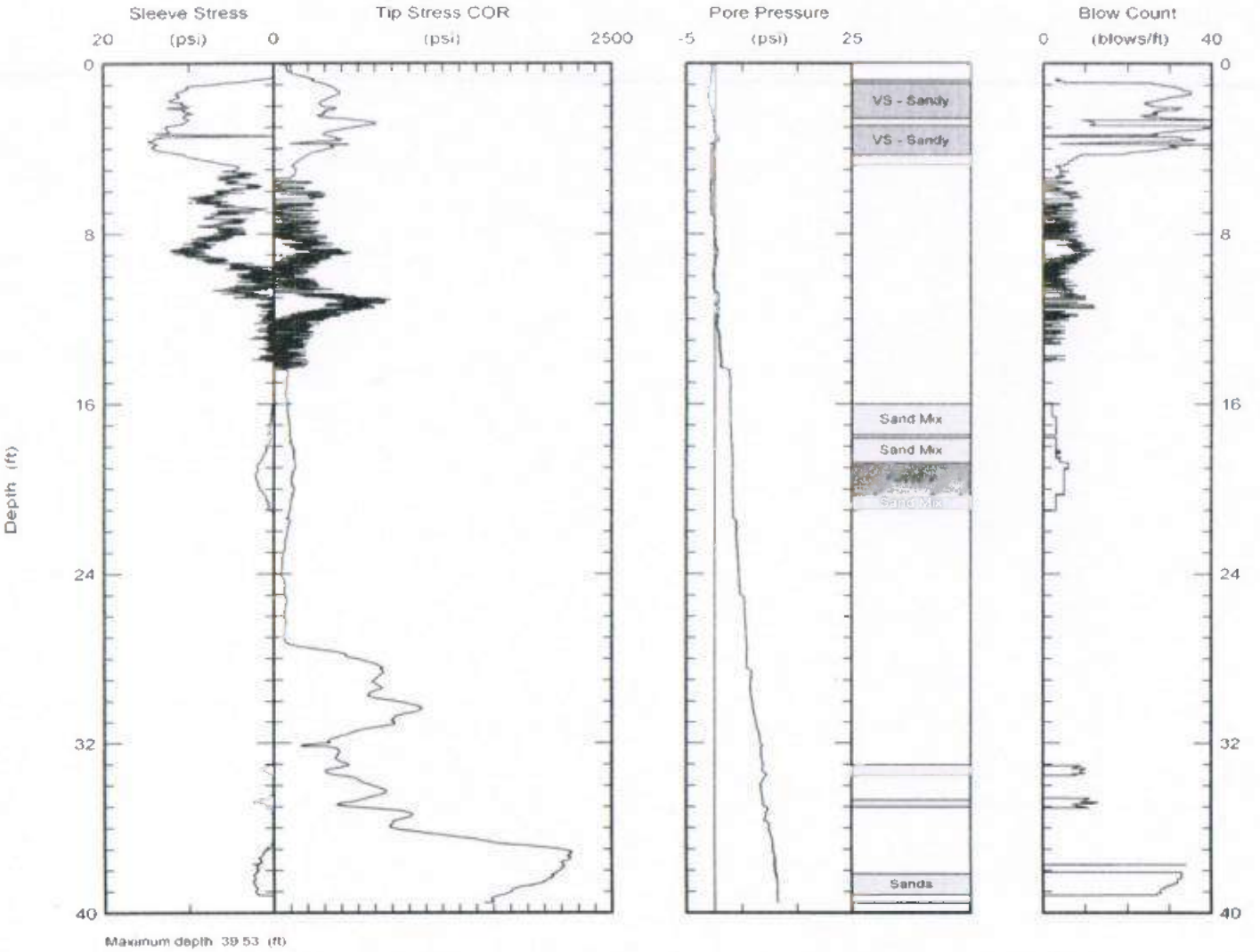
Northing:
Easting:
Elevation:

Date: 15/May/2011
Test ID: cpt17
Project: Alliant

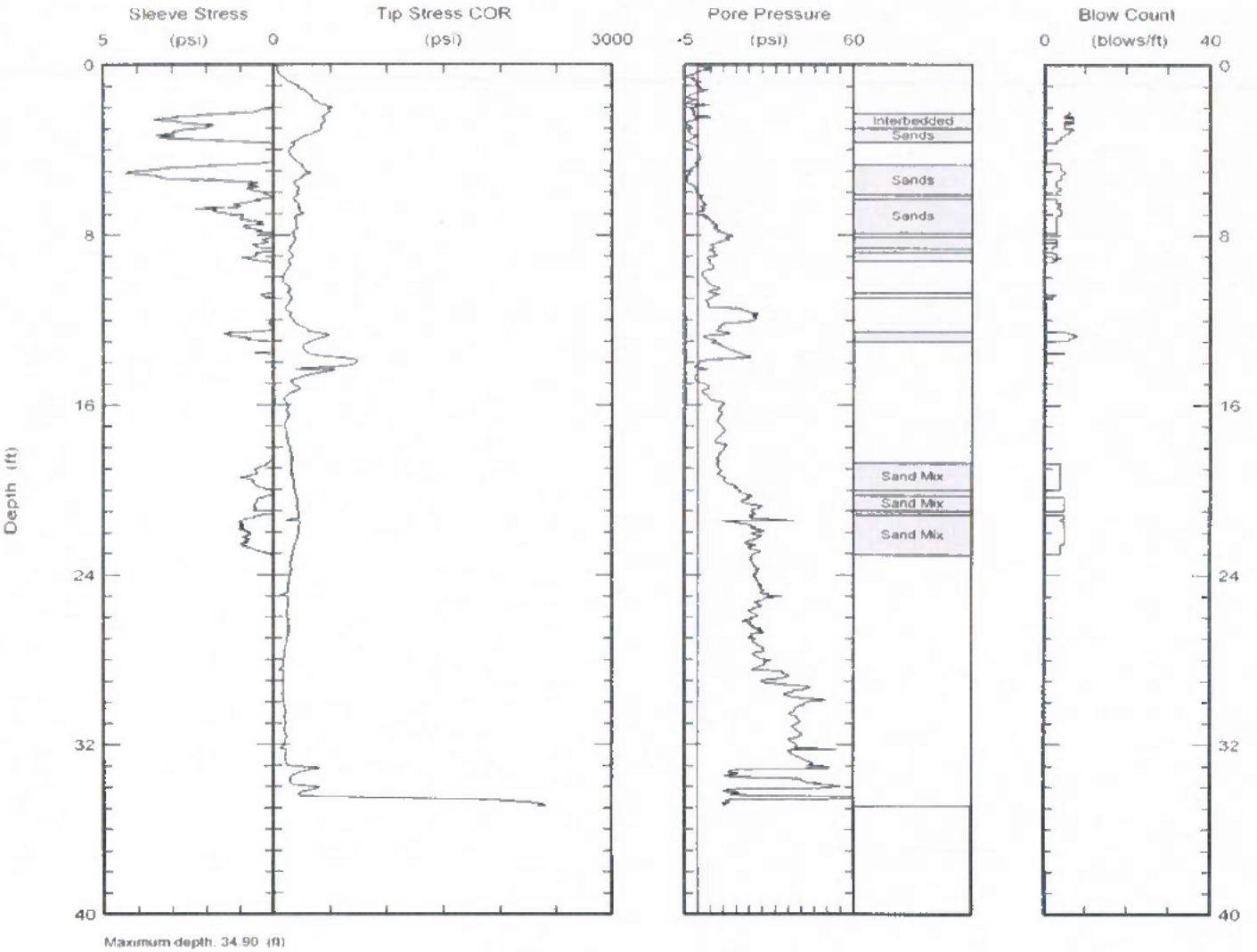
Client: Aetherdbs
Job Site: Burlington



Applied Research Associates, Inc. South Royalton, VT 05068 802-763-8348 cpt@ned.ara.com www.ara.com	Northing: Easting: Elevation:	Date: 15/May/2011 Test ID: cpt18 Project: Alliant
	Client: Aetherdbs Job Site: Burlington	



Applied Research Associates, Inc. South Royalton, VT 05068 802-763-8348 cpt@ned.ara.com www.ara.com	Northing: Easting: Elevation:	Date: 16/May/2011 Test ID: cpt19 Project: Alliant
	Client: Aetherdbs Job Site: Burlington	



Maximum depth: 34.90 (ft)

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802-763-8348
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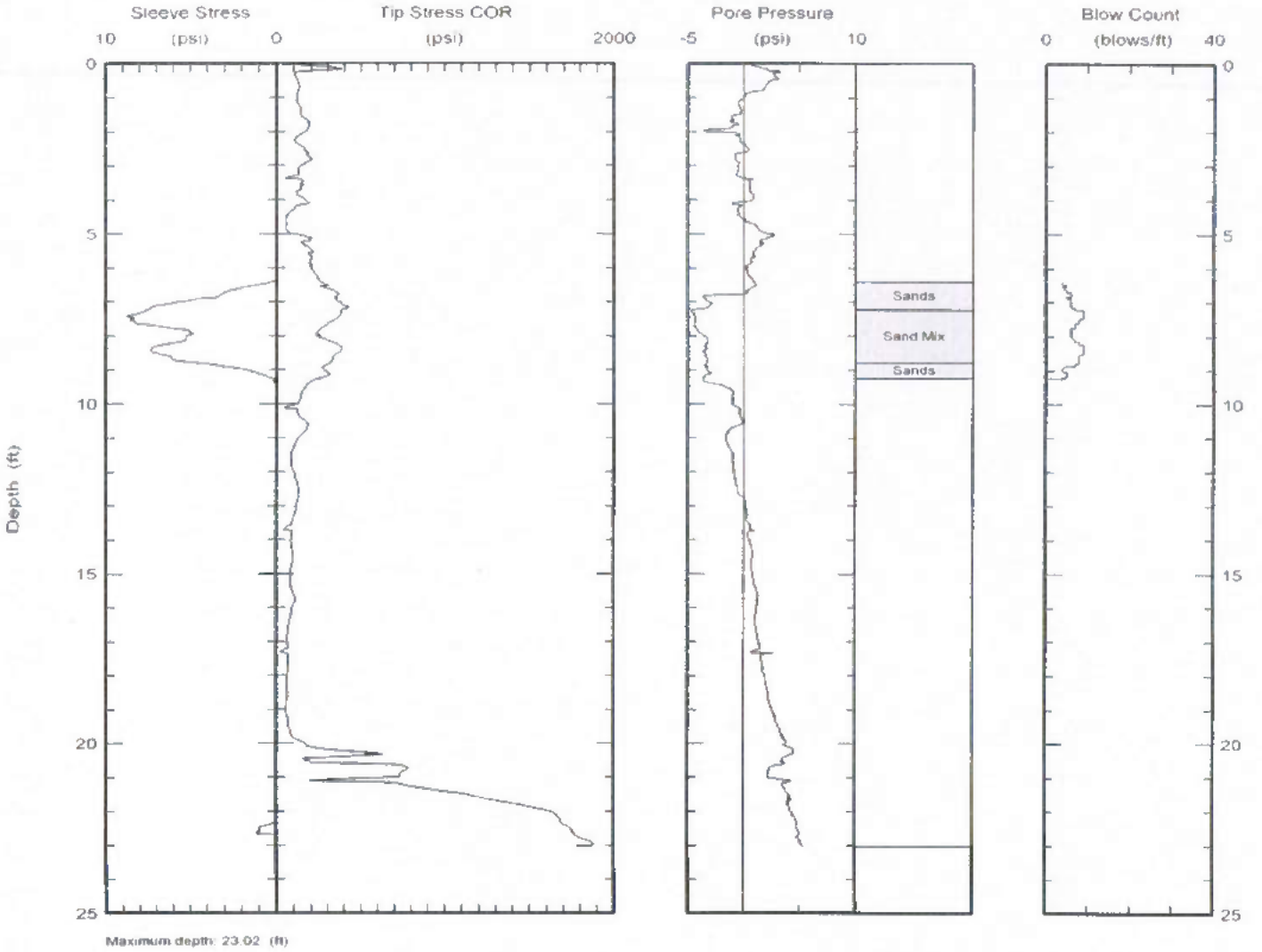
Northing:
Easting:
Elevation:

Date: 16/May/2011
Test ID: cpt20
Project: Alliant

Client: Aetherdbs
Job Site: Burlington



Applied Research Associates, Inc.
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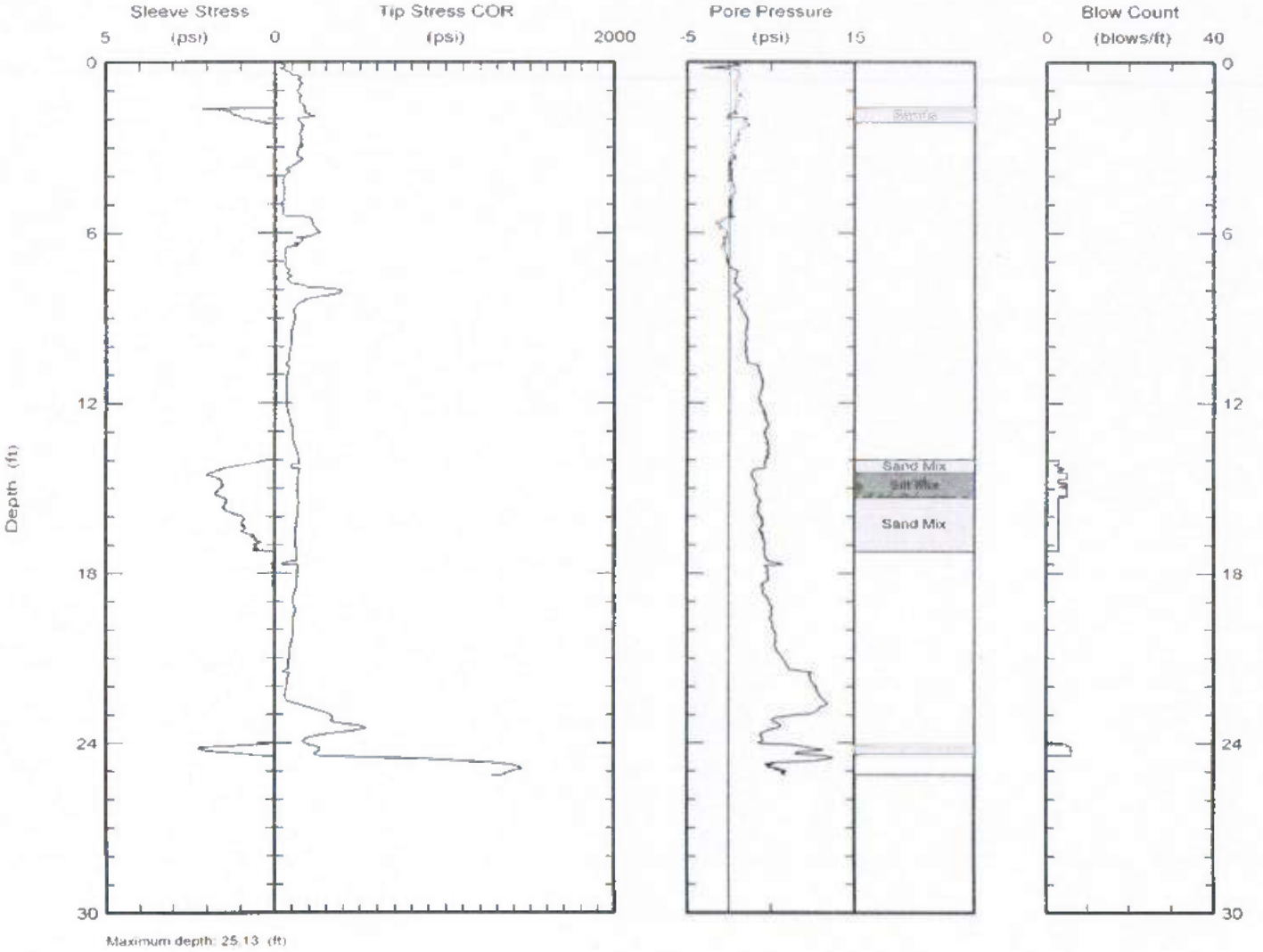
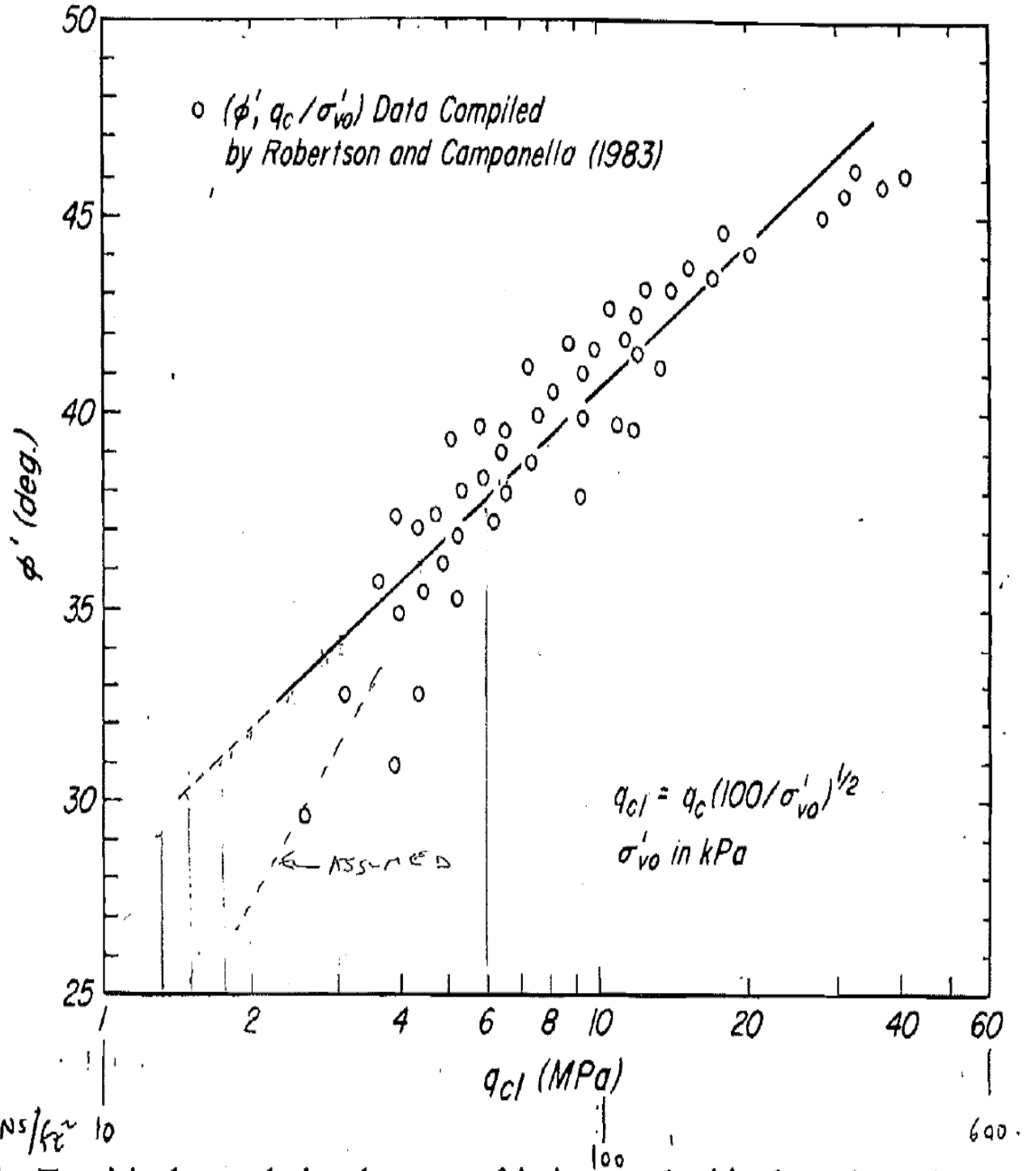
802-763-8348
cpt@ned.ara.com
www.ara.com

Northing:	Date: 16/May/2011
Easting:	Test ID: cpt21
Elevation:	Project: Alliant
Client: Aetherdbs	
Job Site: Burlington	





19.5 Empirical correlation between friction angle ϕ' of sands and norma penetration resistance.

Re: TERZAGHI PECK & MESRI (1996), SOIL MECHANICS IN ENG. PRACTICE, 3RD ED., JOHN WILEY & SONS, INC

APPENDIX F – Laboratory Testing on CCR Embankment Soils – 2011

Alliant Energy
Interstate Power and Light Company
Burlington Generating Station
Burlington, Iowa

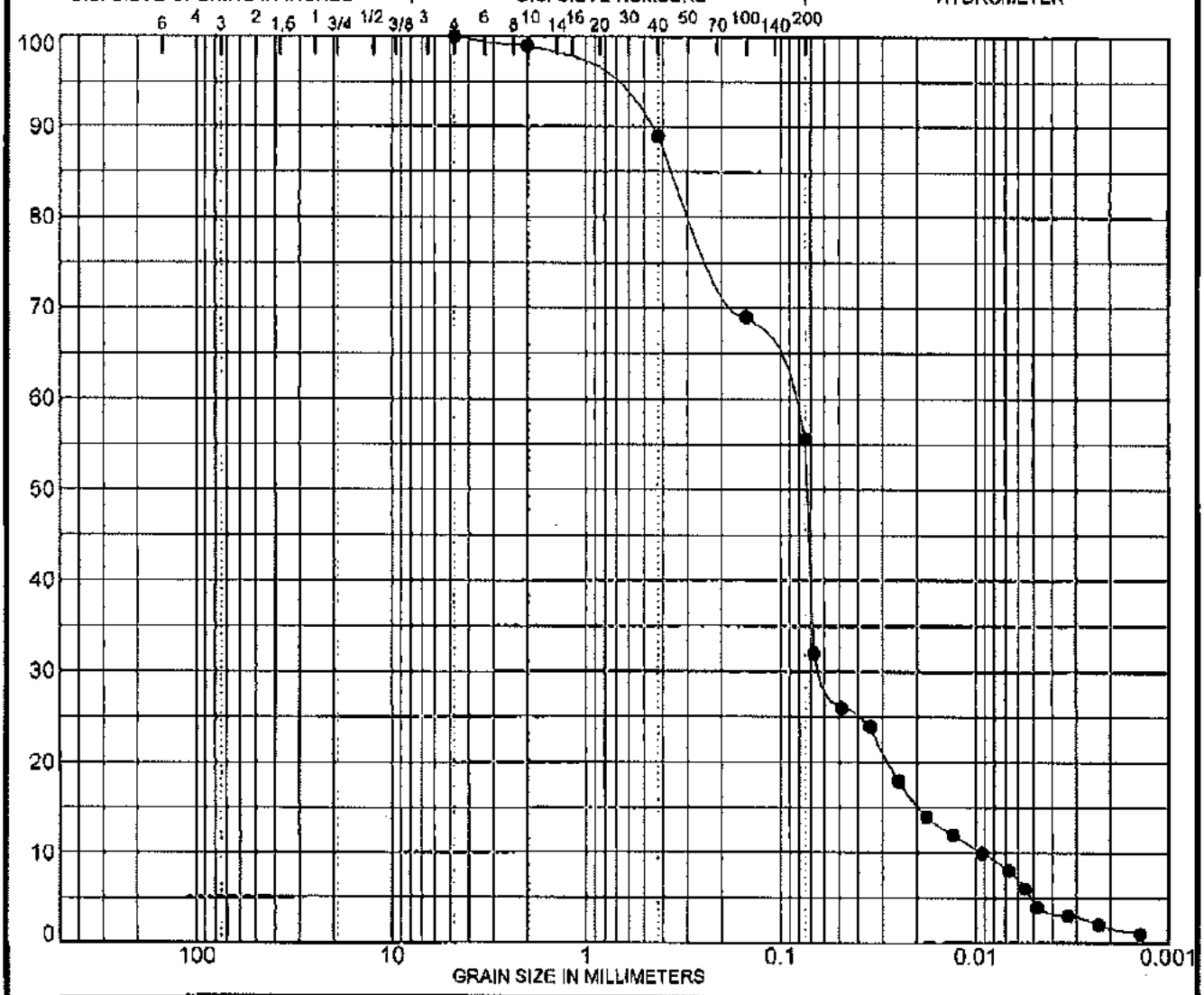
History of Construction

Attachment C

Soil Laboratory Results

Burlington Generating Station

Source: Testing Service Corporation, May 2011



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SOIL CLASSIFICATION
Broing: SB-1	3 inch	100	Brown ASH
Sample: Ash	2	100	
	1 1/2	100	
	1	100	
NOTES:	3/4	100	
	3/8	100	
	# 4	100	
	# 10	99	
	# 40	89	
	# 100	69	
	# 200	56	

%GRAVEL	%SAND	%SILT	%CLAY
0	44	54	2

MC%		LL	PL	PI
44.0		NP	NP	NP

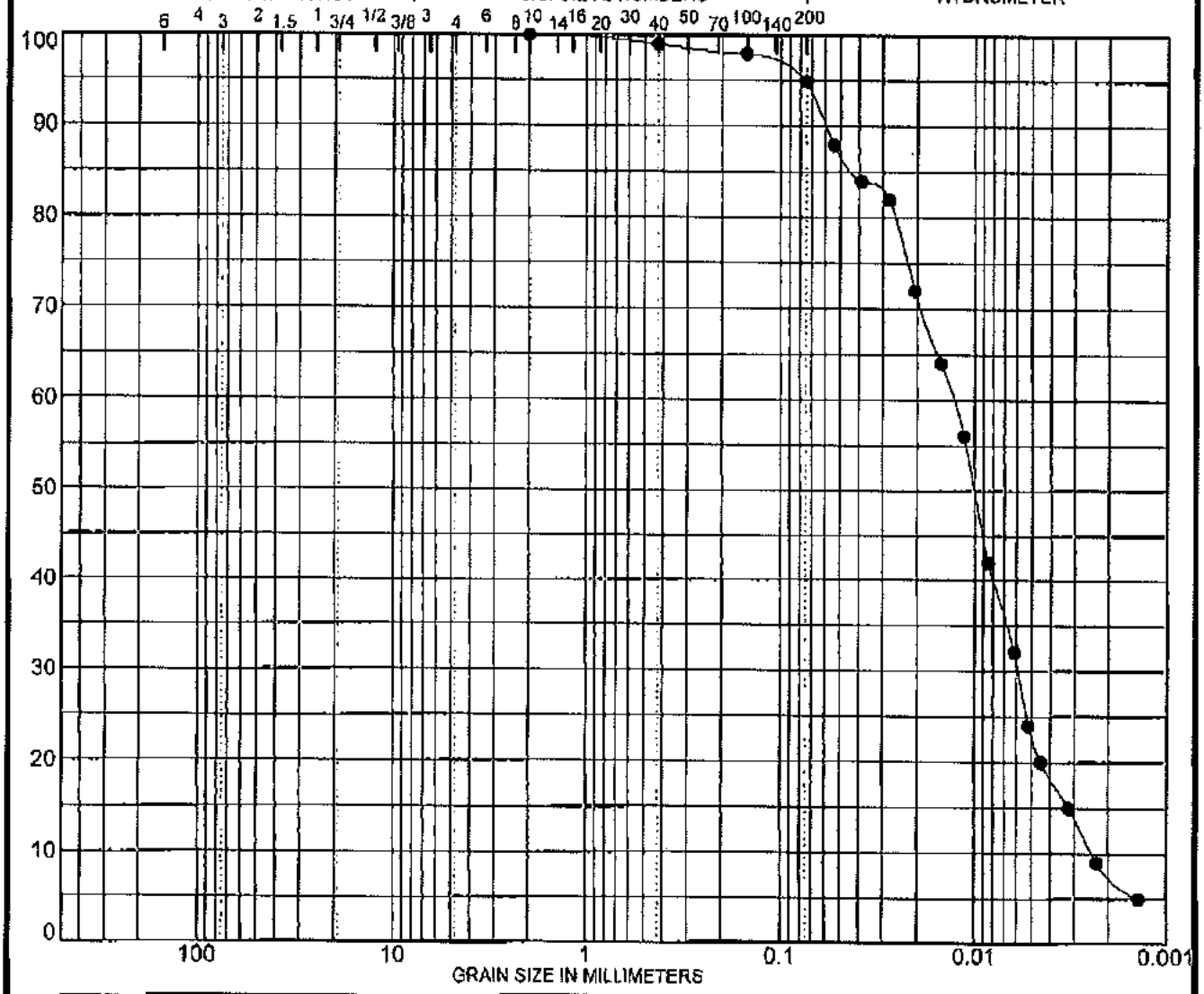
PROJECT Geotechnical Testing
LOCATION
SB1

JOB NO. L - 76,757
DATE May 20, 2011

SOIL DATA SHEET

Testing Service Corporation
Carol Stream, IL 60188

SOILGENR 76757.GPJ TSC_ALL.GDT 5/20/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-1	3 inch	100
Sample: A	2	100
Depth: 25.0'-26.0'	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	100
	# 4	100
	# 10	100
	# 40	99
	# 100	96
	# 200	95

SOIL CLASSIFICATION

Gray clayey SILT, trace sand (ML)

%GRAVEL	%SAND	%SILT	%CLAY
0	5	87	8

MC%		LL	PL	PI
69.4		38	31	5

PROJECT LOCATION: Geotechnical Testing

JOB NO.: L - 76,757

DATE: May 20, 2011

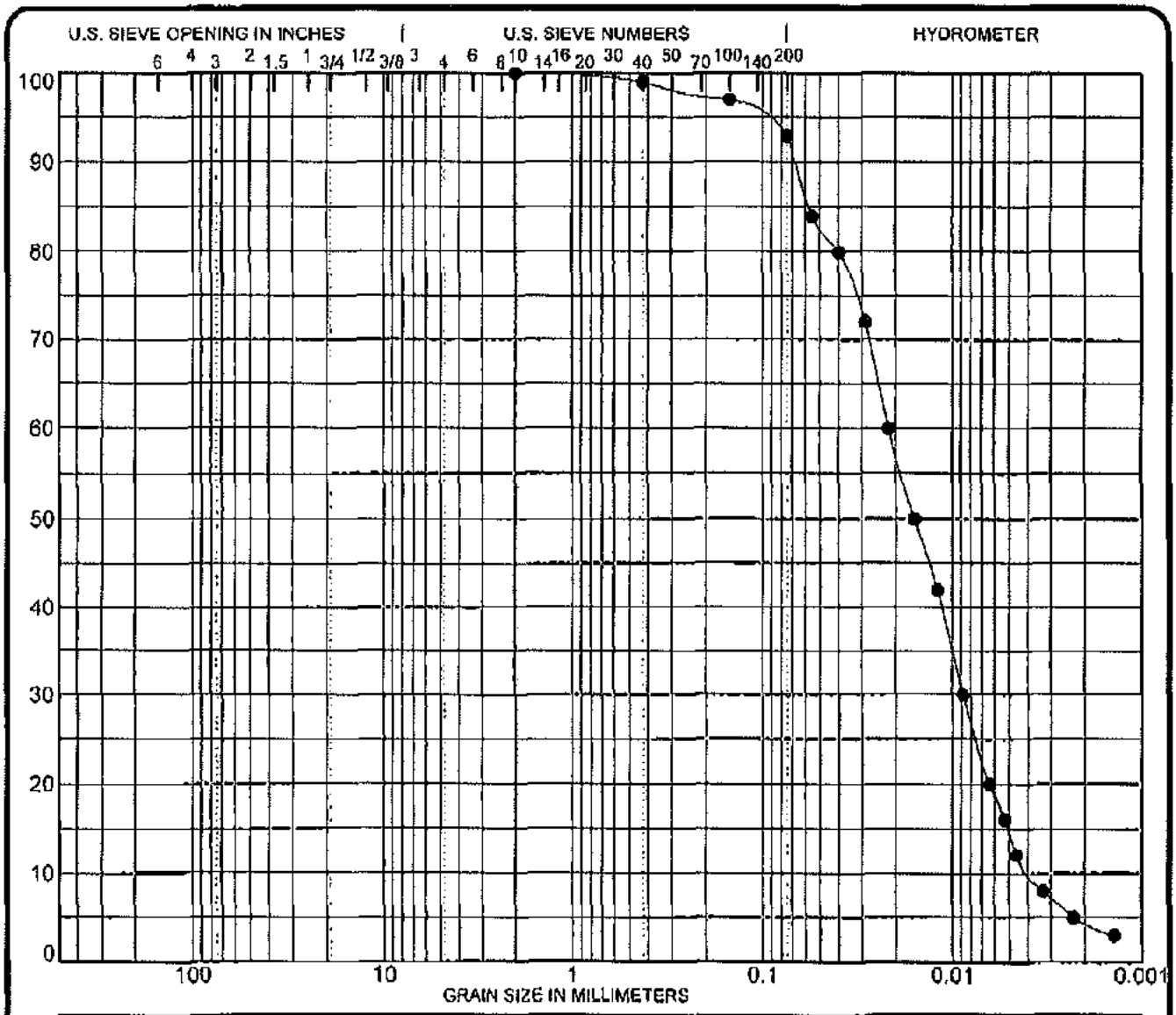
SB1

SOIL DATA SHEET

Testing Service Corporation

Carol Stream, IL 60188

SOILGENR 76757.GPJ TSC_ALL.GDT 5/20/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-1	3 inch	100
Sample: B	2	100
Depth: 29.0'-30.0'	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	100
	# 4	100
	# 10	100
	# 40	99
	# 100	97
	# 200	93

SOIL CLASSIFICATION: Gray clayey SILT, trace sand (ML)

%GRAVEL	%SAND	%SILT	%CLAY
0	7	89	4

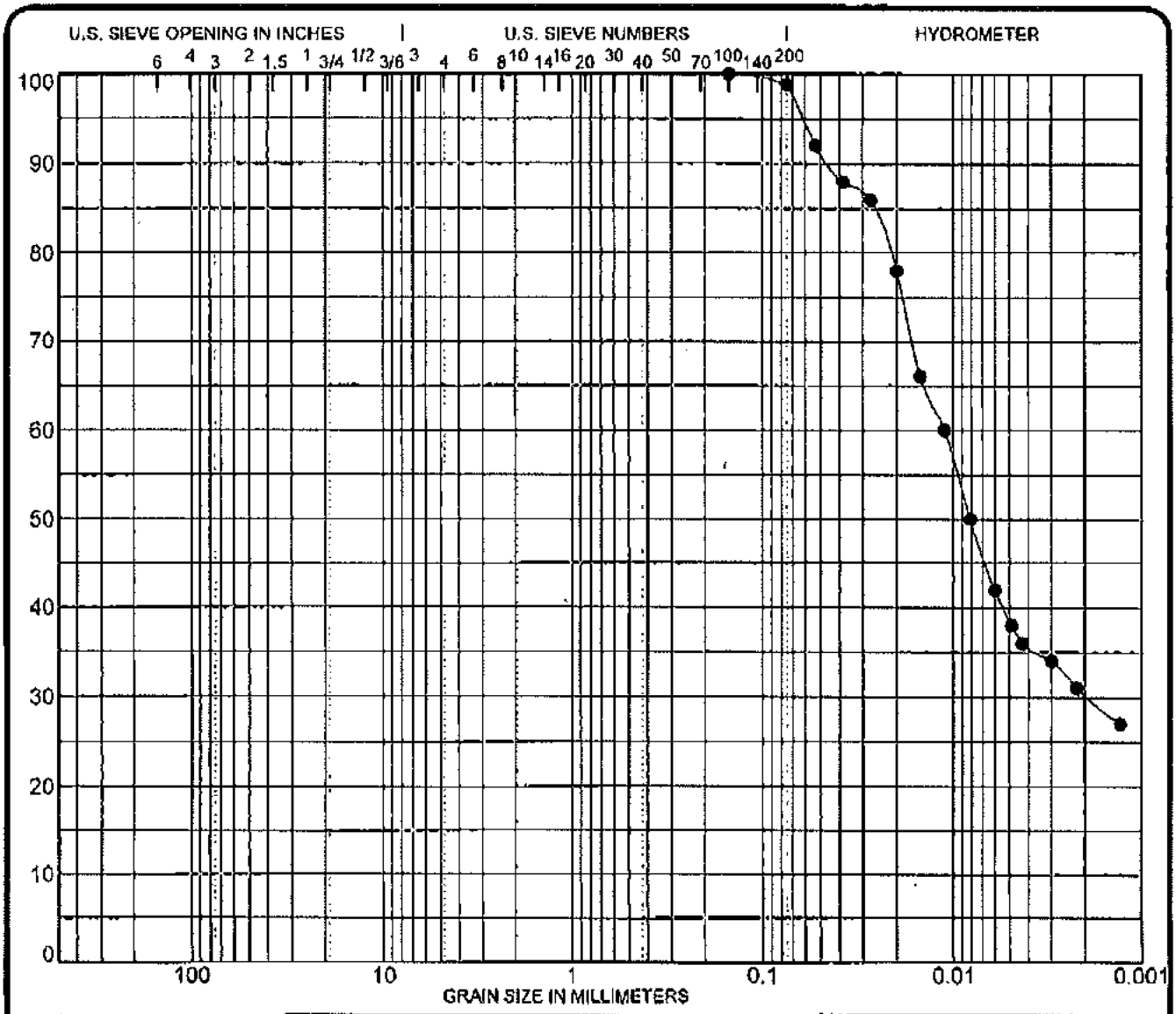
MC%		LL	PL	PI
58.6		40	37	3

PROJECT Geotechnical Testing
LOCATION
SB1

JOB NO. L - 76,757
DATE May 20, 2011

SOIL DATA SHEET
Testing Service Corporation
Carol Stream, IL 60188

SOILGSNR 76757.GPJ TSC ALL.GDT 5/20/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-1	3 inch	100
Sample: C	2	100
Depth: 34.0'-35.0'	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	100
	# 4	100
	# 10	100
	# 40	100
	# 100	100
	# 200	99

SOIL CLASSIFICATION: Gray silty CLAY, trace sand (CH)

%GRAVEL	%SAND	%SILT	%CLAY
0	1	69	30

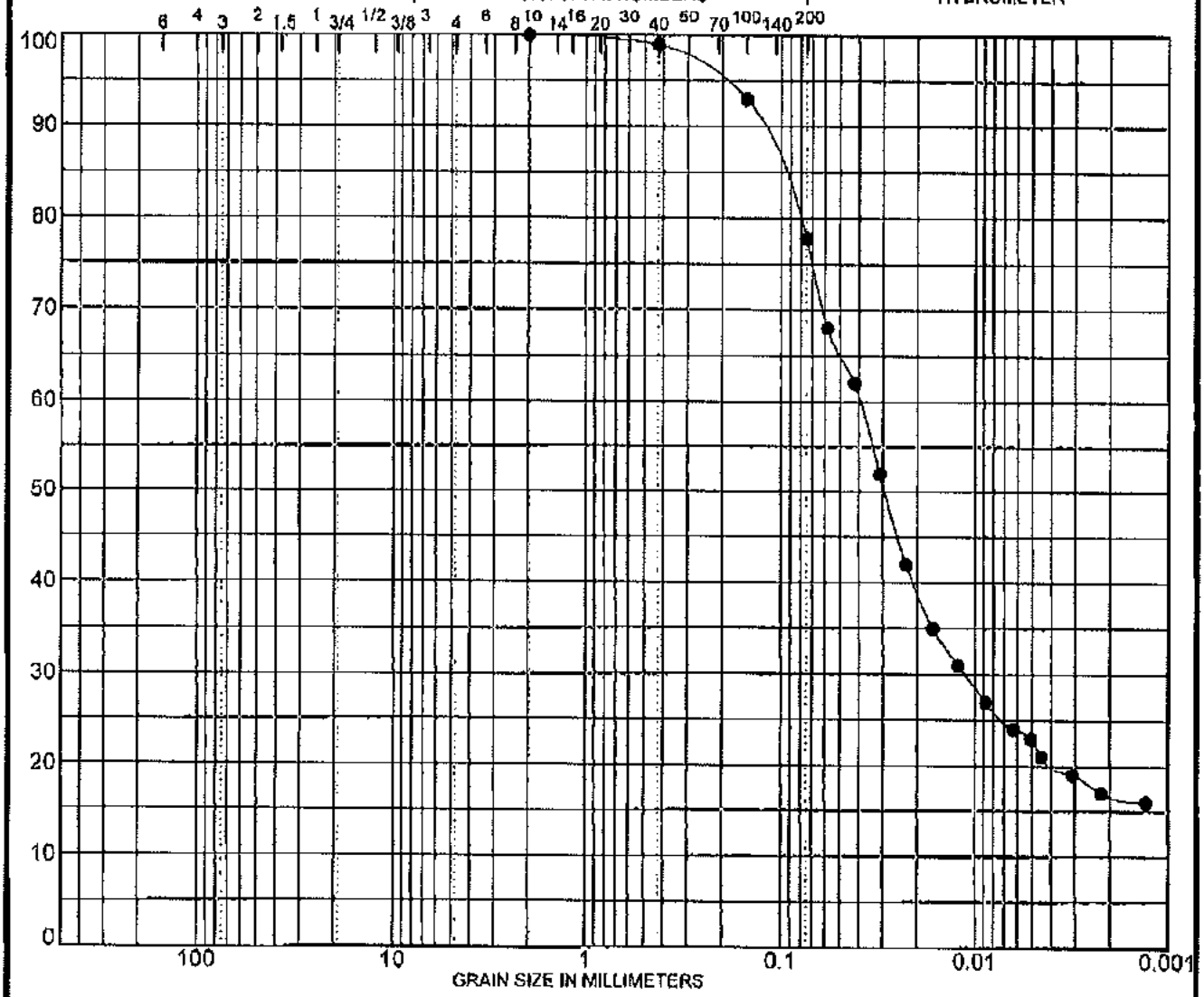
MC%		LL	PL	PI
31.3		52	17	35

PROJECT Geotechnical Testing
LOCATION ,
JOB NO. L - 76,757
DATE May 20, 2011

SB1

SOIL DATA SHEET
Testing Service Corporation
Carol Stream, IL 60188

SOILGENR 76757.GPJ TSC ALL.GDT 5/20/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SOIL CLASSIFICATION
Boring: SB-1	3 inch	100	Gray very silty CLAY, some sand (CL)
Sample: D	2	100	
Depth: 36.0'-37.0'	1 1/2	100	
	1	100	
NOTES:	3/4	100	
	3/8	100	
	# 4	100	
	# 10	100	
	# 40	99	
	# 100	93	
	# 200	78	

%GRAVEL	%SAND	%SILT	%CLAY
0	22	61	17

MC%		LL	PL	PI
29.1		36	16	20

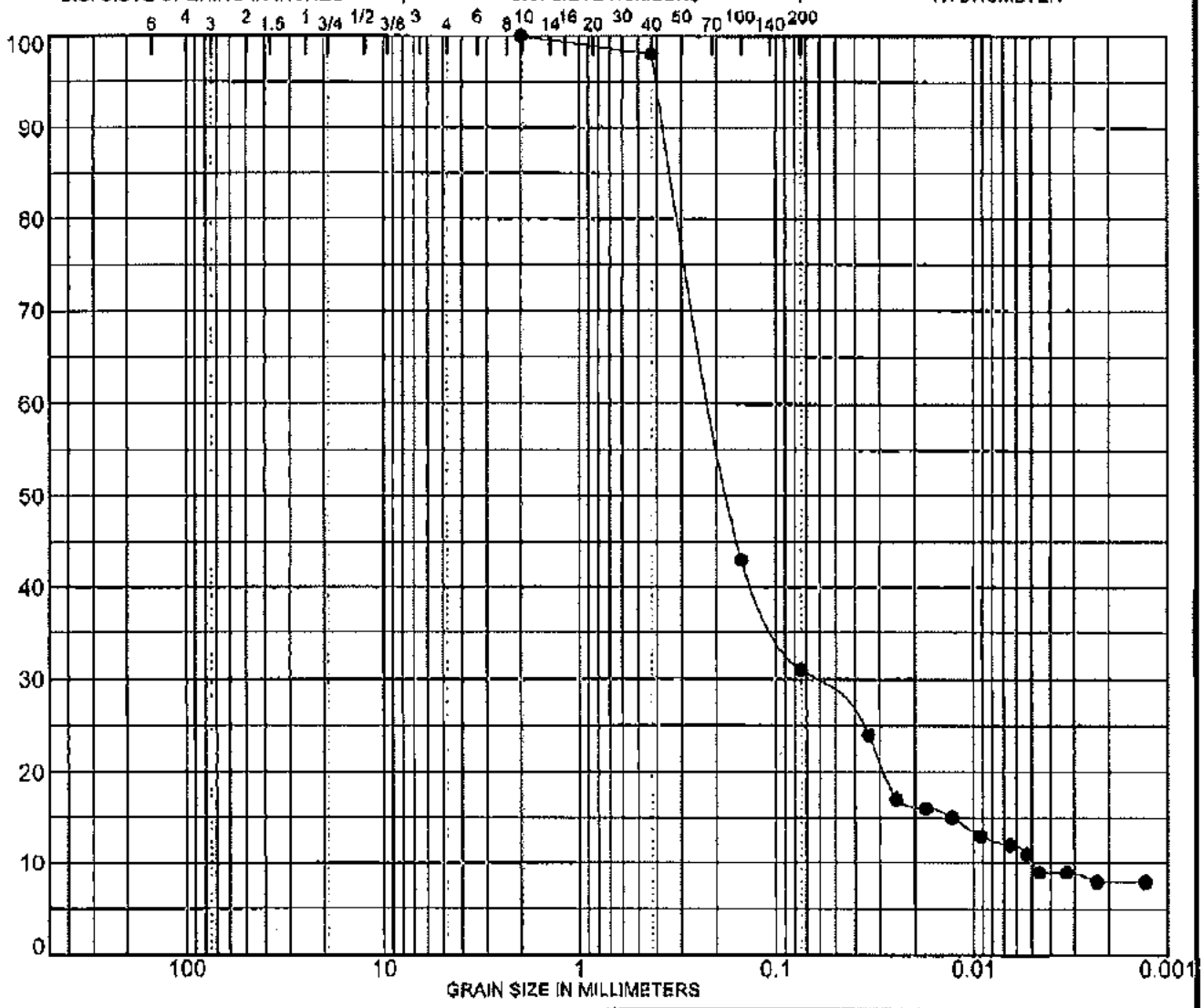
PROJECT Geotechnical Testing
LOCATION ,
JOB NO. L - 76,757
DATE May 20, 2011

SB1

SOIL DATA SHEET

Testing Service Corporation
Carol Stream, IL 60188

SOILGENR 76757.GPJ TSC ALLGDT 5/20/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-1	3 inch	100
Sample: E	2	100
Depth: 37.0'-38.0'	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	100
	# 4	100
	# 10	100
	# 40	98
	# 100	43
	# 200	31

SOIL CLASSIFICATION: Gray clayey SAND (SC)

%GRAVEL	%SAND	%SILT	%CLAY
0	69	23	8

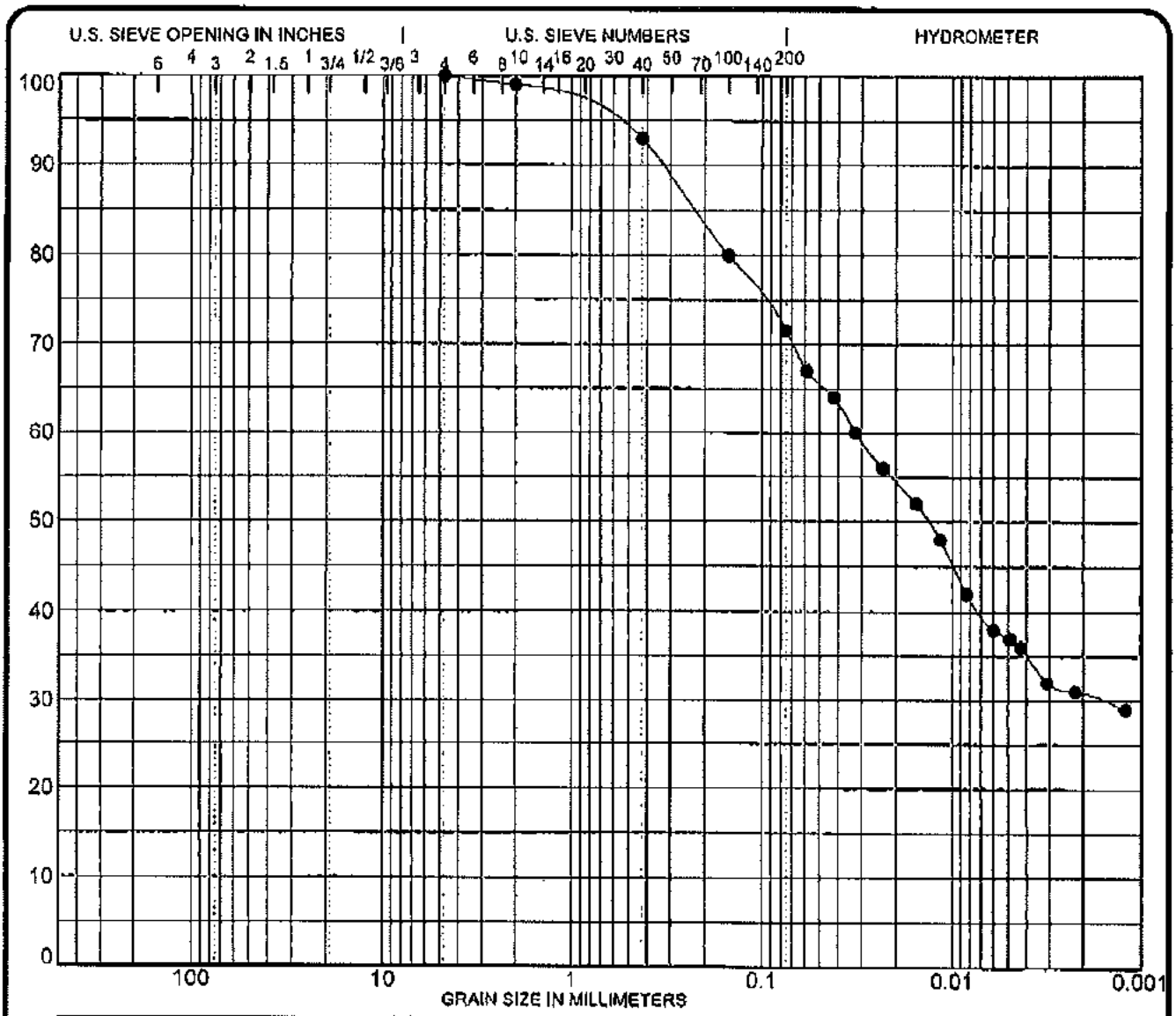
MC%		LL	PL	PI
30.4		22	14	8

PROJECT Geotechnical Testing
LOCATION ,
JOB NO. L - 76,757
DATE May 20, 2011
SB1

SOILGENR 76757.GPJ TSC ALL.GDT 5/20/11

SOIL DATA SHEET

Testing Service Corporation
Carol Stream, IL 60188



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

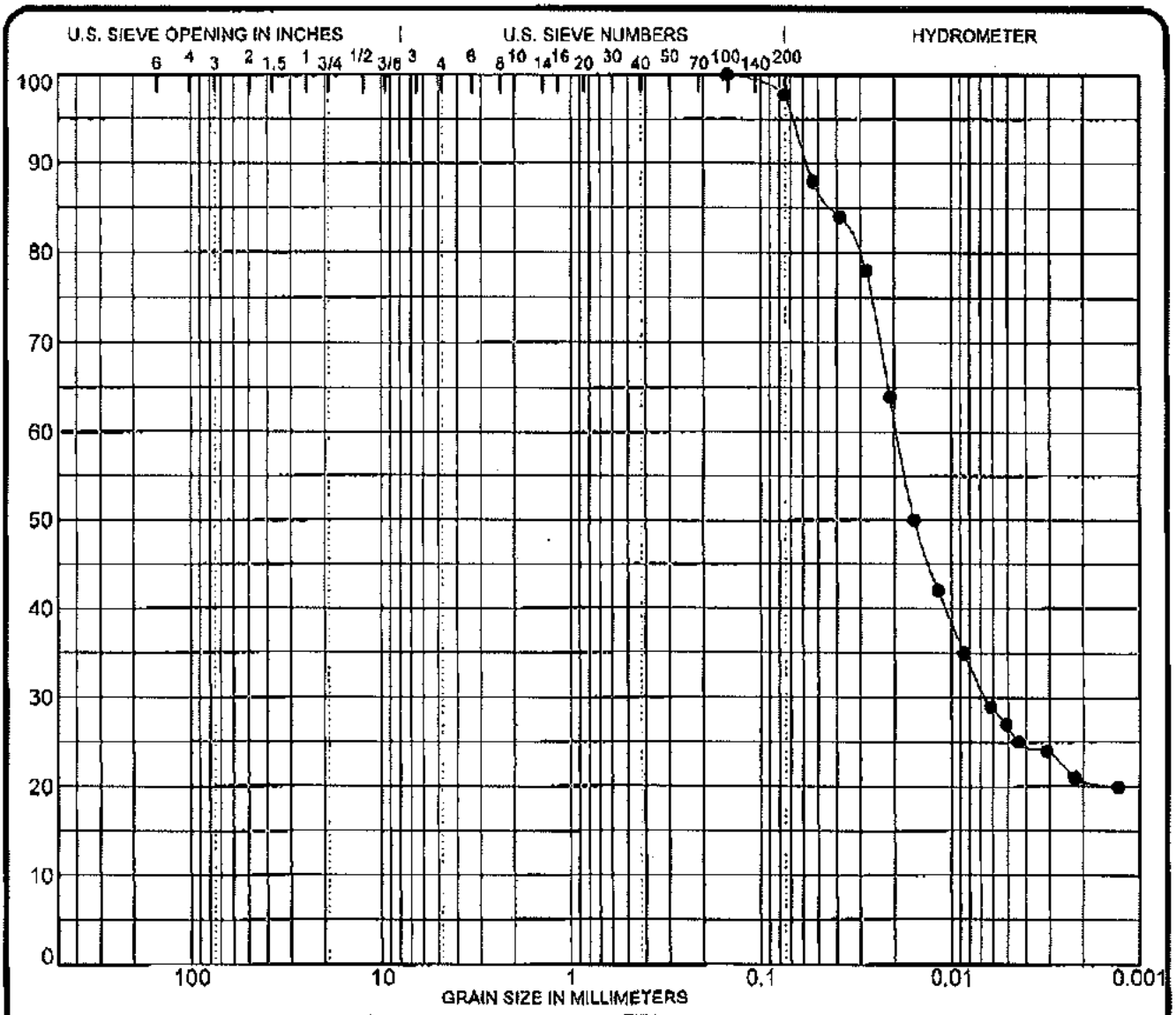
SPECIMEN IDENTIFICATION	SIEVE	% PASS	SOIL CLASSIFICATION
Boring: SB-2	3 inch	100	Brownish gray silty CLAY, some sand
Sample: A	2	100	(CL)
Depth: 8.0'-9.0'	1 1/2	100	
	1	100	%GRAVEL 0 / %SAND 28 / %SILT 41 / %CLAY 31
NOTES:	3/4	100	
	3/8	100	
	# 4	100	MC% 15.7 / LL 46 / PL 12 / PI 34
	# 10	99	
	# 40	93	
	# 100	80	
	# 200	72	

PROJECT Geotechnical Testing
LOCATION
SB2

JOB NO. L-76,757
DATE May 20, 2011

SOIL DATA SHEET
Testing Service Corporation
Carol Stream, IL 60188

SOILGEMR 76757.GPJ TSC ALL.GDT 5/20/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-2	3 inch	100
Sample: B	2	100
Depth: 28.0'-29.0	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	100
	# 4	100
	# 10	100
	# 40	100
	# 100	100
	# 200	98

SOIL CLASSIFICATION: Dark gray very silty CLAY, trace sand (CL)

%GRAVEL	%SAND	%SILT	%CLAY
0	2	77	21

MC%		LL	PL	PI
35.1		42	18	24

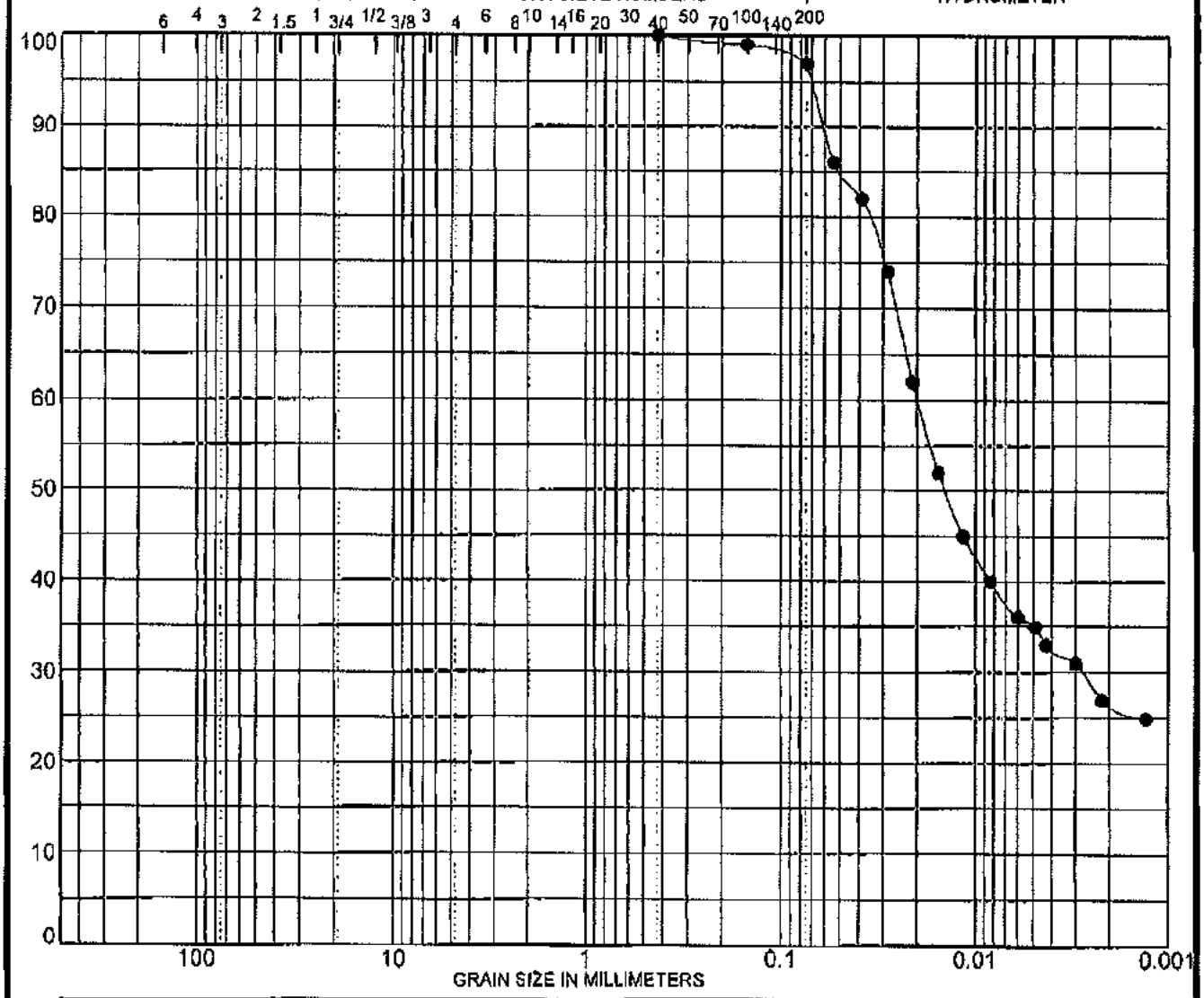
PROJECT: Geotechnical Testing
LOCATION:
JOB NO. L-76,757
DATE May 20, 2011

SB2

SOIL DATA SHEET

Testing Service Corporation
Carol Stream, IL 60188

SOILGENR 76757.GPJ TSC ALL.GDT 5/20/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-2	3 inch	100
Sample: C	2	100
Depth: 32.0'	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	100
	# 4	100
	# 10	100
	# 40	100
	# 100	99
	# 200	97

SOIL CLASSIFICATION: Dark gray silty CLAY, trace sand (CH)

%GRAVEL	%SAND	%SILT	%CLAY
0	3	70	27

MC%		LL	PL	PI
32.8		51	16	35

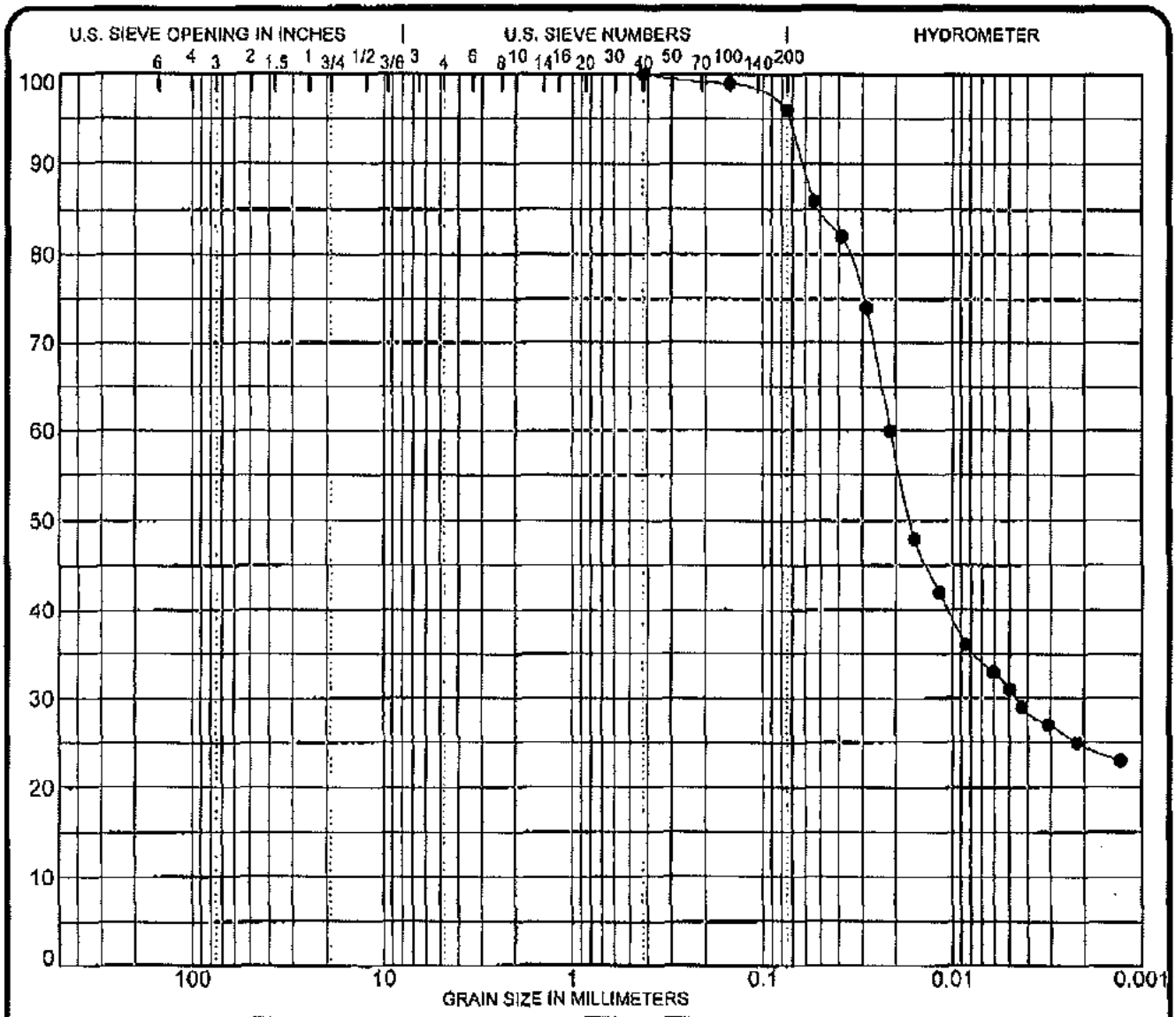
PROJECT Geotechnical Testing
LOCATION ,
JOB NO. L - 76,757
DATE May 20, 2011

SB2

SOIL DATA SHEET

Testing Service Corporation
Carol Stream, IL 60188

SOILGENR Y6757.GPJ TSC_ALL.GDT 5/20/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SOIL CLASSIFICATION
Boring: SB-3	3 inch	100	Dark gray very silty CLAY, trace sand
Sample: A	2	100	(CL)
Depth: 38.0'	1 1/2	100	
	1	100	%GRAVEL: 0 | %SAND: 4 | %SILT: 71 | %CLAY: 25
NOTES:	3/4	100	
	3/8	100	
	#4	100	MC%: 34.4 | LL: 46 | PL: 15 | PI: 31
	#10	100	
	#40	100	
	#100	99	
	#200	96	

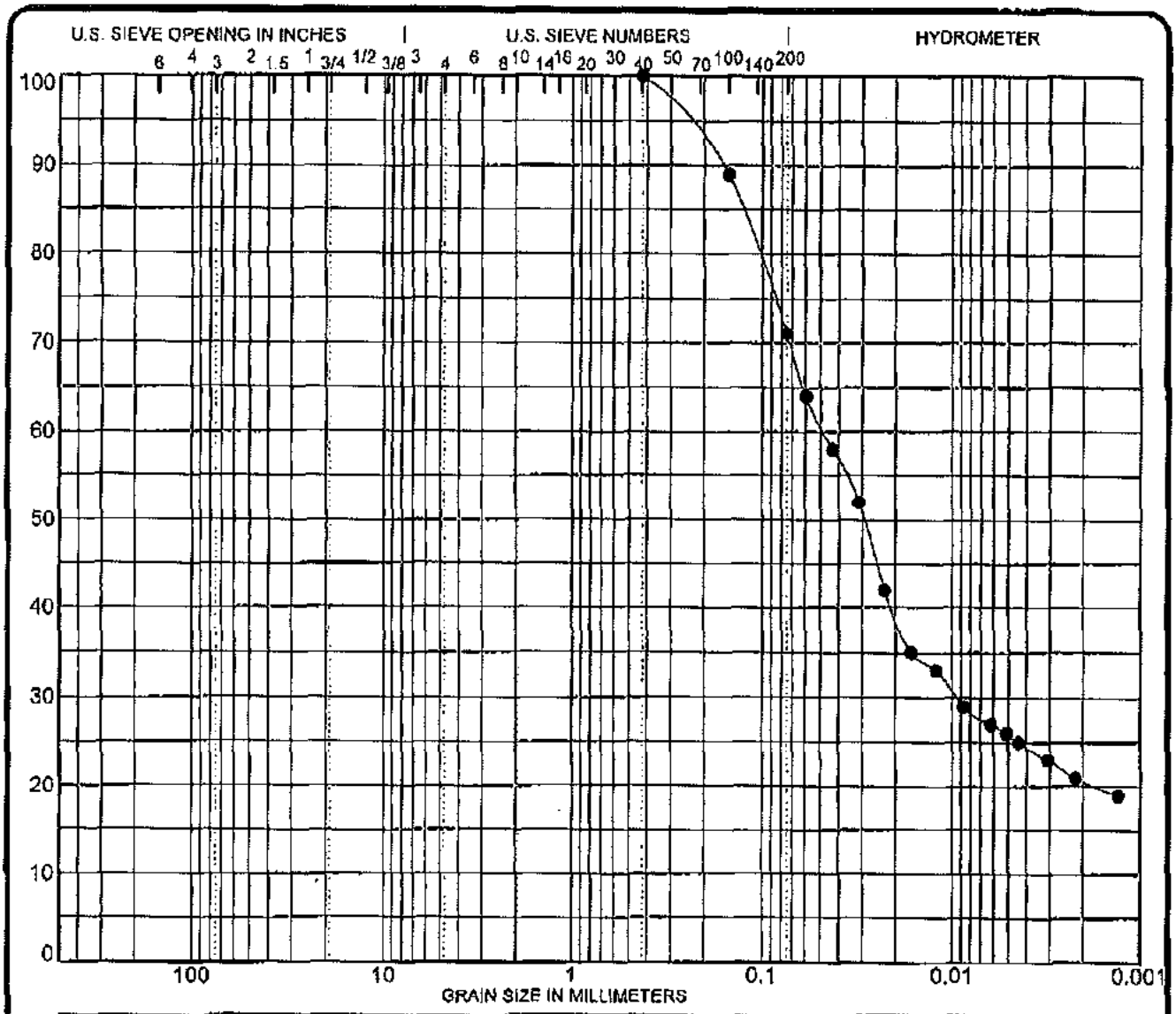
PROJECT Geotechnical Testing
LOCATION ,
JOB NO. L - 76,757
DATE May 20, 2011

SB3

SOIL DATA SHEET

Testing Service Corporation
Carol Stream, IL 60188

SOILGEHR 76757.GPJ TSC_ALLGDT 5/20/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-4	3 inch	100
Sample: A	2	100
Depth: 34.0'	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	100
	# 4	100
	# 10	100
	# 40	100
	# 100	89
	# 200	71

SOIL CLASSIFICATION

Dark gray silty CLAY, some sand (CL)

%GRAVEL	%SAND	%SILT	%CLAY
0	29	50	21

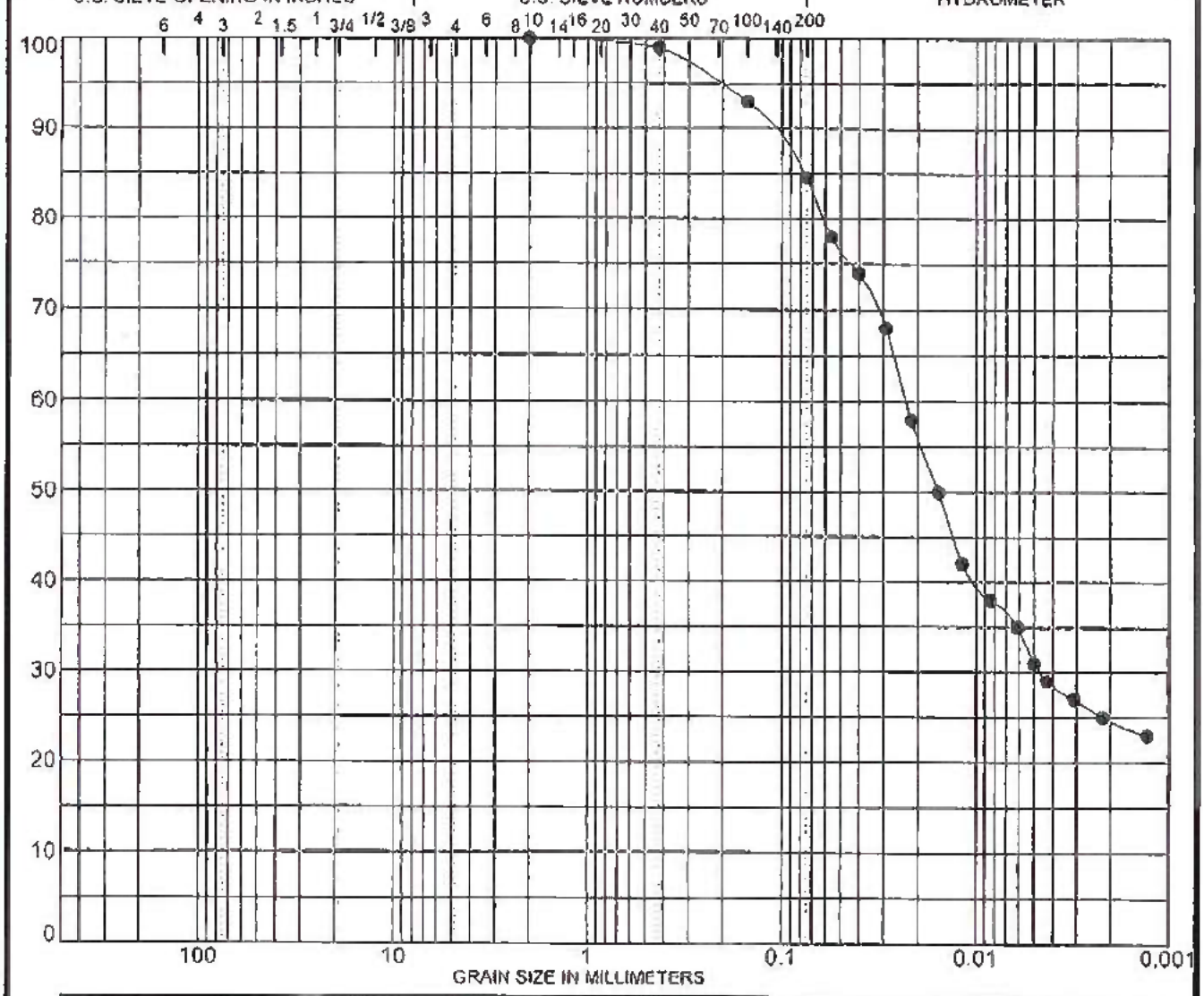
MC%		LL	PL	PI
24.1		41	12	29

PROJECT Geotechnical Testing
LOCATION ,
SB4

JOB NO. L - 76,757
DATE May 20, 2011

SOIL DATA SHEET
Testing Service Corporation
Carol Stream, IL 60188

SOILGENR 76757.GPJ TSC_ALL.GDT 5/20/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SOIL CLASSIFICATION
Boring: SB-5	3 inch	100	Gray very silty CLAY, little sand (CL)
Sample: A	2	100	
Depth: 34.0'	1 1/2	100	
	1	100	
NOTES:	3/4	100	
	3/8	100	
	# 4	100	
	# 10	100	
	# 40	99	
	# 100	93	
	# 200	85	

%GRAVEL	%SAND	%SILT	%CLAY
0	15	60	25

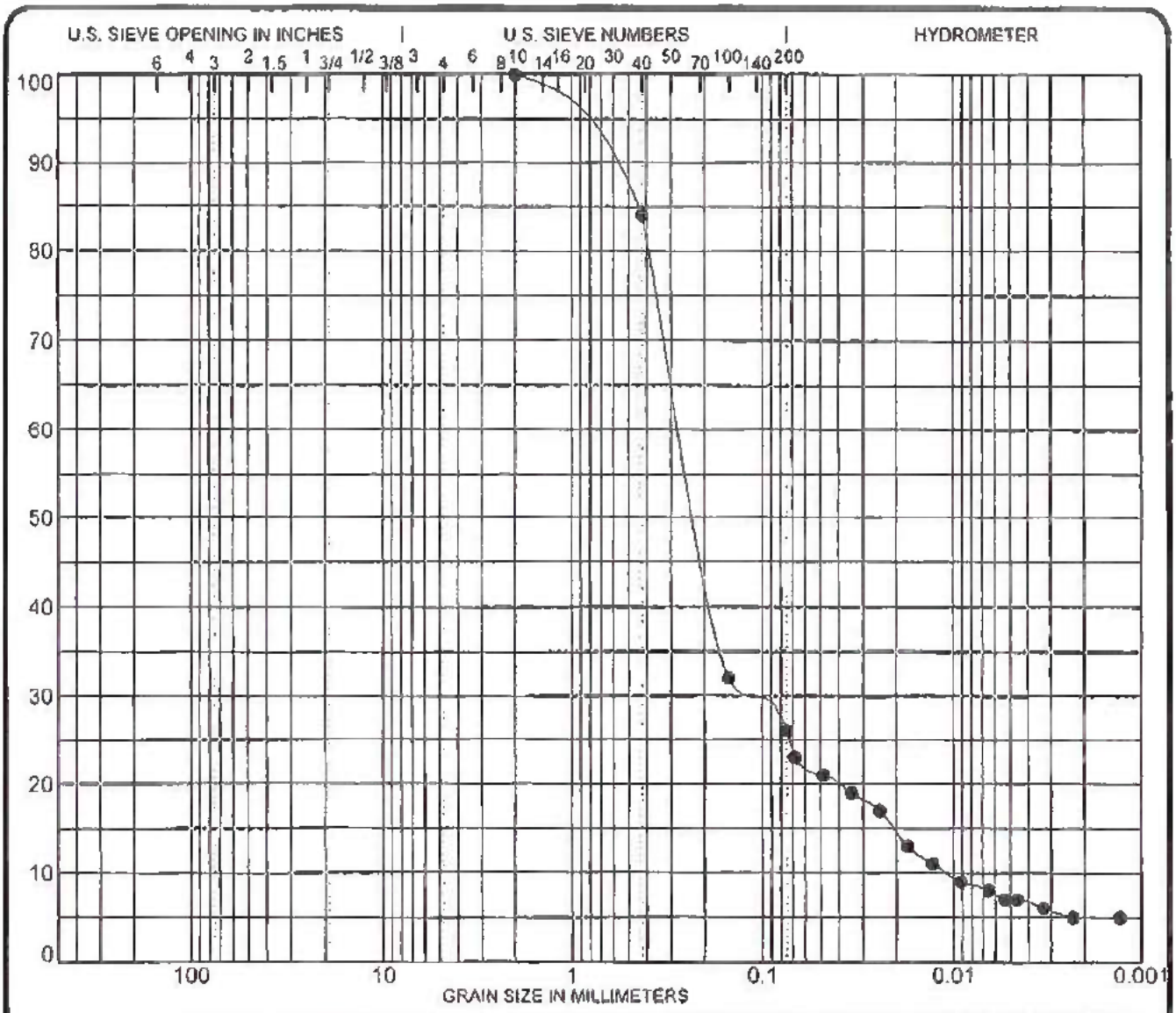
MC%		LL	PL	PI
23.3		43	16	27

PROJECT Geotechnical Testing
LOCATION ,
SB5

JOB NO. L - 76,757
DATE May 23, 2011

SOIL DATA SHEET
Testing Service Corporation
Carol Stream, IL 60188

SOILGENR 7675/.GPJ TSC_ALL.GDT 5/24/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-6	3 inch	100
Sample: A	2	100
Depth: 16.0'-17.0'	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	100
	# 4	100
	# 10	100
	# 40	84
	# 100	32
	# 200	26

SOIL CLASSIFICATION: Gray clayey SAND (SC)

%GRAVEL	%SAND	%SILT	%CLAY
0	74	21	5

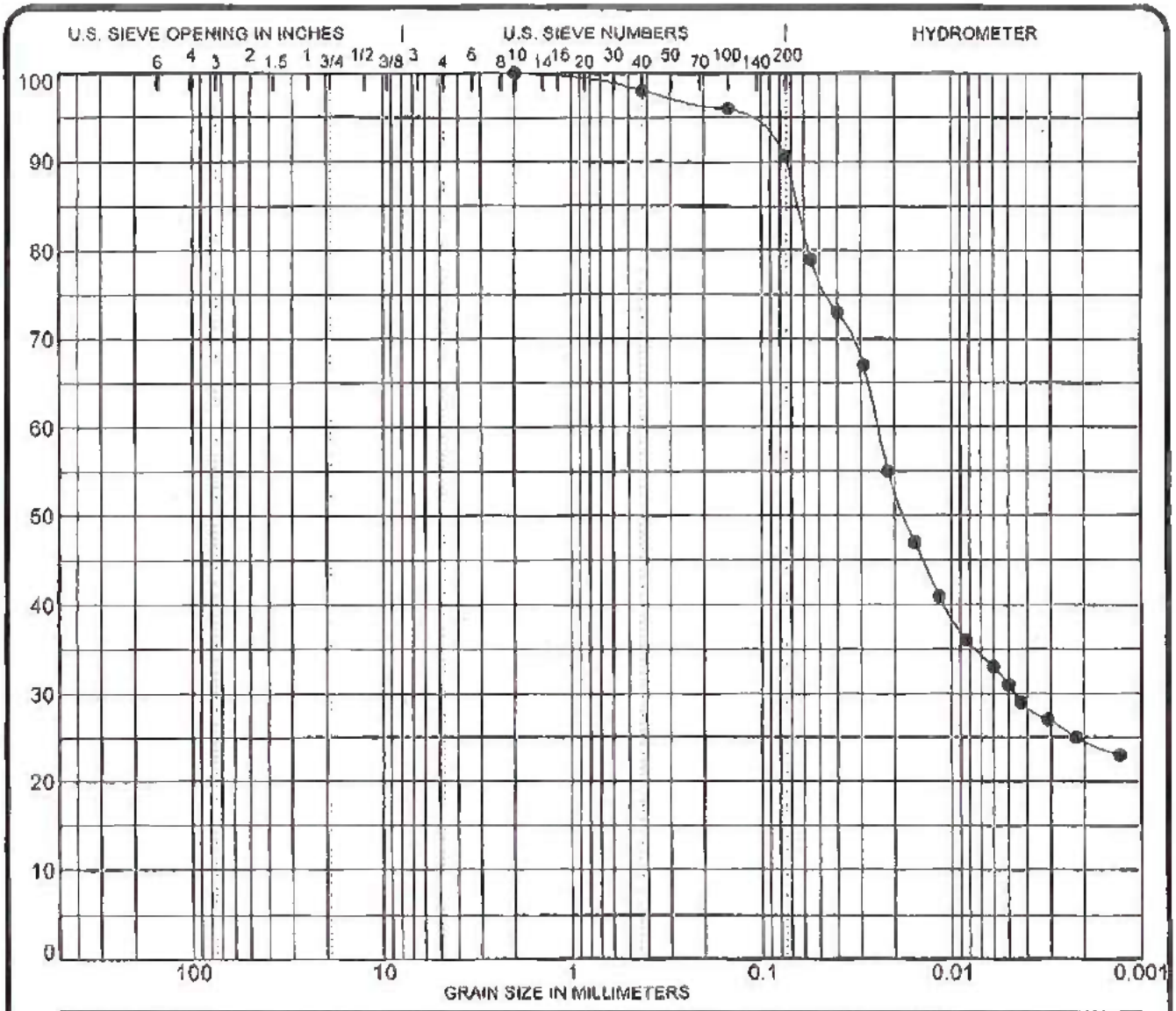
MC%		LL	PL	PI
24.6		16	13	3

PROJECT Geotechnical Testing
LOCATION ,
JOB NO. L - 76,757
DATE May 23, 2011

SB6

SOIL DATA SHEET
Testing Service Corporation
Carol Stream, IL 60188

SOILGINK 76757.GPJ TSC ALL.GDT 5/23/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-6	3 inch	100
Sample: B	2	100
Depth: 28.0'-29.0'	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	100
	# 4	100
	# 10	100
	# 40	98
	# 100	96
	# 200	91

SOIL CLASSIFICATION

Brownish gray very silty CLAY, trace sand

(CL)

%GRAVEL	%SAND	%SILT	%CLAY
0	9	66	25

MC%		LL	PL	PI
28.3		43	13	30

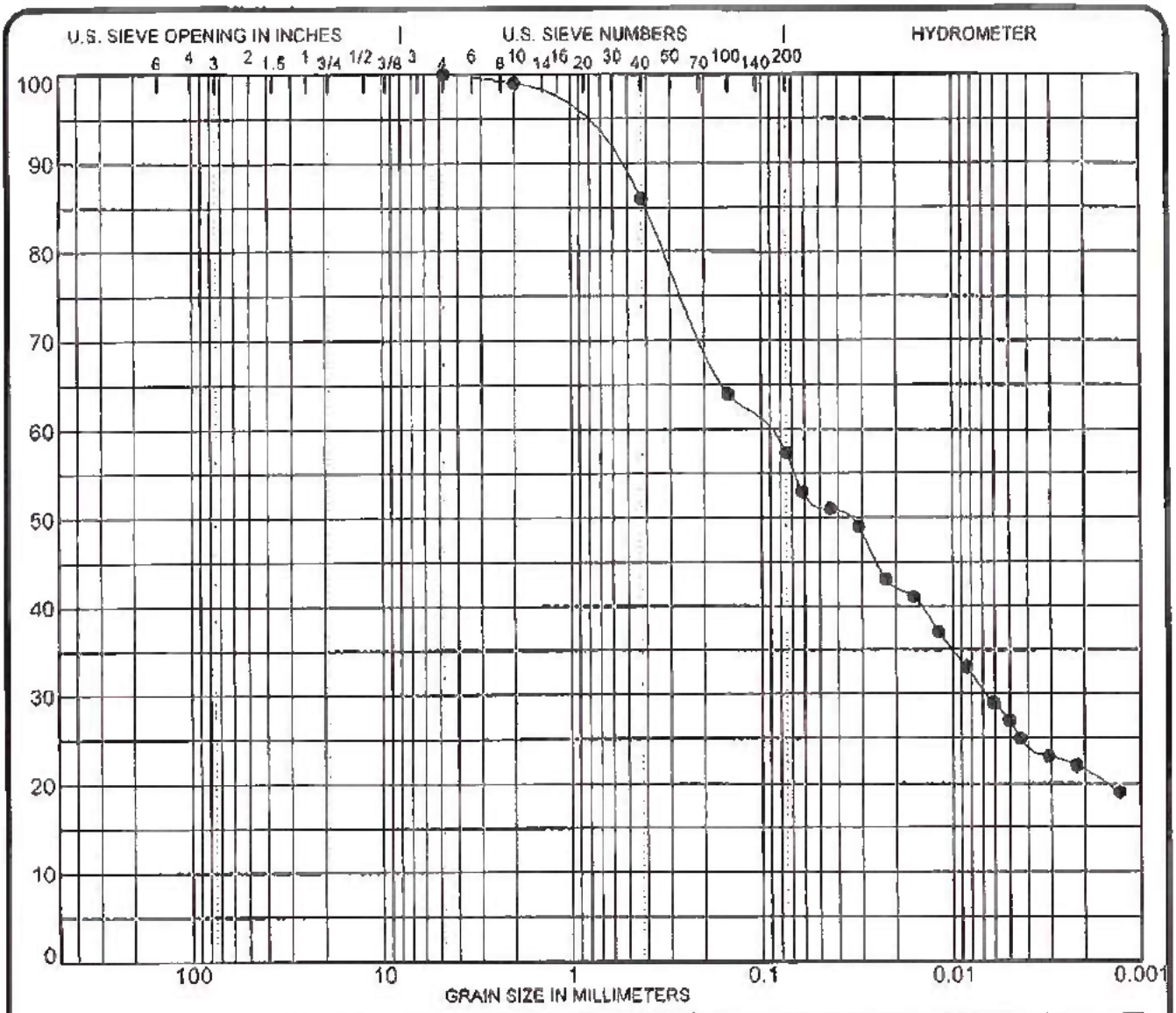
PROJECT Geotechnical Testing
LOCATION ,
SB6

JOB NO. L - 76,757
DATE May 23, 2011

SOIL DATA SHEET

Testing Service Corporation
Carol Stream, IL 60188

SOILGENR 76757 GPJ TSC_ALL.GDT 5/23/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-8	3 inch	100
Sample: A	2	100
Depth: 10.0'	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	100
	# 4	100
	# 10	99
	# 40	86
	# 100	64
	# 200	57

SOIL CLASSIFICATION: Gray sandy CLAY (CL)

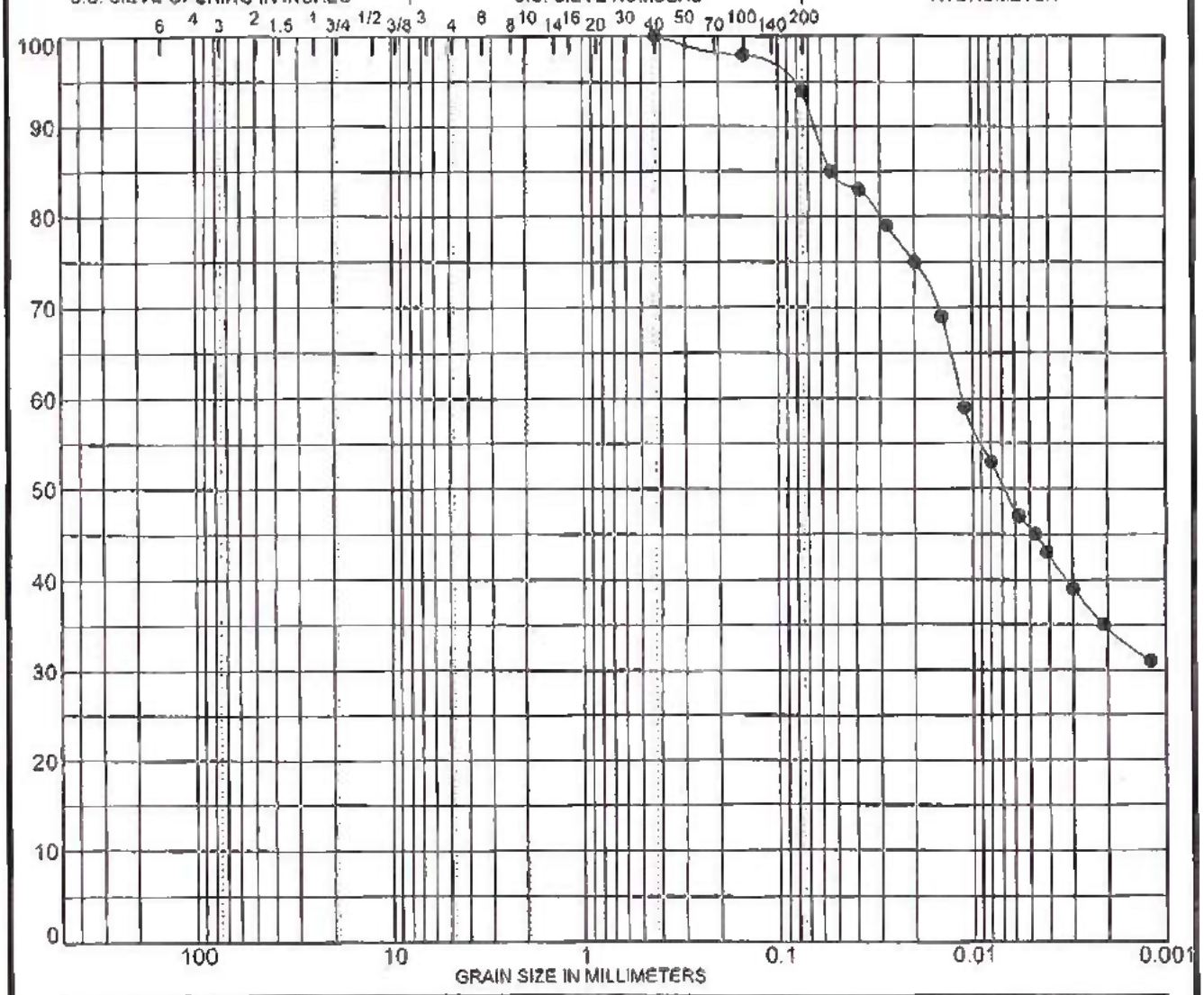
%GRAVEL	%SAND	%SILT	%CLAY
0	43	36	21

MC%		LL	PL	PI
21.6		36	12	24

PROJECT Geotechnical Testing
LOCATION SB8
JOB NO. L - 76,757
DATE May 23, 2011

SOIL DATA SHEET
Testing Service Corporation
Carol Stream, IL 60188

SOILGENR 76757.GPJ TSC ALL.GDT 5/23/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-8	3 inch	100
Sample: B	2	100
Depth: 20.0'	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	100
	# 4	100
	# 10	100
	# 40	100
	# 100	98
	# 200	94

SOIL CLASSIFICATION: Gray very silty CLAY, trace sand (CL)

%GRAVEL	%SAND	%SILT	%CLAY
0	6	59	35

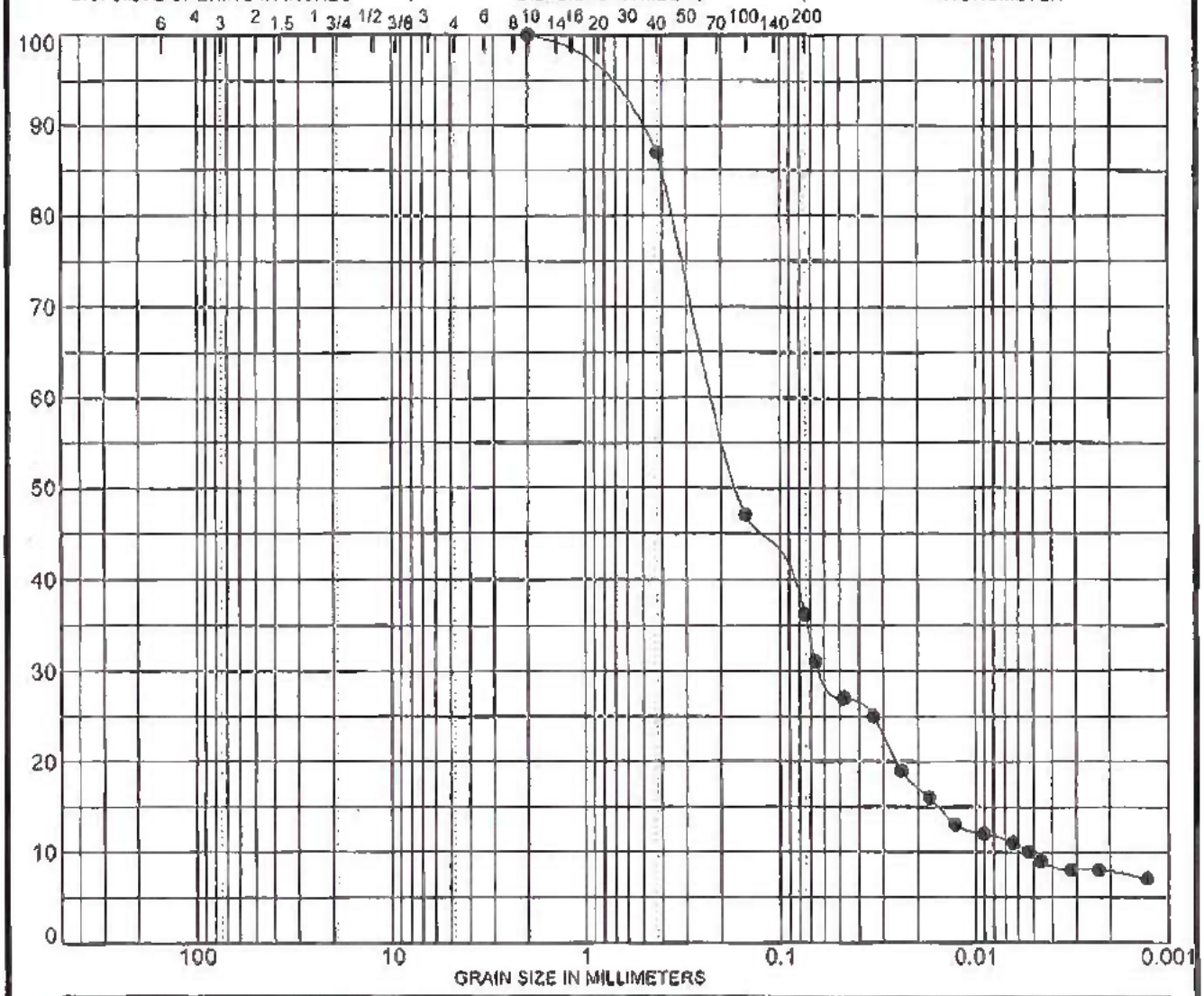
MC%		LL	PL	PI
31.1		56	19	37

PROJECT Geotechnical Testing
LOCATION ,
SB8

JOB NO. L - 76,757
DATE May 23, 2011

SOIL DATA SHEET
Testing Service Corporation
Carol Stream, IL 60188

SOILGENR 76757.GPJ TSC ALLGDT 5/23/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SOIL CLASSIFICATION
Boring: SB-8	3 inch	100	Gray clayey SAND (SC)
Sample: C	2	100	
Depth: 22.0'	1 1/2	100	
	1	100	%GRAVEL: 0 | %SAND: 64 | %SILT: 28 | %CLAY: 8
NOTES:	3/4	100	
	3/8	100	
	# 4	100	MC%: 26.9 | LL: 21 | PL: 13 | PI: 8
	# 10	100	
	# 40	87	
	# 100	47	
	# 200	36	

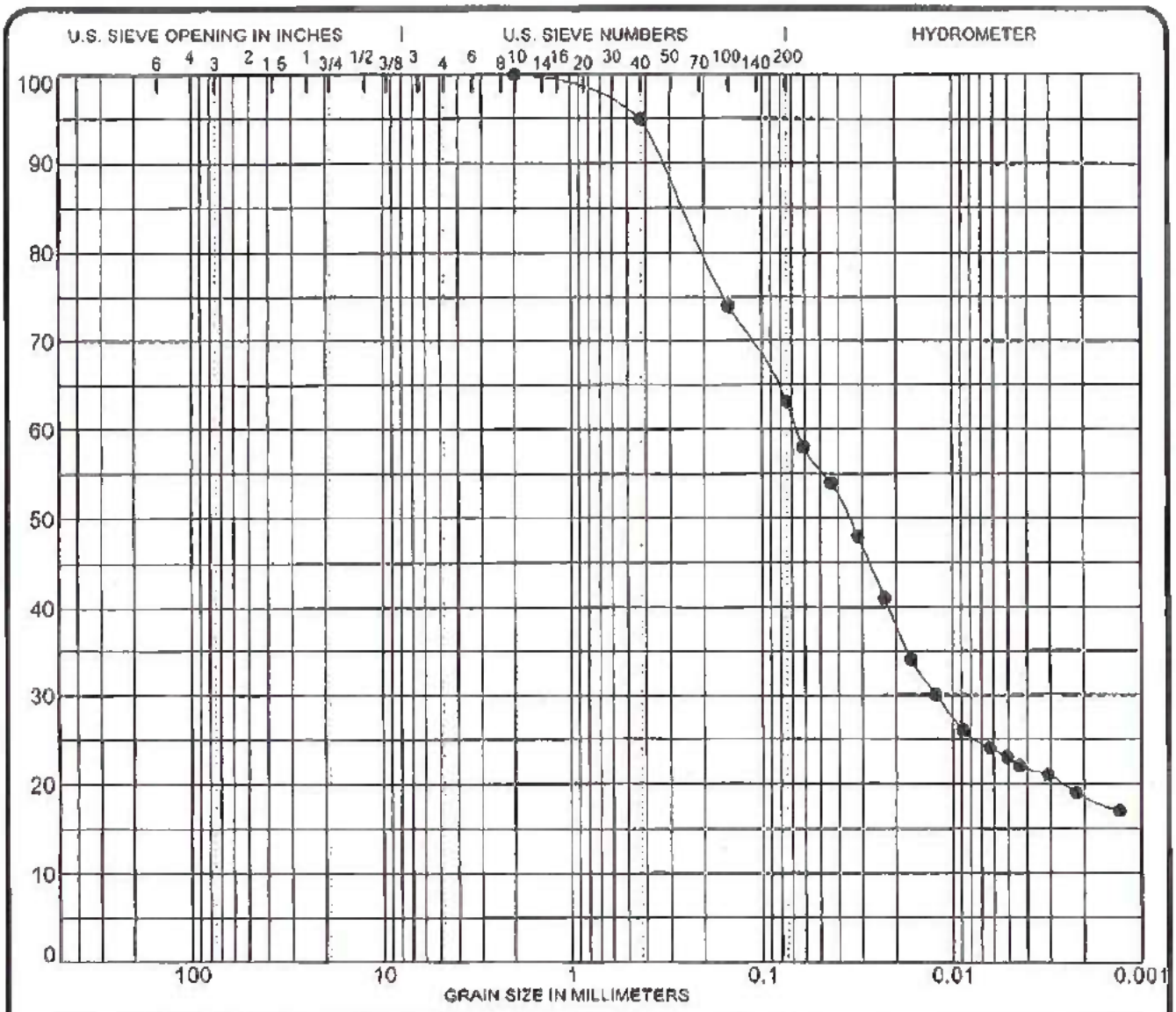
PROJECT Geotechnical Testing
LOCATION ,
SB8

JOB NO. L - 76,757
DATE May 23, 2011

SOIL DATA SHEET

Testing Service Corporation
Carol Stream, IL 60188

SOILGENR 7675? GPJ TSC_AUL.GDT 5/23/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS	SOIL CLASSIFICATION
Boring: SB-9	3 inch	100	Brownish gray sandy CLAY (CL)
Sample: A	2	100	
Depth: 18.0'	1 1/2	100	
	1	100	%GRAVEL: 0 | %SAND: 37 | %SILT: 44 | %CLAY: 19
NOTES:	3/4	100	
	3/8	100	
	# 4	100	MC%: 34.0 | LL: 35 | PL: 13 | PI: 22
	# 10	100	
	# 40	95	
	# 100	74	
	# 200	63	

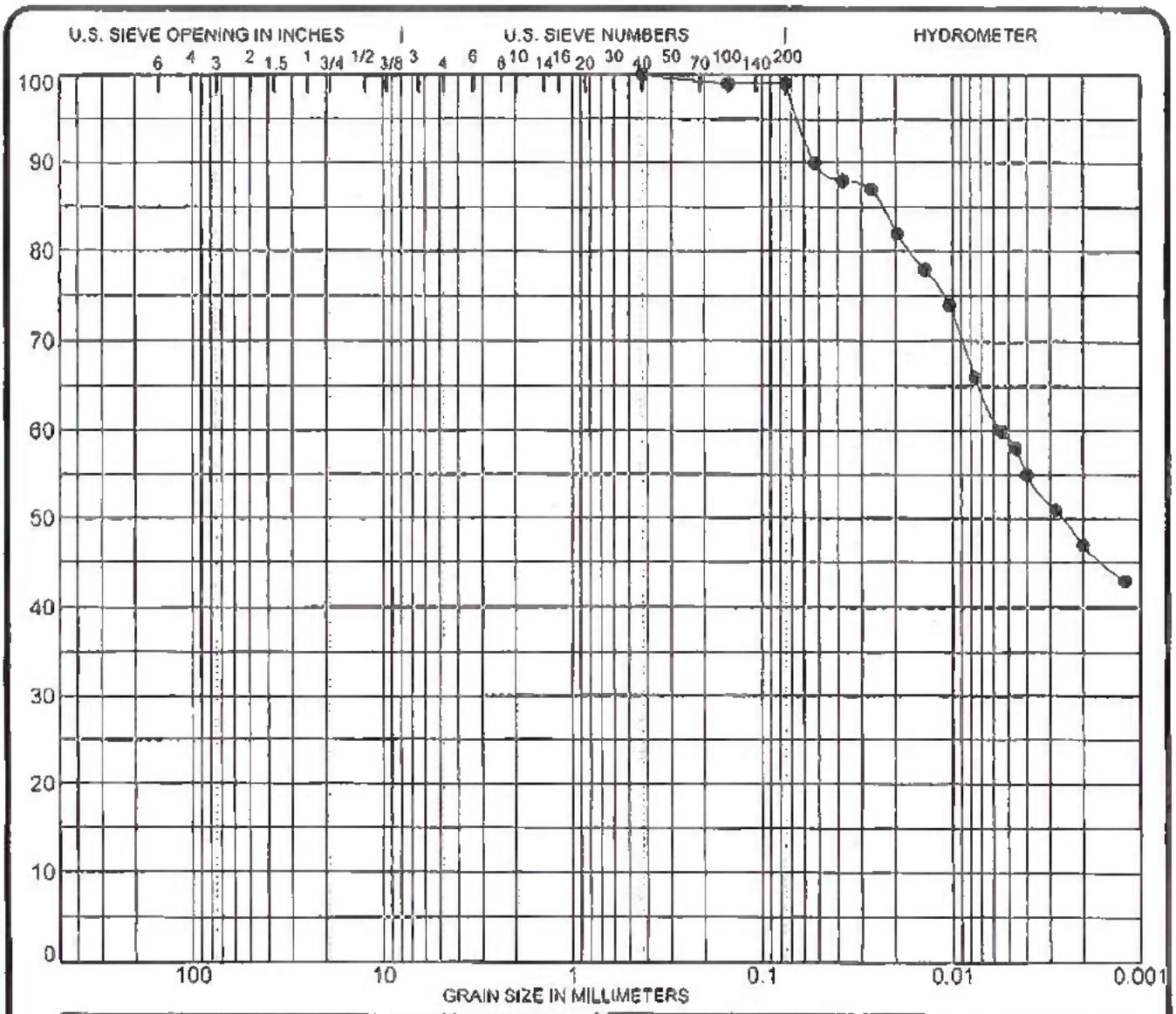
PROJECT Geotechnical Testing
LOCATION ,
SB9

JOB NO. L - 76,757
DATE May 23, 2011

SOIL DATA SHEET

Testing Service Corporation
Carol Stream, IL 60188

SOILGENR 76757.GPJ TSC_ALL.GDT 5/23/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-10	3 inch	100
Sample: A	2	100
Depth: 20.0'	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	100
	# 4	100
	# 10	100
	# 40	100
	# 100	99
	# 200	99

SOIL CLASSIFICATION

Brownish gray silty CLAY, trace sand

(CH)

%GRAVEL	%SAND	%SILT	%CLAY
0	1	52	47

MC%		LL	PL	PI
26.9		74	15	59

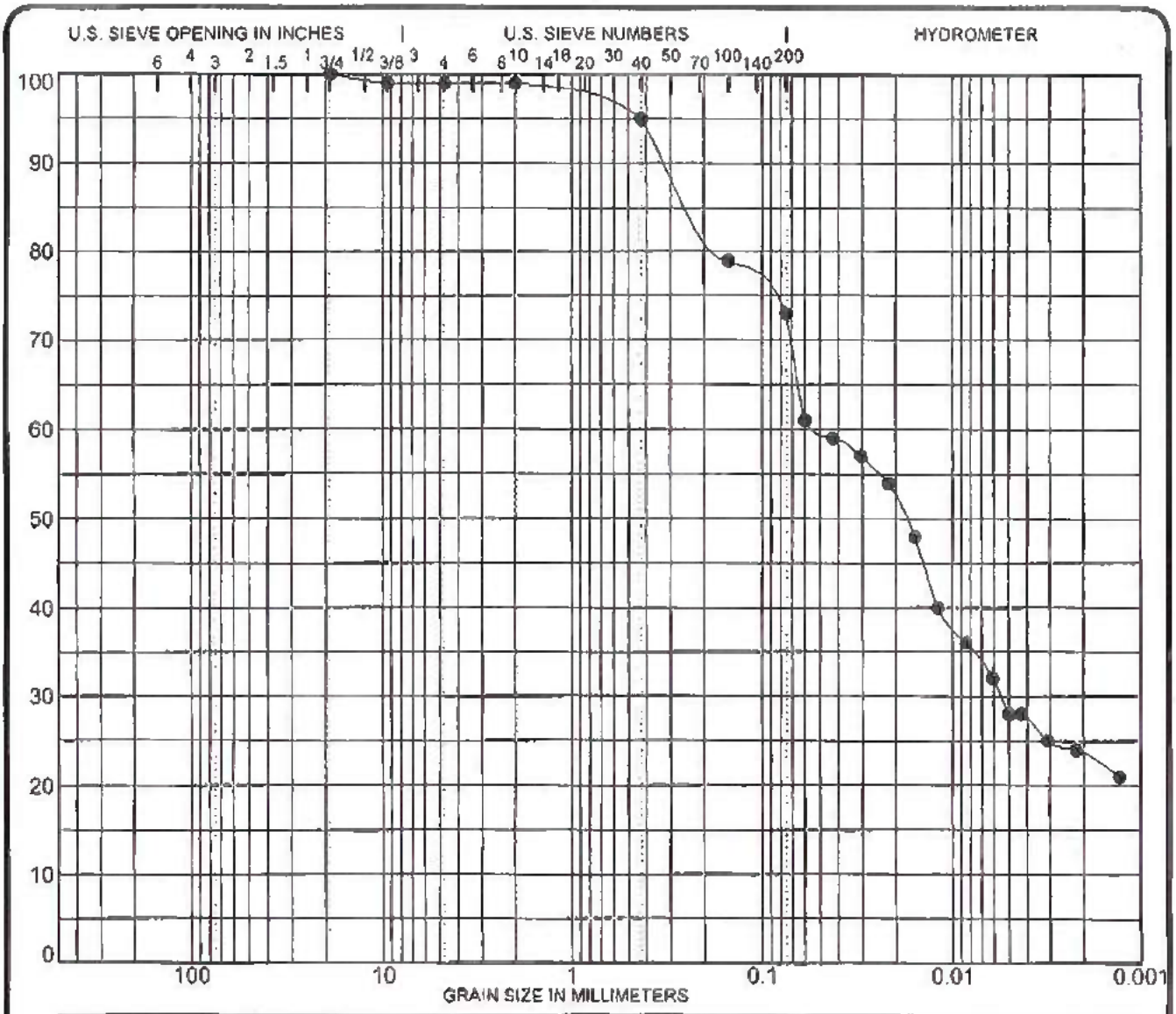
PROJECT Geotechnical Testing
LOCATION ,
SB10

JOB NO. L - 76,757
DATE May 23, 2011

SOIL DATA SHEET

Testing Service Corporation
Carol Stream, IL 60188

SOILGENR 76757.GPJ TSC ALL.GDT 5/23/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SPECIMEN IDENTIFICATION	SIEVE	% PASS
Boring: SB-12	3 inch	100
Sample: A	2	100
Depth: 23.0'-24.0'	1 1/2	100
	1	100
NOTES:	3/4	100
	3/8	99
	# 4	99
	# 10	99
	# 40	95
	# 100	79
	# 200	73

SOIL CLASSIFICATION: Gray silty CLAY, some sand, trace gravel (CL)

%GRAVEL	%SAND	%SILT	%CLAY
1	26	50	23

MC%		LL	PL	PI
35.9		42	16	26

PROJECT Geotechnical Testing
LOCATION ,
SB12

JOB NO. L - 76,757
DATE May 23, 2011

SOILGENR 76757.GPJ TSC ALL.GDT 5/23/11

SOIL DATA SHEET
Testing Service Corporation
Carol Stream, IL 60188

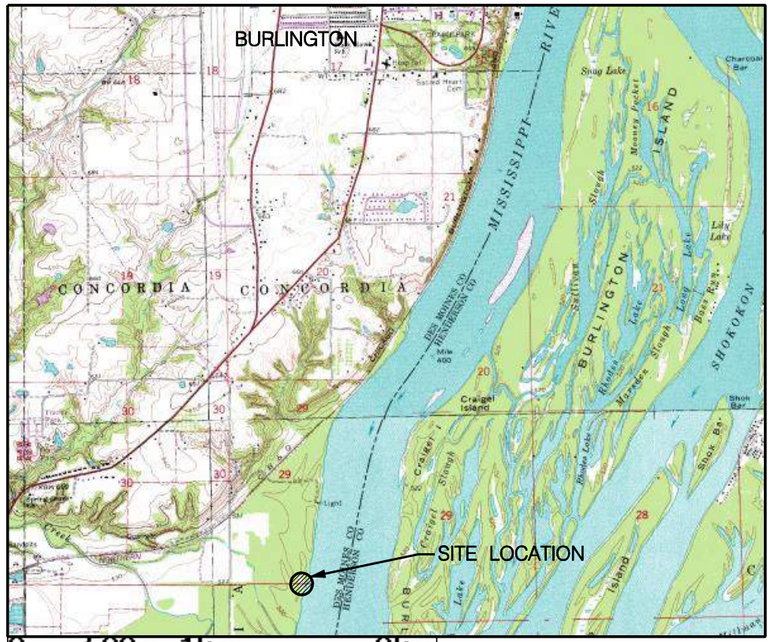
APPENDIX G – BGS Ash Seal Pond Drawings

Alliant Energy
Interstate Power and Light Company
Burlington Generating Station
Burlington, Iowa

History of Construction

ALLIANT ENERGY
BURLINGTON GENERATING STATION
SLURRY WALL CONSTRUCTION AND SEEP REPAIR

4282 SULLIVAN SLOUGH ROAD
BURLINGTON, IA 52601
OCTOBER 2007



AREA QUAD

DRAWING INDEX

SITE AERIAL

REV	DATE	BY	DESCRIPTION

SCALE: NONE

DESIGNED: M. Loerop
DRAWN: HHSI
CHECKED: HHSI

CLIENT: ALLIANT ENERGY
BURLINGTON GENERATING STATION

TITLE: COVER SHEET

HARD HAT SERVICES TM
Engineering, Construction and Management Solutions
940 E. Diehl Rd, Suite 150
Naperville, IL 60563
(630) 637-9470

SHEET: 1 OF 3 SHEETS

10/12/2007 ...\cover.dgn

ECO-STONE
PRODUCTION
& STORAGE

ASH POND

APPROXIMATE LOCATION OF
POND OVERFLOW STRUCTURE

TOP OF BERM SLOPE

WEST RR TRACK WAS GIVEN
AN ELEVATION OF 100.00 FEET

RR TRACKS

FENCE

ASH POND
DISCHARGE PIPE

A
3

ROAD

SB9
SB8
SB7
SB6
SB4
SB1
SB3
SB2
SB5

MISSISSIPPI RIVER

STORMWATER
OUTFALL 002

275' SOIL-BENTONITE SLURRY WALL

APPROXIMATE LOCATION OF SEEP
TO BE REPAIRED BY CONTRACTOR
PER SPECIFICATIONS

APPROXIMATE LOCATION OF
INVESTIGATION SOIL BORINGS

APPROXIMATE EDGE OF WATER

FENCE

N

REV	DATE	BY	DESCRIPTION

SCALE: 0 30 60
SCALE IN FEET

DESIGNED: M. Loerop
DRAWN: HHSI
CHECKED: HHSI

CLIENT: ALLIANT ENERGY
BURLINGTON GENERATING STATION

TITLE: GENERAL SITE LAYOUT

HARD HAT SERVICES TM
Engineering, Construction and Management Solutions
940 E. Diehl Rd, Suite 150
Naperville, IL 60563
(630) 637-9470

SHEET: 2
OF 3 SHEETS

10/12/2007 ...\SITE LAYOUT.dgn

DESIGN SPECIFICATIONS

Contractor Experience

An experienced slurry wall Contractor shall construct a soil-bentonite slurry wall. Experience shall include at least 100,000 square feet of soil-bentonite slurry wall construction with the contractors proposed site superintendent having at least 50,000 square feet of soil bentonite wall experience. Contractor shall submit their experience to the Project Manager for approval prior to installation of the slurry wall or purchase of materials.

Sodium Bentonite

Contractor shall supply the Construction Manager with the bentonite manufacturer's certificate of compliance. The bentonite shall be pulverized premium grade sodium cation montmorillonite.

Test results for each lot of bentonite must be provided:

• YP/PV ratio	API Std. 13A	Less than 3
• Viscometer		Greater than 30
• Filtrate Loss		15 - 25 cm3 loss at 100psi, and 12-15cm3 loss at 42 psi with no more than 2 mm of filter cake on the paper
• Moisture Content	ASTM D 2216	less than 10 percent

Sodium Bentonite must be stored in an above ground dry enclosure. High humidity storage locations shall not be used. Prematurely hydrated sodium bentonite shall not be used for construction of the slurry wall and shall be properly disposed.

Make-up Water

Clean and fresh water, free from excessive quantities of deleterious substances that could adversely affect the properties of the slurry, shall be used to manufacture the bentonite slurry. It is the responsibility of the contractor that the slurry resulting from the water used shall always meet the following standards:

• pH	6 - 9
• Hardness	less than 200 ppm
• Total Dissolved Solids	less than 500 ppm
• Oil, organics, acids, alkali	less than 50 ppm each
• Chloride	report

Sodium Bentonite Slurry

The initial bentonite slurry must be tested prior to placement in the trench. The slurry may either be mixed in high shear mixers or mixed and hydrated in slurry hydration ponds. If slurry ponds are used for hydration, dry bentonite shall be added in a venturi mixer, not in bulk. Sodium Bentonite shall be added to the make-up water at a minimum of 5% by weight.

• Viscosity - Marsh Funnel (API RP 13B-1)	less than 40 seconds
• Density	less than 64 pcf
• pH	6.5 to 10

A minimum hydration time of 8 hours shall be used.

After placement in the trench, the slurry shall be tested two times at two locations for each 8-hour shift. At each location the slurry shall be tested two feet from the surface and two feet from the bottom of the trench

- The viscosity shall be measured using the Marsh Funnel test (API RP 13B-1) and shall be between 30 to 40 seconds.
- Slurry shall have a unit weight between 64 pcf and 85 pcf unless approved by the Project Manager. If the slurry exceeds 85 pcf the excess solids must be removed by desanding or the slurry replaced with fresh slurry.

In place slurry shall be no more than 2 feet below the top of the working platform and at least 2 feet above the ash pond water elevation.

Soil-Bentonite Backfill

Soil used to produce the soil-bentonite backfill shall pass the following gradation specification.

- 65 to 100 percent passing 3/8" sieve
- 40 to 85 percent passing the #20 sieve
- 25 to 40 percent passing the #200 sieve
- Roll soil that passes the #200 sieve to 1/8 inch thread

Bentonite backfill shall be mixed with the soil removed from the excavation and mixed until the material is homogeneous with a slump of 2 to 6 inches, as measured per ASTM D 143. The Contractor shall mix the materials at the location determined by the Project Manager. Contractor shall provide documentation to the Project Manager that the soil-bentonite backfill contains at least 2% bentonite by weight. A passing slump test is required for each 750 CY of backfill material. All particles should be coated with bentonite slurry and large particles (> 4 inches) should be removed or segregated. The tracks of a bulldozer and excavator or other method may be used in reducing the clod size and in producing a homogeneous material prior to material placement within the slurry wall. The slurry wall shall be constructed at least 12 inches above the high water elevation within the settling pond, which will be provided by the Project Manager. The Contractor shall place the soil-bentonite backfill to a depth of 18 inches below the surrounding ground elevation.

The Contractor shall demonstrate, to the satisfaction of the Project Manager, that each section of the slurry-filled trench is continuous prior to backfilling. Trench continuity shall be assured by demonstrating the free action and movement of the excavation equipment within the trench prior to backfilling. Digging tools must pass vertically from top to bottom of the trench, and horizontally along the alignment of the trench, without encountering unexcavated material. The trench shall be verified and documented by the Contractor for proper depth every 10 feet.

The contractor shall demonstrate, to the satisfaction of the Project Manager, that the trench is keyed the minimum specified depth into the underlying hard silty clay. Penetration of the bottom of the trench into the underlying hard silty clay shall be assured by observation of the cuttings removed from the trench and by comparing direct trench depth measurements to anticipated depths based on the design details.

Temporary and Permanent Clay Cap

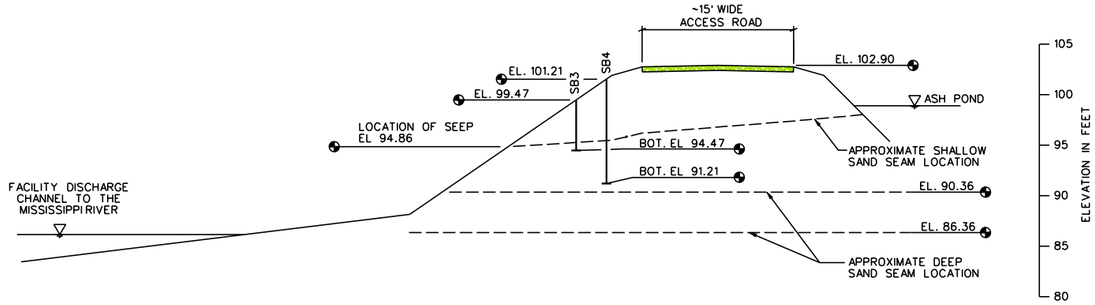
A two-foot deep temporary protective slurry wall cap shall be constructed in the form of non-compacted soil cover and placed within 24-hours of each 100-foot length of slurry wall. The temporary cap shall be completely removed after greater than two weeks of consolidation time. In place of the temporary cap, Contractor may chose to place soil-bentonite to finish grade and then remove soil bentonite to construct the permanent cap. The permanent clay cap shall be constructed by replacing the void space with at least, three, 6-inch compacted clay lifts, placed at +/- 2% of optimum moisture content or as approved by project manager and compacted to 95% of a Standard Proctor, per ASTM D698. The compacted clay lifts shall be installed to match the surrounding ground surface, as necessary. The clay fill material shall pass the backfill gradation requirement as specified above.

Restoration Activities

A six-ounce geotextile shall be placed atop the completed soil bentonite slurry wall in accordance with the manufacture's installation instructions. The geotextile shall extend 5 feet beyond all disturbed areas along the berm. Finally, 6 inches of well-graded Iowa DOT 4120.03 Class C gravel shall be placed and compacted atop the geotextile at a minimum of 5 passes with a smooth drum roller. The gravel gradation shall be provided to and approved by the Project Manager prior to placement by the Contractor.

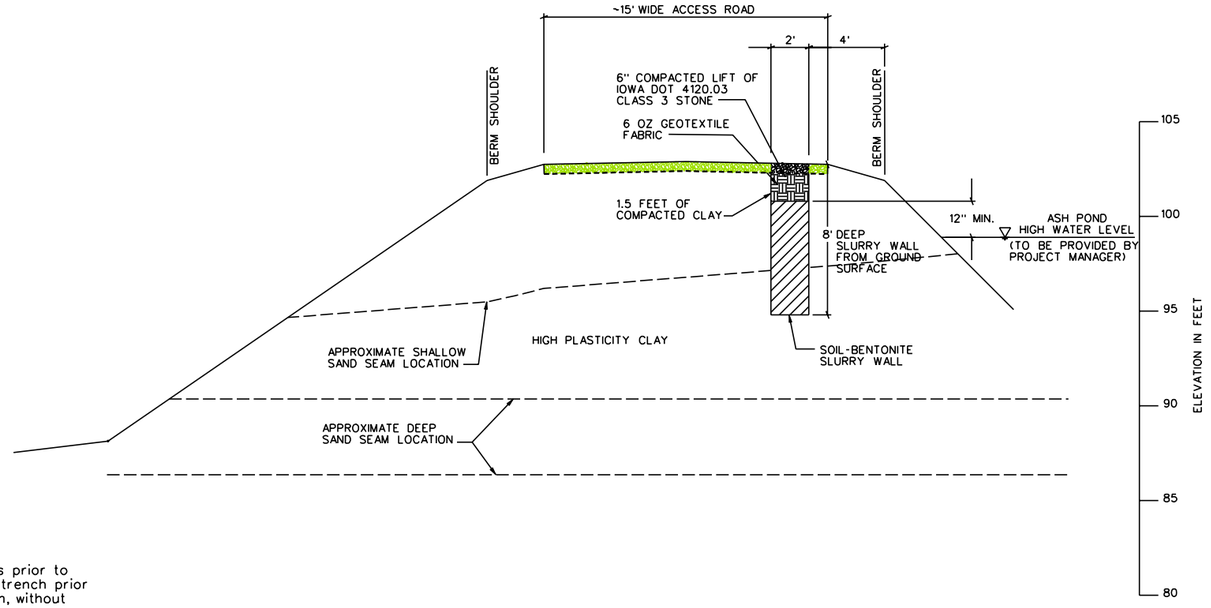
The Contractor shall repair the seep on the south east corner of the berm as shown on Sheet 2. The erosion area shall be regraded, seeded with Iowa DOT approved seed mix, and straw shall be placed on disturbed areas to prevent erosion along the berm face.

After Completion of backfilling and capping, remove and level all remaining excavated material and slurry as directed by the Project Manager. Dispose of excess slurry by spreading in thin layers at the location designated by the Project Manager. No slurry shall be left in ponds, and all ponds shall be pumped dry and backfilled with suitable material approved by the Project Manager.



EXISTING BERM DETAIL

0 4 10 15
SCALE IN FEET



SLURRY WALL SECTION 1/2

0 4 8
SCALE IN FEET

REV	DATE	BY	DESCRIPTION

SCALE: AS SHOWN

DESIGNED: M. Loerop
DRAWN: HHSI
CHECKED: HHSI

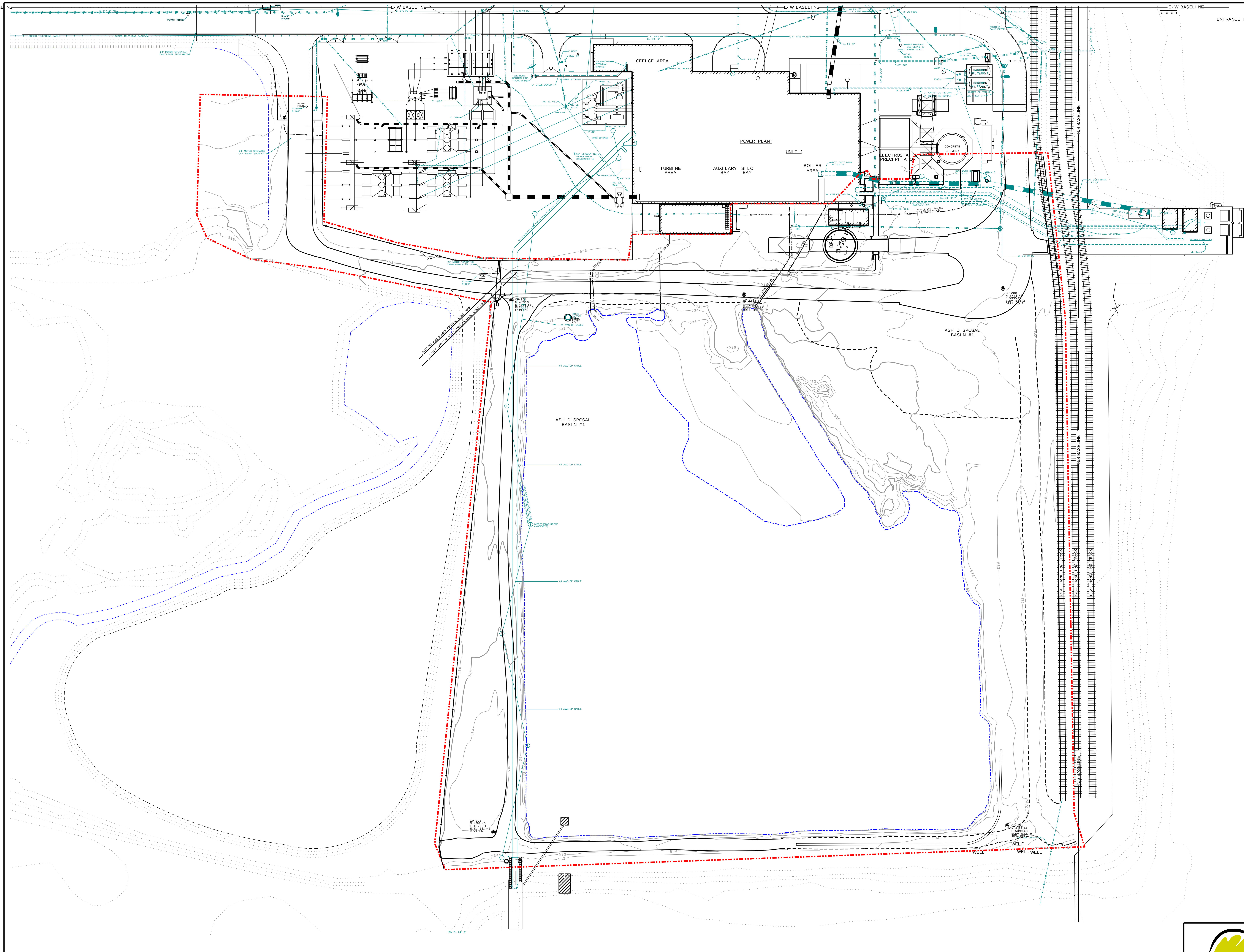
CLIENT: ALLIANT ENERGY
BURLINGTON GENERATING STATION

TITLE: SPECIFICATIONS AND DETAILS

HARD HAT SERVICES TM
Engineering, Construction and Management Solutions
940 E. Diehl Rd, Suite 150
Naperville, IL 60563
(630) 637-9470

SHEET: 3 OF 3 SHEETS

10/12/2007 ...\DETAILS.dgn



LEGEND:

(red dash-dot line)	APPROX. EXTENT OF JUNE 08 SURVEY
(teal line)	DESIGN UTILITY LOCATIONS
(black line)	NEWLY SURVEYED UTILITY LOCATIONS
(blue dash-dot line)	EDGE OF WATER
(dotted line)	NEWLY SURVEYED CONTOURS
(grey line, 536)	PRE-EXISTING CONTOURS

EXISTING SITE LAYOUT

PREPARED_FOR

ALLIANT ENERGY BURLINGTON, IOWA

HARD HAT SERVICES™
Engineering, Construction and Management Solutions
940 East Diehl Road, Suite 150 Naperville, Illinois 60563
www.hardhatinc.com

DATE: 6/25/2008	SHEET 1	DRAWING NUMBER 154.002	
SCALE: AS SHOWN			

ALLIANT ENERGY
BURLINGTON GENERATING STATION
4282 SULLIVAN SLOUGH RD, BURLINGTON, IOWA

BOILER SEAL WATER REROUTE, ASH POND REDESIGN, AND BAGHOUSE GRADING PLAN

MARCH 2009

PROJECT AERIAL MAP

SITE LOCATION MAP

DRAWING INDEX

COVER SHEET

BURLINGTON GENERATING STATION
BURLINGTON, IOWA

PREPARED FOR

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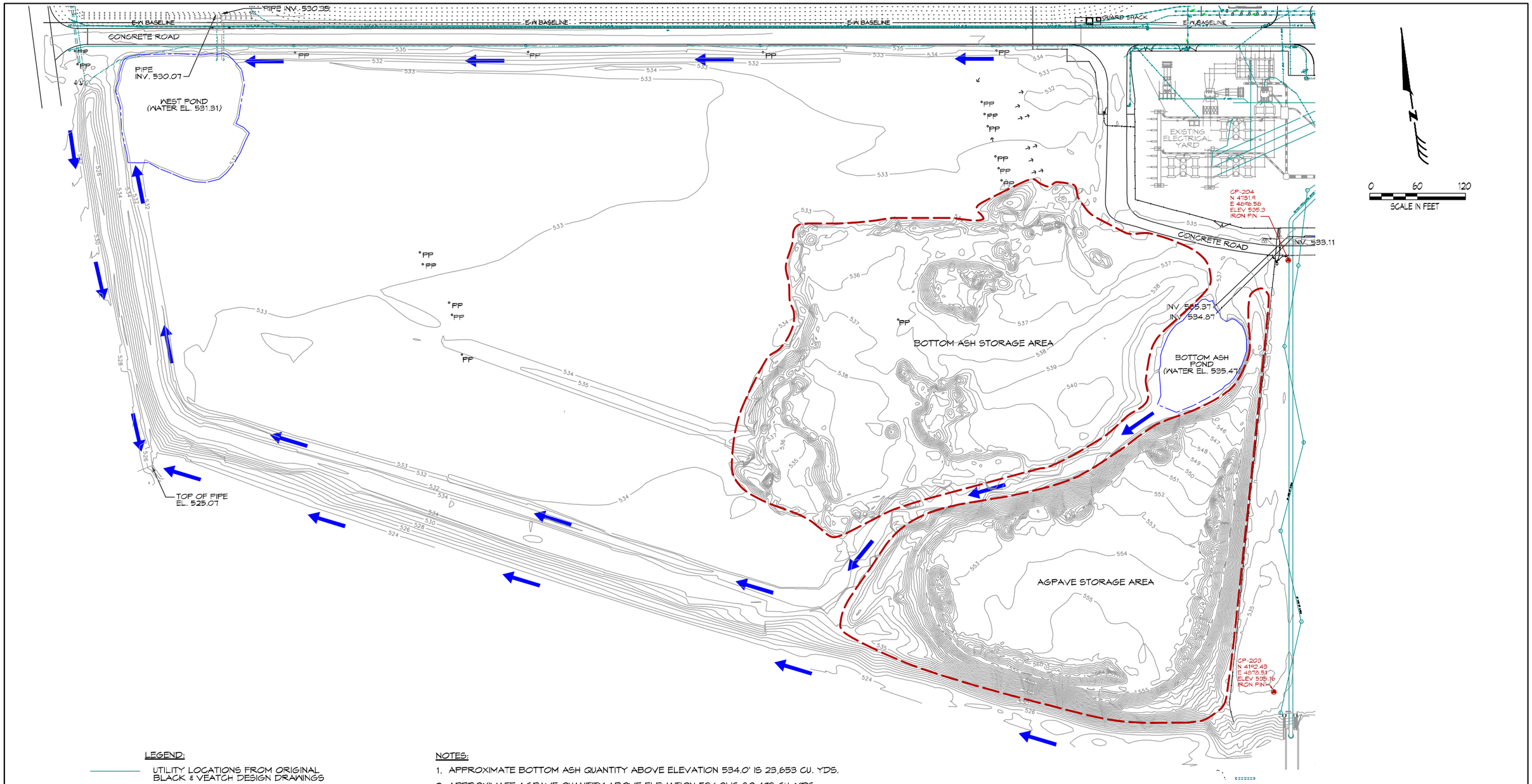
DATE: 3-27-09	SHEET 1	DRAWING NUMBER 154.002.D1
SCALE: NONE		



LEGEND:

- UTILITY LOCATIONS FROM ORIGINAL BLACK & VEATCH DESIGN DRAWINGS
- SURVEYED UTILITY LOCATIONS
- EDGE OF WATER
- ESTIMATED CONTOURS SUPPLIED BY ALLIANT ENERGY
- 536 SURVEYED CONTOURS
- GRAVEL ROAD
- °PP POWER POLE
- CONTROL POINT / MONUMENT
- OVERLAND FLOW DIRECTION

NOTES:

1. APPROXIMATE BOTTOM ASH QUANTITY ABOVE ELEVATION 534.0' IS 23,653 CU. YDS.
2. APPROXIMATE AGPAVE QUANTITY ABOVE ELEVATION 534.0' IS 80,493 CU. YDS.

EXISTING CONDITIONS - WEST

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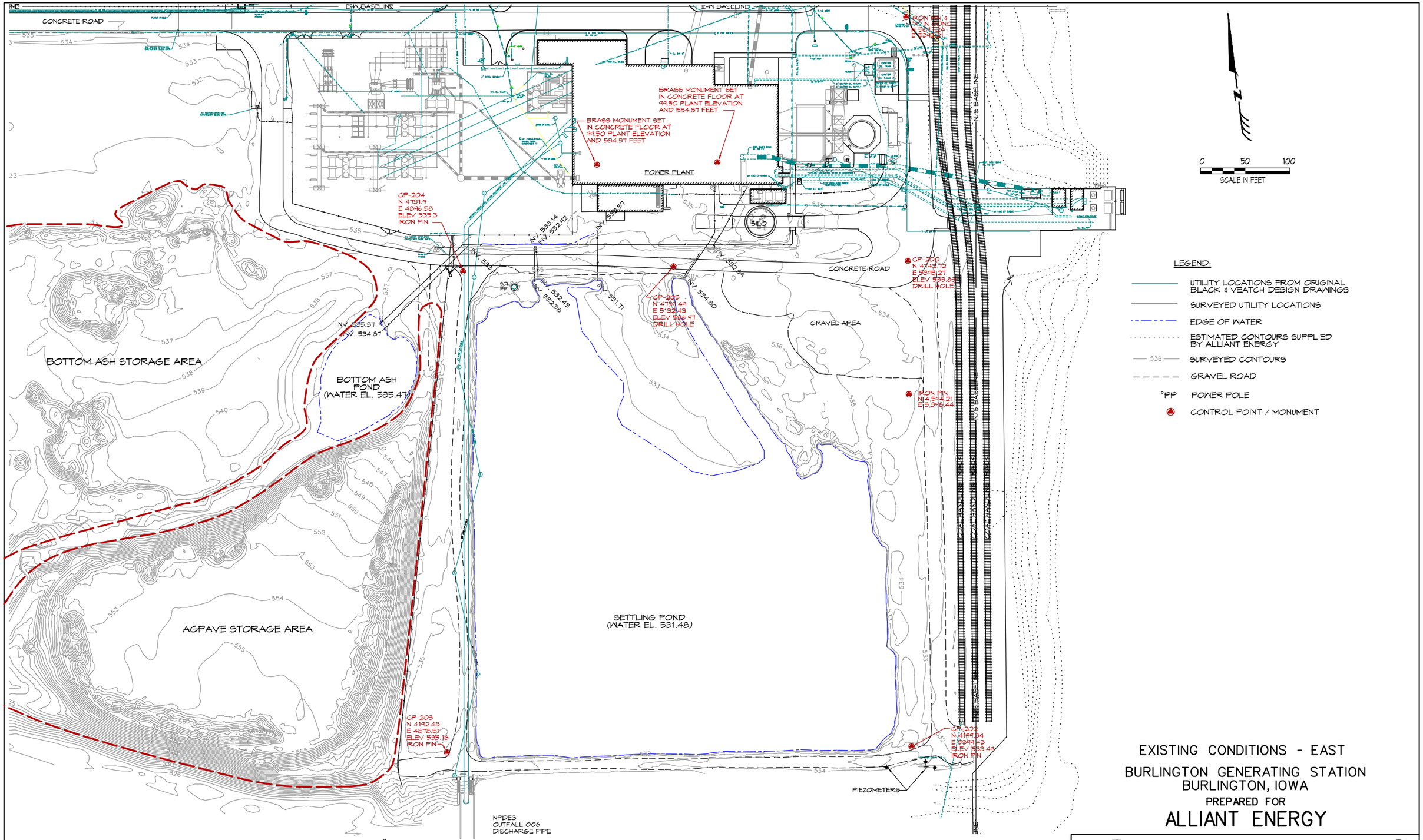

EXISTING CONDITIONS - EAST

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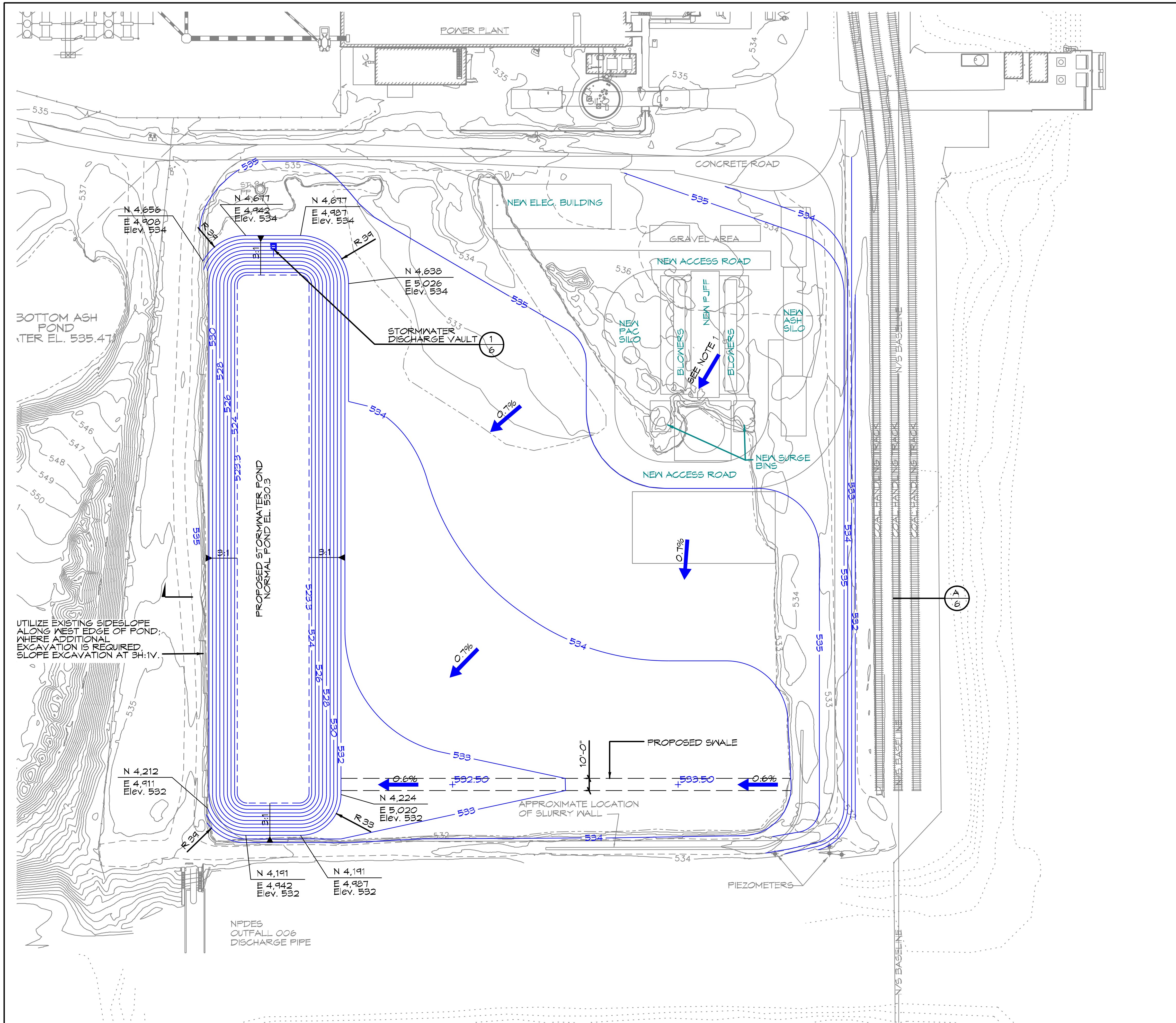

LEGEND:

- 536 — EXISTING CONTOURS
- 534 — PROPOSED CONTOURS
- PROPOSED BAGHOUSE FOOTPRINT
- OVERLAND FLOW DIRECTION

NOTES:

1. PROPOSED BAGHOUSE FOOTPRINT SHALL BE DESIGNED BY OTHERS TO DRAIN TOWARD PROPOSED STORMWATER POND.
2. SEE SHEET 3, EXISTING CONDITIONS - EAST, FOR HORIZONTAL AND VERTICAL CONTROL INFORMATION.

PROPOSED BAG HOUSE GRADING PLAN

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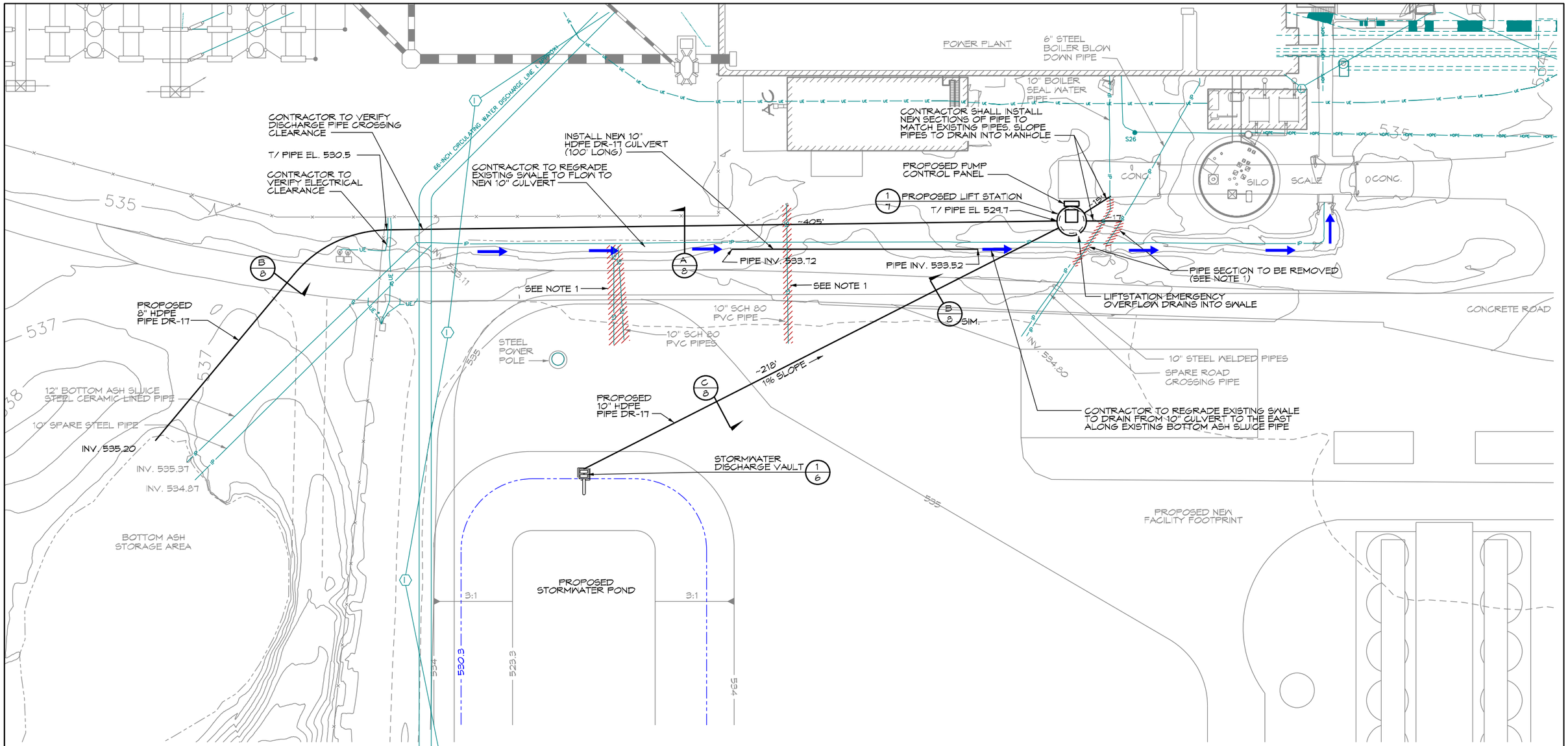

NOTES:

1. PIPES PASSING UNDER ROADWAY TO BE CUT OFF NEAR GROUND SURFACE AND SEALED WITH GROUT TO PREVENT SURFACE DRAINAGE FROM PASSING UNDER ROADWAY.
2. SEE SHEET 3, EXISTING CONDITIONS - EAST, FOR HORIZONTAL AND VERTICAL CONTROL INFORMATION.

LEGEND:

- PROPOSED PIPE ROUTE
- EXISTING PIPE TO BE REMOVED
- UTILITY LOCATIONS FROM ORIGINAL BLACK & VEATCH DESIGN DRAWINGS
- SURVEYED UTILITY LOCATIONS
- EDGE OF WATER
- 536 SURVEYED CONTOURS
- FLOW DIRECTION FOR SWALE REGRADE

N

0 20 40

SCALE IN FEET

PROPOSED PLAN VIEW STORMWATER DISCHARGE VAULT/ BOILER SEAL WATER REROUTE

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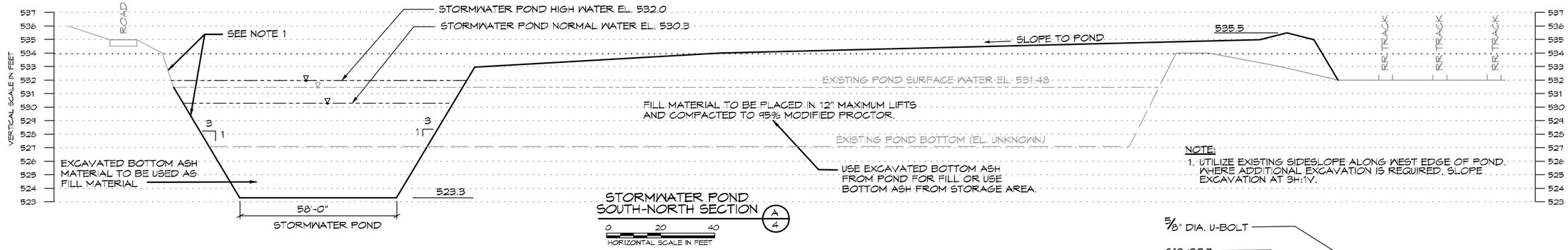
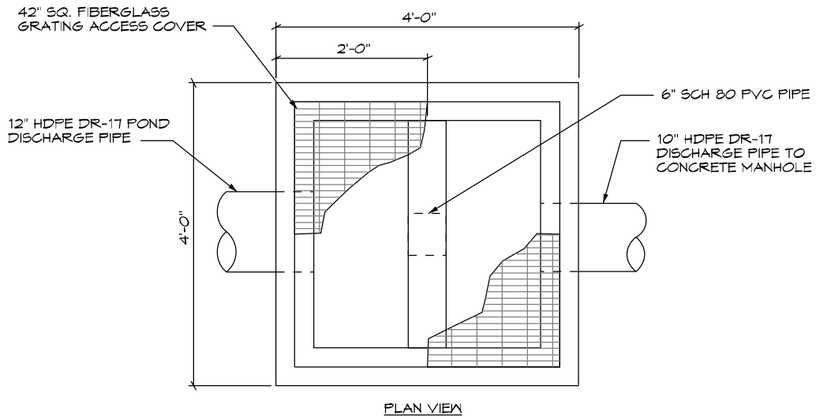
SCALE: AS SHOWN		154.002.D5	



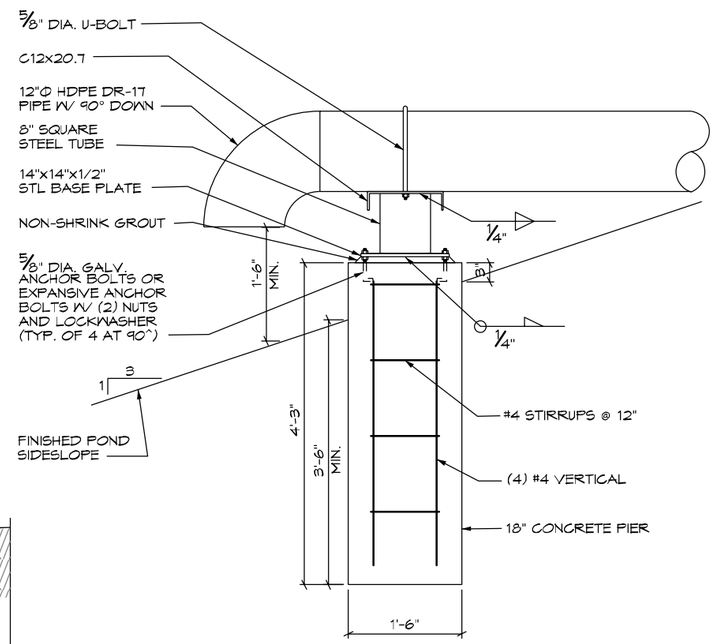
NOTE:
1. UTILIZE EXISTING SIDESLOPE ALONG WEST EDGE OF POND. WHERE ADDITIONAL EXCAVATION IS REQUIRED, SLOPE EXCAVATION AT 3H:1V.

STORMWATER POND SOUTH-NORTH SECTION (A/4)

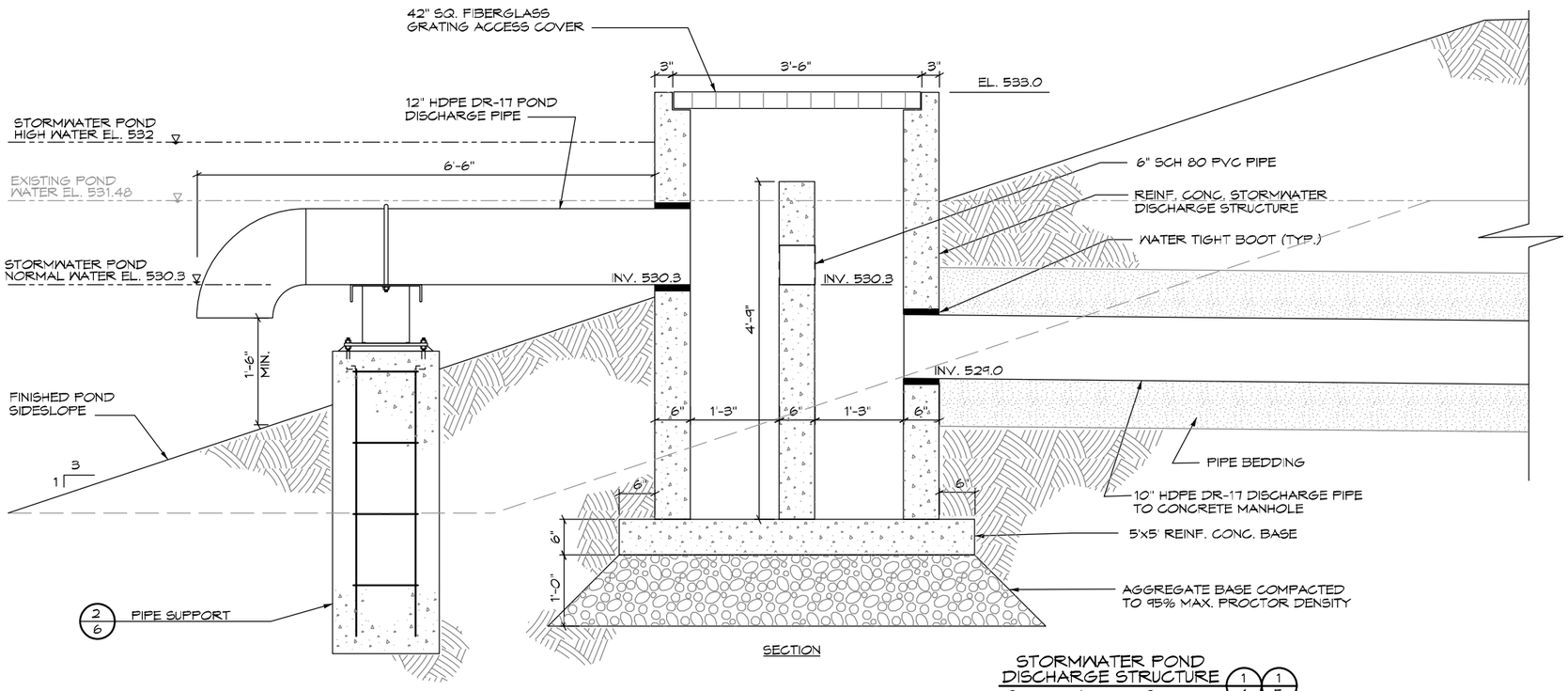
0 20 40
HORIZONTAL SCALE IN FEET



PLAN VIEW



PIPE SUPPORT (2/6)



SECTION

STORMWATER POND DISCHARGE STRUCTURE (1/4, 1/5)

0 1 2
SCALE IN FEET

STORMWATER POND SECTIONS AND DETAILS

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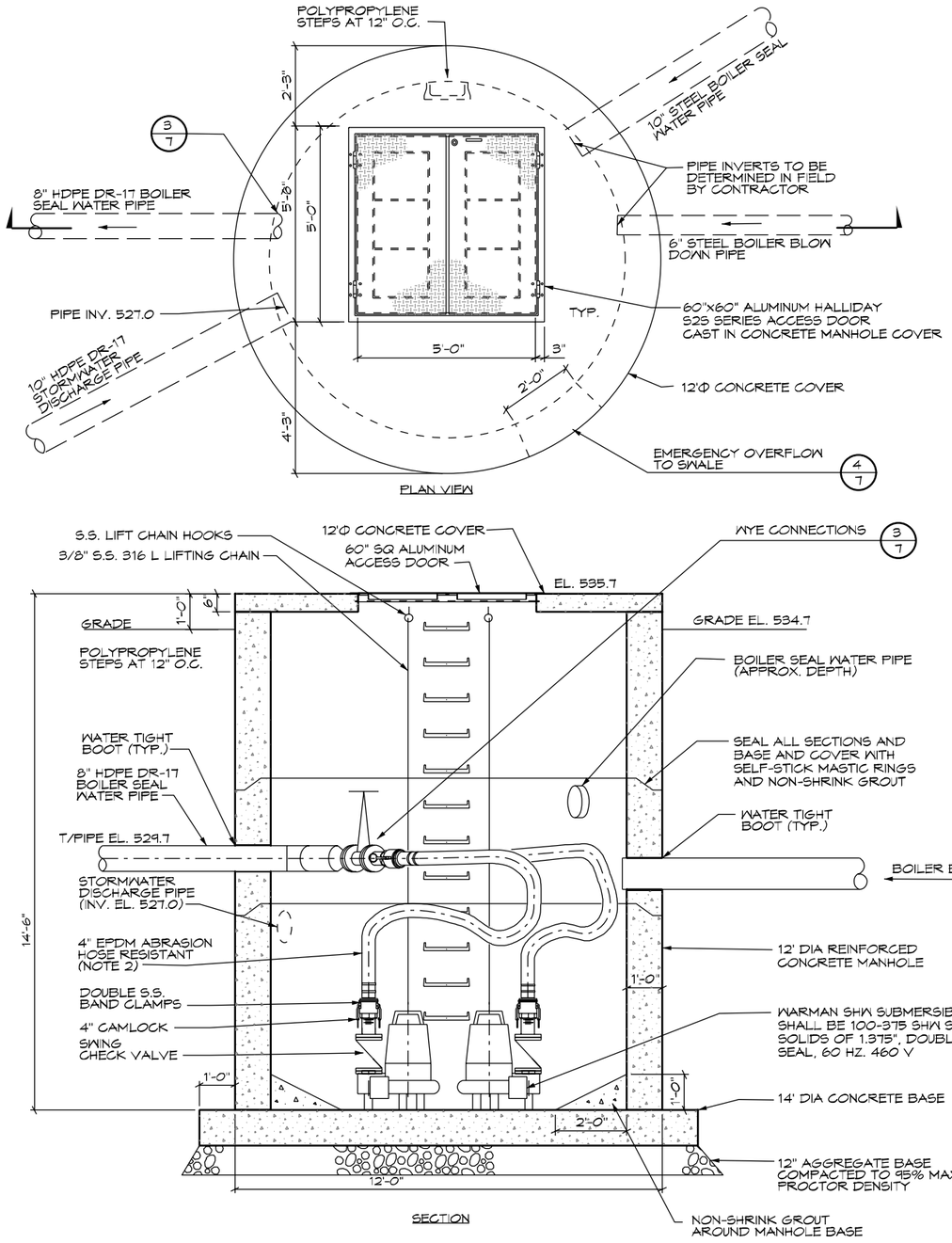
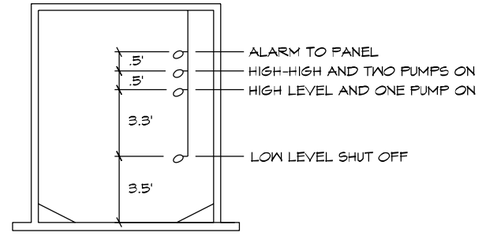


NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE TO DEWATER EXCAVATION TO PROPERLY INSTALL CONCRETE MANHOLE.
2. EPDM HOSE SHALL BE OF SUFFICIENT LENGTH TO REMOVE PUMPS FROM THE MANHOLE FOR SERVICING.
3. PIPE AND VALVE SUPPORTS TO BE DETERMINED BY CONTRACTOR.
4. SEE DETAIL 2/7 FOR PUMP CONTROLS.

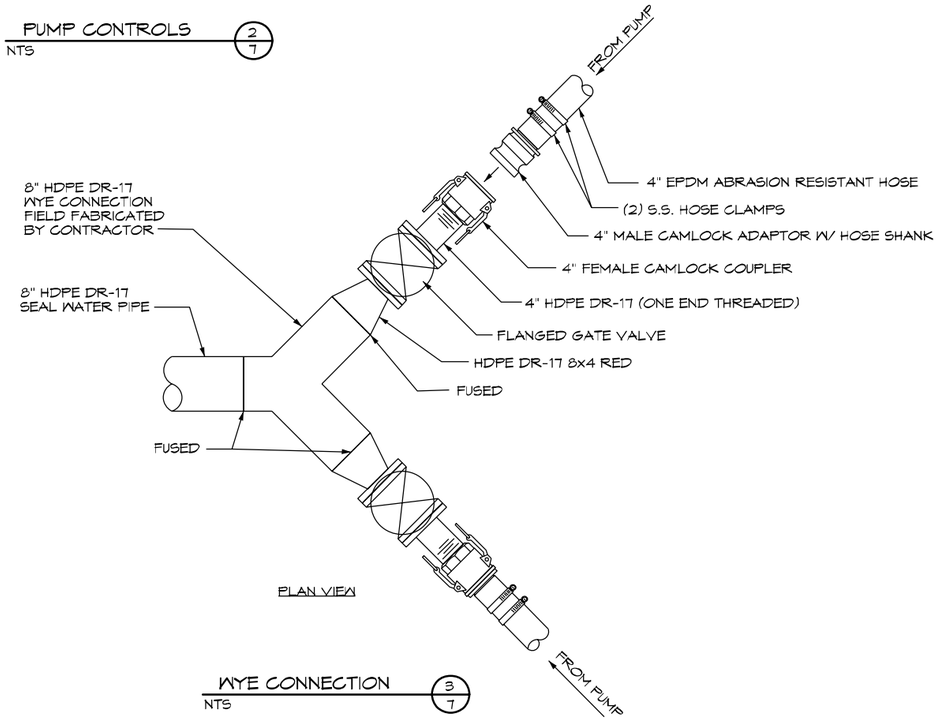
CONCRETE LIFT STATION (1/5)
NTS



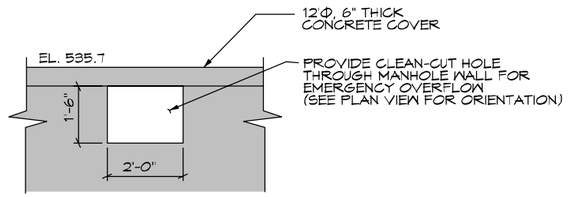
NOTES:

1. PUMP CONTROL PANEL SHALL BE NEMA 4 RATED FOR OUTDOOR APPLICATIONS.
2. PUMP OPERATION SHALL BE CONTROLLED AS STATED ABOVE.
3. CONTROL PANEL SHALL CONTAIN A PUMP ALTERNATOR TO PROVIDE EQUAL USE ON PUMPS, SEPARATE HOUR COUNTERS FOR EACH PUMP, HAND-OFF-AUTO SWITCHES FOR EACH PUMP, LOCAL DISCONNECT FOR EACH PUMP, AND RUN LIGHTS FOR EACH PUMP.
4. CONTRACTOR SHALL PROVIDE POWER TO THE PUMPS AND PANEL AS DIRECTED BY ALLIANT ENERGY.

PUMP CONTROLS (2/7)
NTS



WYE CONNECTION (3/7)
NTS



EMERGENCY OVERFLOW (4/7)
NTS

LIFTSTATION DETAILS

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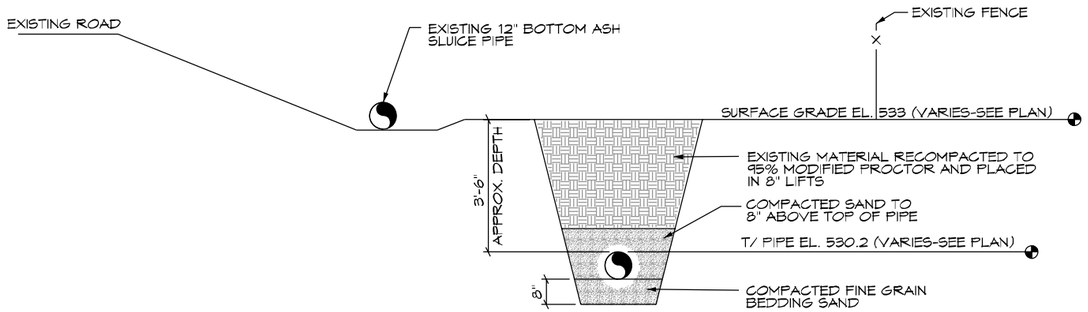
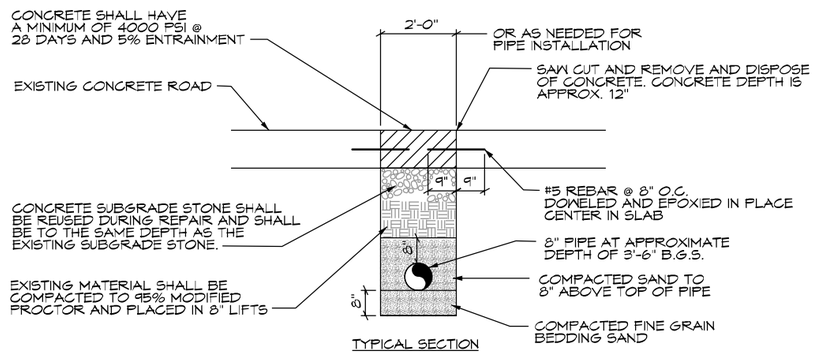


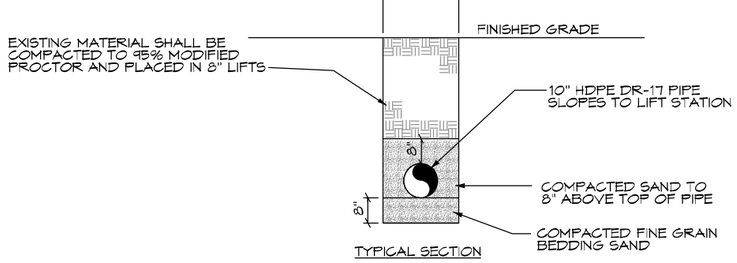
BOILER SEAL WATER DISCHARGE PIPE TRENCH SECTION (A/5)

NTS



ROAD CROSSING (B/5)

NTS



STORMWATER POND DISCHARGE PIPE TRENCH (C/5)

NTS

PIPE TRENCH SECTIONS

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SCALE: AS SHOWN			

Process Equipment and Instrument Specifications

Level Switches – Float, Submersible

A. General: Normally open or normally closed mercury type switch rated for 20 Amperes at 120 Volts AC.
B. Materials: 20 gauge 316 stainless steel or 5 or 5-1/2 inch diameter sphere permanently assembled to switch cable.
C. To be provided with a grounding wire.
D. Cable shall be type SO with a Nitrile PVC jacket containing three #14 AWG fine stranded conductors (black, white and green).
E. Installation Notes
   1. Install per manufacture's instructions.
   2. Provide and install a weighted stainless steel cable or chain or wall mounted stainless steel pipe on which the float switches shall be mounted.
   3. Float switches shall be mounted to the stainless steel cable, chain or pipe with stainless steel brackets and stainless steel U-bolts which are to be manufactured by the float switch manufacturer.
   4. All hardware shall be stainless steel including bracket anchors.
F. Standards of Acceptance: Consolidated Electric Company (Model 9G), Anchor Scientific (Rotofloat P20)

Mechanical Equipment

General Requirements

A. Perform all work in accordance with applicable Federal, State, and Local codes and ordinances.
B. Verify locations of existing utilities prior to beginning any earthwork or construction.
C. Protect existing structures, pipes, pumps, instruments, instruments and items to remain.
D. Install equipment in accordance with manufacturers' supplied installation drawings.

Submersible Pumps (Sump)

A. Quantity: 2
B. Capacity (GPM): 1500 GPM combined at 70' TDH
C. Wastewater pH Range: 6 to 10 SU
D. Max. Solids Size: 1.375 inch diameter
E. Maximum Motor Size: 30 horsepower (HP)
F. Impeller: 14 Inches
G. Discharge: 4" NPT
H. Min. Full Load Motor Efficiency: 69.5%
I. Motor Speed: Constant 1180 RPM
J. Electrical 3-Phase 60 Hz: 460 volts
K. Materials of Construction:
   1. Impellor: A05 Chrome meeting specification ASTM A532, Class III, Type A
   2. Casing: A05 Chrome meeting specification ASTM A532, Class III, Type A
   3. Shaft: Stainless Steel
L. Each pump shall include a short agitator.
M. Pump and motor capable of continuous operation at conditions specified without excessive noise, vibration, or cavitation.
N. Pump and motor capable of continuous submergence in water without loss of watertight integrity.
O. Each pump furnished with a stainless steel chain of sufficient strength and length to permit raising and lowering of the pump.
P. Materials or features not specified herein shall be manufacturer's standard equipment and suitable for specified service conditions.
Q. Standard of Acceptance: Warman SHW Series Model Hazleton 100-375 SHW or equal

Pump Installation

A. Equipment Cleaning: Thoroughly clean equipment of all temporary protective coatings and foreign materials including oil, grease, and dirt prior to assembly or erection.
B. Installation
   1. Verify with Alliant Energy Project Manager that relative dimensions and location of pumps, hatches and piping are correct for proper removal of pumps for replacement and/or maintenance. Note that Contractor is responsible for confirming dimensions.
   2. Install pumps and accessories as shown on the Drawings and per manufacturer's instructions.
   3. Install pump, mechanical drive, and motor equipment as recommended by the manufacturer.
   4. Connect all piping required for proper operation of the pump assemblies.
   5. Pump shall be aligned and lubricated per the manufacturer's requirements.
C. Start-up
   1. All equipment shall be placed into operation in accordance with a schedule properly coordinated with Alliant Energy Project Manager. Scheduling and acceptance of the equipment start-up shall be approved by Alliant Energy Project Manager.
D. Field Quality Control - Performance Testing: Perform testing and submit completed Test Sheets in accordance with Hydraulic Institute Standards.

Precast Manholes, Lids, and Access Hatches

A. Base, riser section and flat top shall be constructed in accordance with ASTM C478.
B. Joints shall meet ASTM C443.
C. Connections between manhole structure and pipes shall meet ASTM C923. The minimum cored or formed hole must be 12 inches to assure adequate adjustment for manholes to be cut in existing sewer lines.
D. Manhole Steps:
   1. Provide plastic coated steel or cast iron steps with 16-inch spacing. EJIW 8512, M.A. Industries PS-1-PF or Neenah R-1881-J or equal.
   2. Top step to be a minimum of 18 inches below top of casting in order to enable clear access through cover.
E. Lids and Access Hatches:
   1. Access hatches shall be corrosion-resistant aluminum with stainless steel hardware and hinges, integral drain gutter, and concealed lock.
F. Installation
   1. Form bottom of excavation clean and smooth to correct elevation.
   2. Install sand fill in 6-inch layers and compact to 95% density per the specifications.
   1. Use adjusting rings as required, but no more than 4, to obtain proper rim elevations.
   4. Mortar joints of adjusting rings, plaster outside and strike inside clean.

Pipes

General Requirements

A. Perform all work in accordance with applicable Federal, State, and Local codes and ordinances.
B. Verify locations of existing utilities prior to beginning any earthwork or construction.
C. Protect existing structures, pipes, pumps, instruments, and items to remain.

Piping and Fittings

A. HDPE Pipe
   1. DR: See Drawings
   2. Classified as Type III , Class C, Category 5, Grade P34, Cell Classification PE 345434C, HDPE black pipe.
   3. Conforming to ASTM D1248, D3161, and D3350
   4. HDPE drawings HDPE piping shall conform to ASTM D 3350. The joints shall be butt fusion welded, flanged or flush threaded as shown on the drawings.
   5. Fittings
      a. All HDPE pipe fittings, as specified in the Contract Document, shall be classified as solid, Type III, Grade PE 3408 HDPE fittings.
      b. Pipe and fittings shall be joined using fusion thermal welding, flanges, or flush threaded connections, except as specified in the Drawings.
B. Water Tight Gaskets
   1. Connection between a reinforced concrete manhole/structure and pipe shall be joined using a water tight boot or waterstop per ASTM C923.
   2. Concrete or mortar to fill in gap between pipe and manhole to ensure that no leakage occurs.

Buried Pipe and Structure Installation

A. Existing Utilities, Piping, and Structures
   1. Existing Utilities and Structures:
      a. Existing structures, utilities, and piping are shown on the Drawings only by general location and the Alliant Energy Project Manager will make all other known records available. However, the Alliant Energy Project Manager does not guarantee the locations as shown on the Drawings.
      b. The Contractor shall have sole responsibility for providing temporary support and for protecting and maintaining all existing utilities, piping, and structures in the project area during the entire period of construction.
   2. Deviations Occasioned by Other Utilities, Pipe, and Structures:
      a. Wherever existing utilities, pipe, or structures present obstructions to the grade and alignment of the pipe, they shall be permanently supported, removed, relocated or reconstructed by the Contractor through cooperation with the Alliant Energy Project Manager. In those instances where the relocation or reconstruction is impracticable, a deviation from the grade will be ordered and the change shall be made in the manner directed with extra compensation allowed.
B. Excavation
   1. Underpin adjacent structures which may be damaged by excavation work, including utilities, pipe chases, buildings, foundations, etc.
   2. Excavate subsoil required to accommodate site structures and construction operations.
   3. Grade top perimeter of excavation to prevent surface water from draining into excavation.
   4. Perform trench excavation adjacent to structures to prevent damage to structures. If structures are damaged by excavation, notify Alliant Energy Project Manager and replace or repair.
   5. Protect excavations by methods required to prevent cave in or loose soil from falling into excavation.
   6. Protect excavation activities from undermining or otherwise impacting the existing underground utilities in the areas of excavation and construction.
   7. Provide sheeting or bracing as necessary to protect life of property and conform to all applicable federal, provincial, and local codes.
   8. Protect bottom of excavations and soil adjacent to and beneath foundations from freezing.
   9. Cut out soft areas of subgrade not capable of in-place compaction. Backfill with fill and compact to density equal or greater than requirements for subsequent backfill material.
C. Pipe Trench and Backfill and Bedding Materials
   1. Place pipe bedding below pipe barrel (before setting pipe) in maximum 12 inches lifts and compact to 95% of the modified Proctor maximum dry density (ASTM D 1557). Pipe bedding to be 3/4 inch crushed stone or sand.
   2. Cover pipe with bedding in maximum 12 inches lifts and compact to 95% of the modified Proctor maximum dry density (ASTM D 1557). Backfill to be 3/4 inch crushed stone or natural soils.
   3. Employ a placement method that does not disturb or damage piping in trenches.
   4. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
   5. Make grade changes gradual and blend with surrounding area. Grade to drain.
   6. Restore surface to pre-existing conditions.
D. Placement of Pipe Within Trenches: Install pipe, fittings, and accessories in accordance with specifications and manufacturer's instructions and at the grade and slope indicated on the drawings. Blow out with compressed air all piping or tubing to be erected as required to remove all foreign material.
E. Corrosion Protection (For all Buried Metallic Pipe)
   1. Conform to AWWA C105.
   2. Materials: Polyethylene Film:
      a. Class C (black).
      b. Grade: E-1.
      c. Flow Rate: 0.4 maximum.
      d. Dielectric Strength: Volume resistivity, minimum ohm – $cm^3 = 10^{15}$.
      e. Tensile Strength: 1200 psi minimum
      f. Elongation: 300 percent minimum
      g. Thickness: 8 mil

   3. Minimum Tube Size and Sheet Widths

Pipe Diameter (inches)	Flat Tube (inches)	Sheet (inches)
3 or smaller	14	28
3	16	32
6	20	40
8	24	48
10	27	54
12	30	60
14	34	68
16	37	74
18	41	82
20	45	90
24	54	108

   4. Method of Installation: Method A.
F. Field Quality Control
   1. General: All pipeline testing shall be tested for exfiltration as specified. All pipe trenches shall be partially backfilled prior to testing. When leakage exceeds the amount allowed, the Contractor, at its expense, shall locate the leaks and make the necessary repairs or replacements, to reduce the leakage to the specified limits. Any individually detectable leaks shall be repaired, regardless of the results of the tests.
   2. Temporary valves, plugs, bulkheads, and other pressure testing and water control equipment and materials shall be provided by the Contractor subject to Alliant Energy Project Manager's review. No materials shall be used which would be injurious to pipeline structure and future function. Air test gages shall be laboratory-calibrated test gages and shall be recalibrated by a certified laboratory at the Contractor's expense prior to the leakage test, if required by Alliant Energy Project Manager.
   3. Unless otherwise specified, water for testing shall be furnished by the Contractor. The Contractor shall make all necessary provisions for conveying the water from the source to the points of use.
   4. Release of water from pipelines, after testing has been completed, shall be performed in accordance with the Contractor's proposed testing plan as approved by Alliant Energy Project Manager
   5. All testing operations shall be performed in the presence of Alliant Energy Project Manager.
   6. Testing Procedure: The carrier pipe shall be tested for leakage as follows:
      a. Each section of carrier pipe shall be installed prior to testing.
      b. Each section of pipe shall be tested as a single unit using plugs or valves.
      c. Water shall be introduced into the isolated test section and pressurized to the extent practical.
      d. Compressed air shall then be introduced into the isolated test section until the internal pressure stabilizes at 100 percent of the systems maximum operating pressure for forcemains and 25 psig for gravity flow pipes.
      e. Following pressure stabilization, the pipe section shall remain pressurized for a period of 15 minutes. The pressure within the pipe shall not deviate (considering no applicable change in atmospheric conditions) by more than 2 percent during test period for forcemains or 0.5 psig for gravity flow pipes.
      f. If pressure deviation within the pipe exceeds the test limits as established herein, the test shall be completed again by the Contractor at their own expense.
      g. Isolated test sections found to fail pressure testing shall be repaired by the Contractor at their own expense.
      h. All testing plugs, valves, and fittings shall be subsequently removed from the discharge piping following testing.
      i. Once the pipe has been properly tested, the pipe will be installed and test again in place to ensure that all joints and appurtenances are free from leaks.

Valve Notes

General

A. Like or similar valves shall be by one manufacturer unless noted otherwise.
B. Valves shall be for not less than 125 psi water working pressure, and in any event shall be compatible in working pressure to the pipe and fittings to which they are attached. Valves shall be designed for the service for which they are attached.
C. Valves 2 inches and smaller shall have socket or threaded end connections expect as otherwise shown in these specifications or drawings. Sockets and threaded valves to be installed with corresponding union for ease or removal. Valves larger than 2 inches shall have flange end construction except as otherwise shown in these specifications or drawings.
D. All valve materials of construction shall be suitable with the service listed.
E. Shut off valves at utilities to be lockable in both the open and closed position.

Products

A. Check Valve, Swing, Cast Iron, Class 125 (Valve Schedule ID THAX)
   1. Connections: Flanged
   2. Body: Cast Iron
   3. Disc: Cast Iron
   4. Cap: Bolted
   5. Nominal valve size: NPS 3 and greater
   6. Standard of Acceptance: Crane, Kitz No. 78, Toyo 435, Clow F5382, GA Industries, or approved equal.

B. Gate Valve, Cast Steel, Class 150 (Valve Schedule ID AEAB)
   1. Connections: Flanged
   2. Body: Cast Steel
   3. Disc: Solid wedge
   4. Bonnet: Bolted
   5. Stem: OS&Y
   6. Nominal valve size: NPS 3" and greater
   7. Standard of Acceptance: Velan F0064C-02TY, Kitz K150SCL, Crane, Milwaukee, Kennedy, or approved equal.

GENERAL NOTES AND SPECIFICATIONS

BURLINGTON GENERATING STATION
BURLINGTON, IOWA
PREPARED FOR
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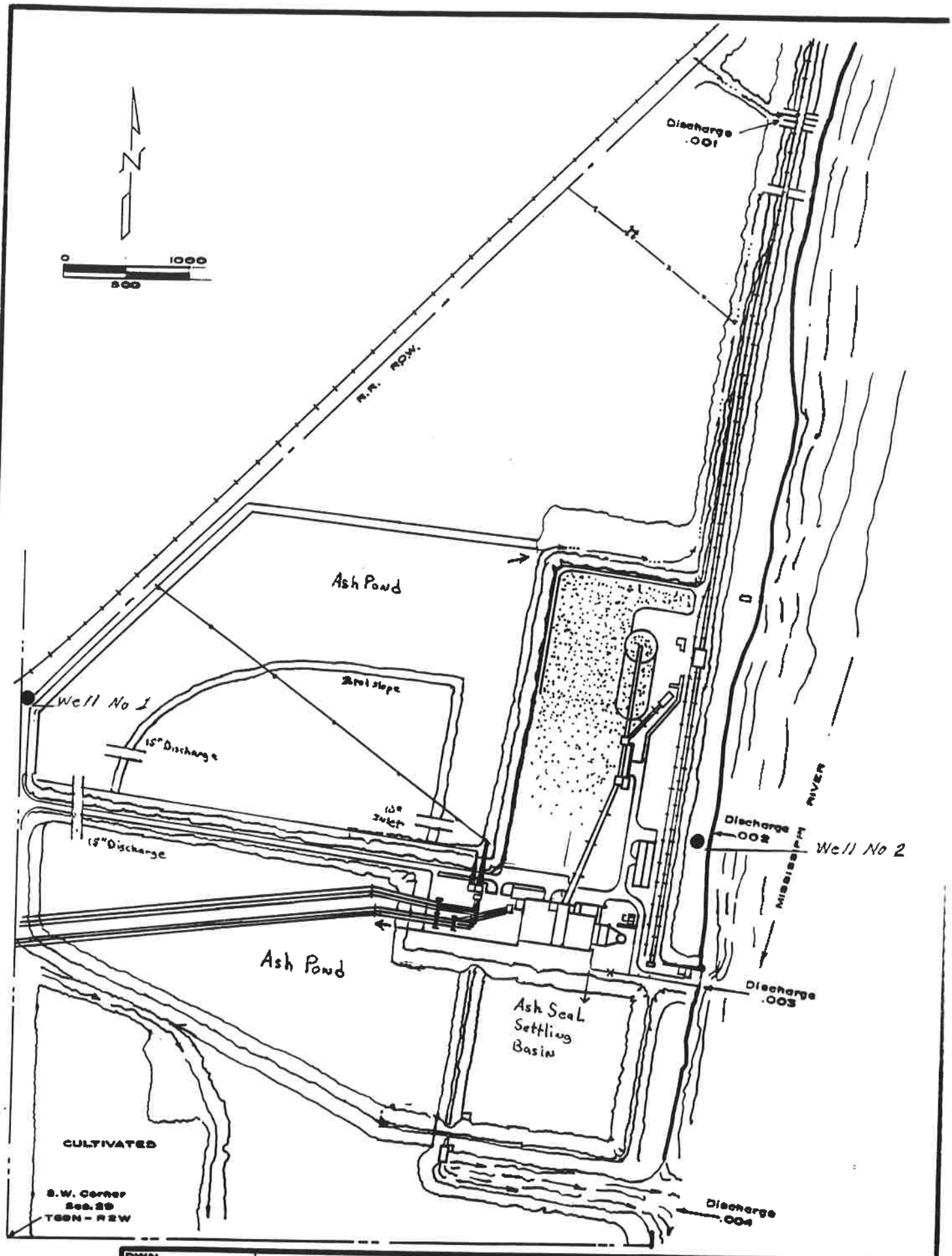
DATE: 3-27-09	SHEET 9	DRAWING NUMBER 154.002.D9	
SCALE: NONE			

APPENDIX H – BGS Main Ash Pond Drawings

Alliant Energy
Interstate Power and Light Company
Burlington Generating Station
Burlington, Iowa

History of Construction

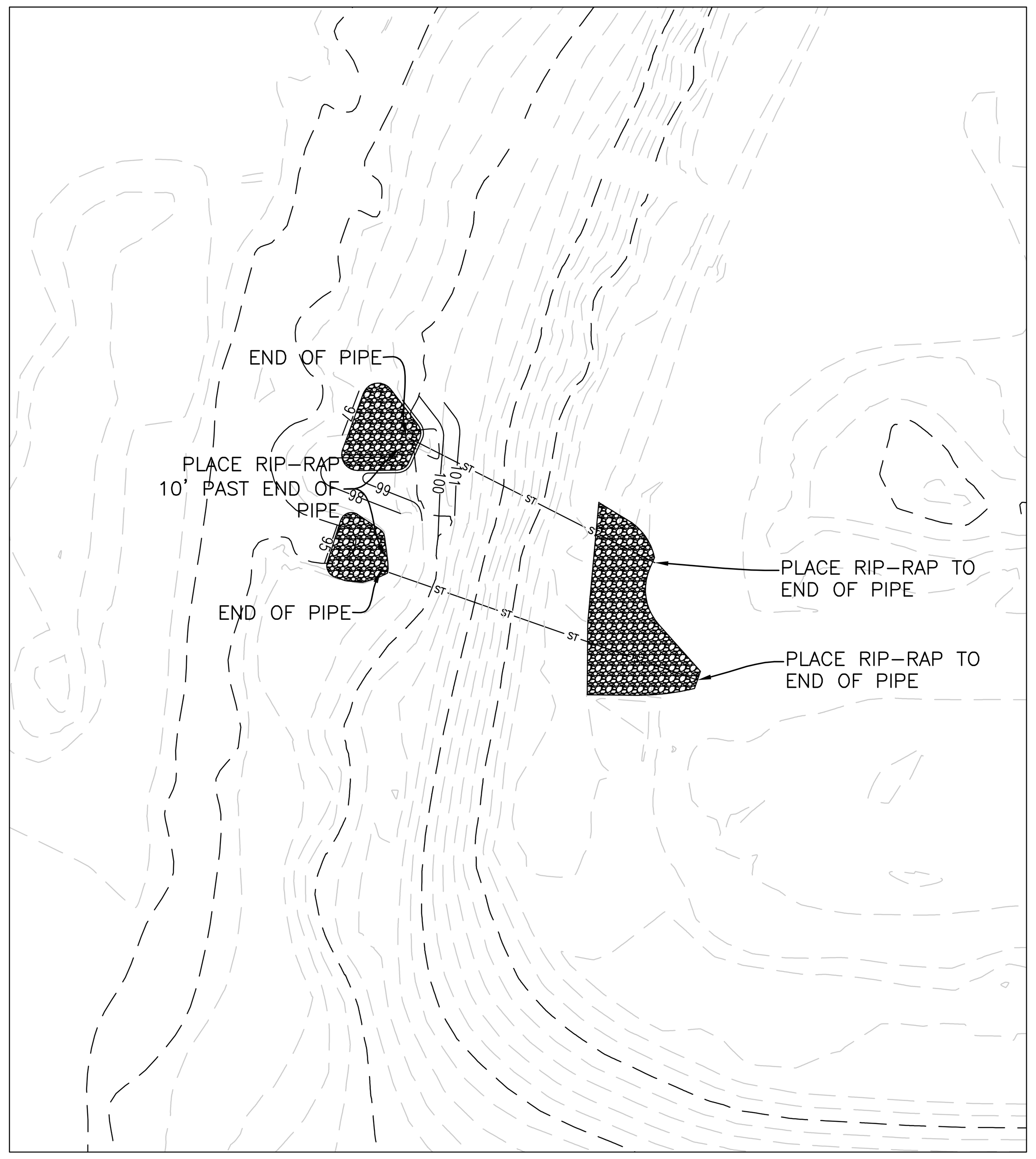


DWN RFD	BURLINGTON GENERATING STATION DISCHARGE LOCATION MAP				
CHKD					
APPR	DATE 6-4-71	A- 1260	REV.	SCALE As Shown	

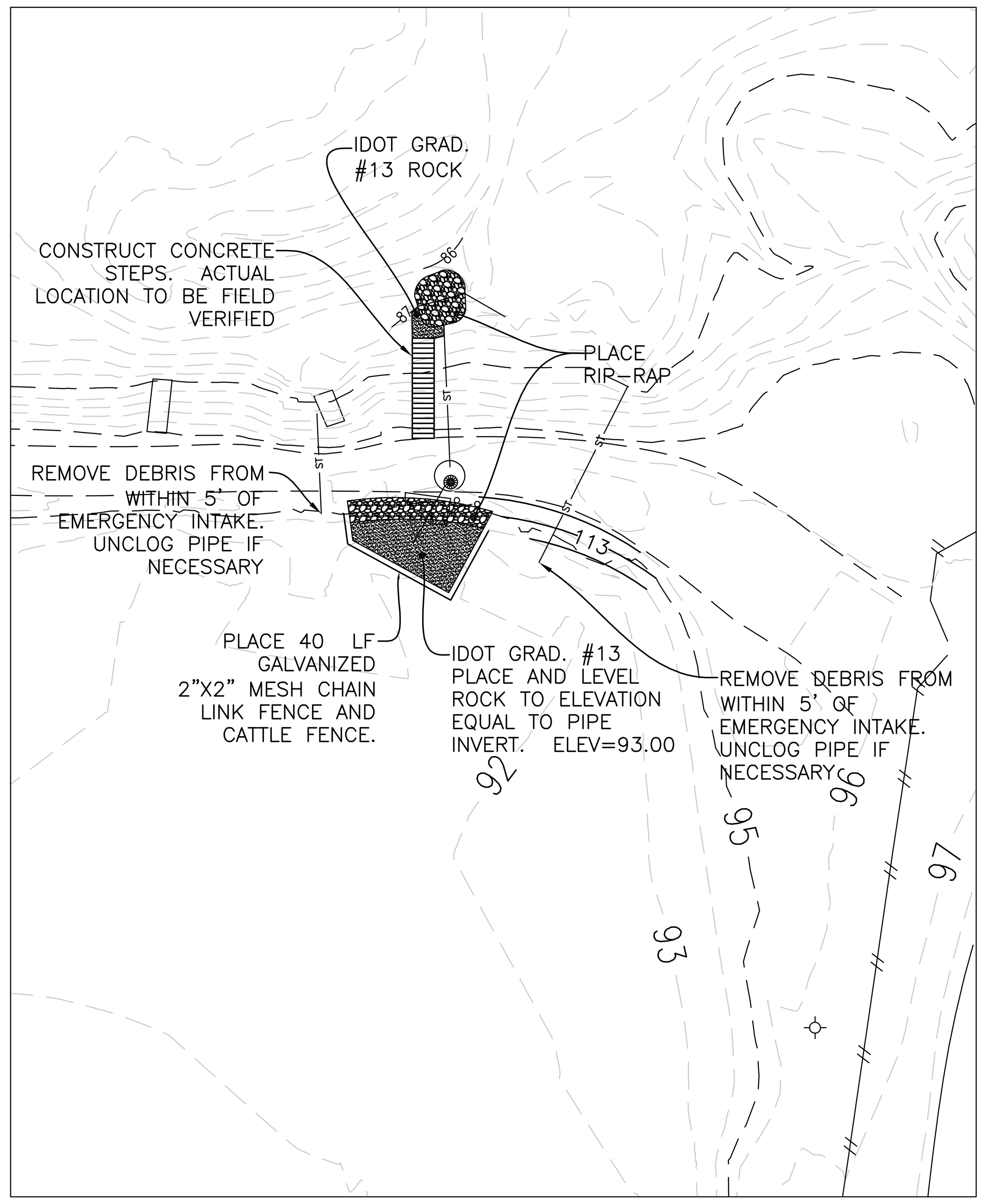
APPENDIX I – BGS Economizer Pond Drawings

Alliant Energy
Interstate Power and Light Company
Burlington Generating Station
Burlington, Iowa

History of Construction

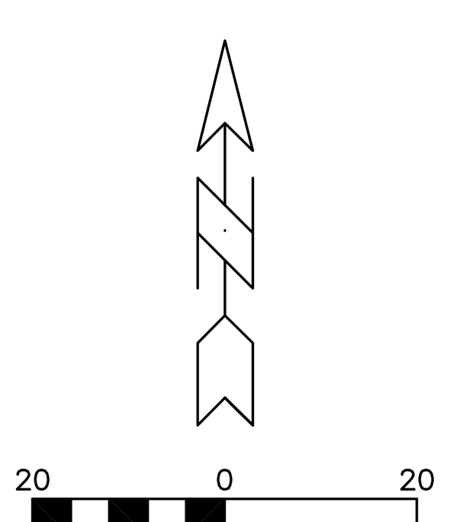


1 C4.3 UPPER ASH POND OUTFALL STABILAZATION
SCALE: =1'-20"



2 C4.3 LOWER ASH POND OUTFALL STABILAZATION
SCALE: =1'-20"

3 C4.1 UPPER ASH POND LEVEE BREACH RECONSTRUCTION
SCALE: =1'-20"



Scale: 1" = 20'

STABILIZATION GENERAL NOTES

CLASS "E" RIP-RAP IS TO BE USED FOR INLET/OUTLET STABILIZATION.

CLASS "E" RIP-RAP IS TO USED FOR LOWER POND LEVEE STABILIZATION.

GRADATION #13 IS TO BE USED FOR ROCK BASE AROUND INLET ON LOWER POND.

APPROXIMATELY 75 TON OF RIP-RAP IS ESTIMATED FOR PLACEMENT, OR AS DIRECTED BY ENGINEER.

RIP-RAP PLACEMENT ON THE INLET SIDE OF PIPES IS TO FUNCTION AS A WALK-WAY FOR MAINTENCE AS WELL AS PROTECTION.

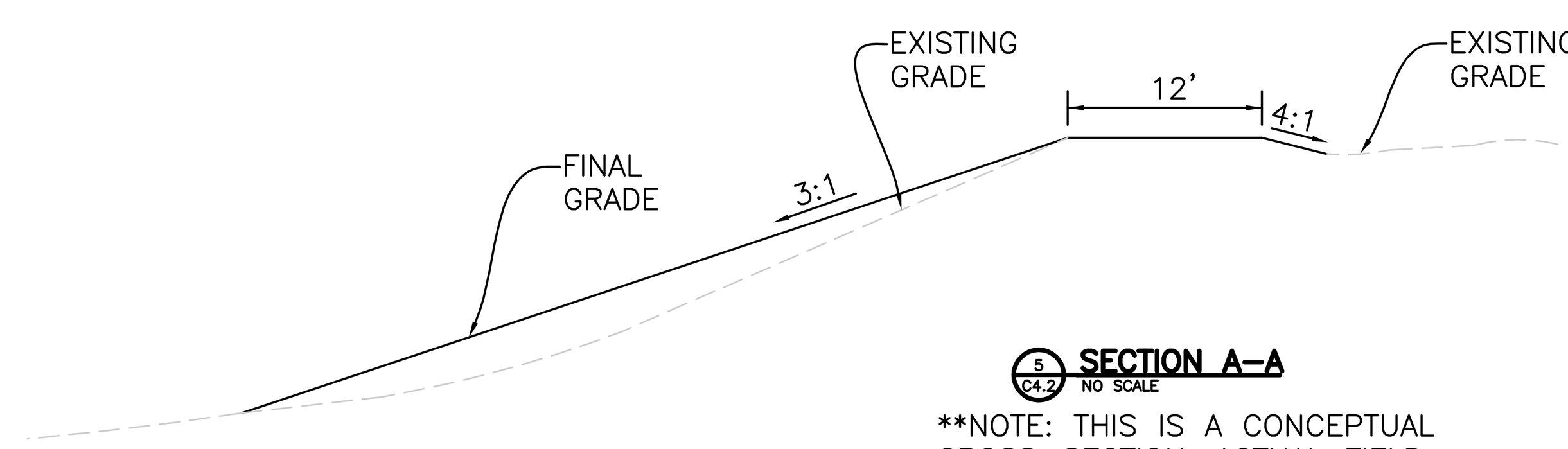
PRELIMINARY FOR DISCUSSION ONLY

EARTHWORK GENERAL NOTES

1. CLAY FROM THE EXISTING LEVEE SYSTEMS THAT IS TO BE REUSED IN THE CONSTRUCTION SHALL BE 100% FREE OF ASH MATERIAL.
2. IN REMOVAL OF THE EXISTING LEVEE SYSTEM, ASH MATERIAL THAT IS ENCOUNTERED SHALL BE PLACED IN THE UPPER STORAGE POND AND GRADED FLAT.
3. ALL TREES AND BRUSH SHALL BE REMOVED FROM LEVEE CONSTRUCTION LIMITS PRIOR TO PLACEMENT OF CLAY FILL. TREES AND BRUSH THAT ARE REMOVED FROM THE LEVEE SHALL BE TAKEN OFF-SITE AND DISPOSED OF PROPERLY.
4. DEPTH OF LEVEE MATERIAL FOR REMOVAL VARIES. EXCAVATE CONTAININATED SUFACE MATERIAL TO A DEPTH SUFFICIENT THAT UNCONTAMINATED CLAY IS ENCOUNTERED OR DETERMINED BY ENGINEER.

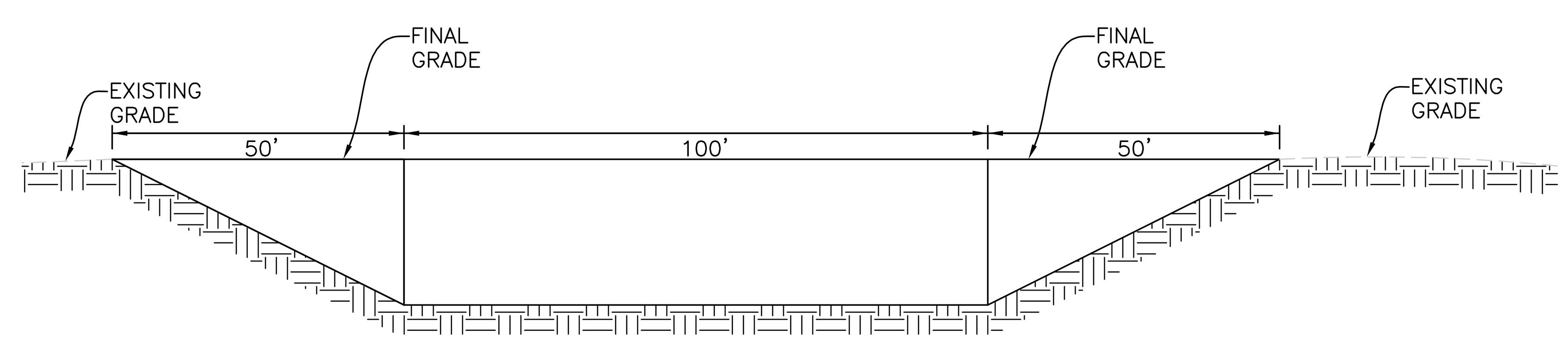
EARTHWORK SPECIFICATIONS

1. SOIL MATERIALS FOR FILL SHALL BE IMPORTED FROM AN APPROVED LOCATION AND CONFORM TO CL-ML,CL OR AS APPROVED BY ENGINEER.
2. PLACE FILL MATERIALS IN LAYERS NO MORE THAN 8" IN LOOSE DEPTH.
3. COMPACTION SHALL BE 95% OF STANDARD PROCTOR DENSITY.
4. MOISTURE CONTENT FOR COMPACTION PURPOSES SHALL BE WITHIN THE RANGE OF 2% BELOW TO 4% ABOVE OPTIMUM MOISTURE AS ESTABLISHED BY ASTM D698.
5. UNSUITABLE MATERIAL REMOVED DUE TO HIGH MOISTURE MAY BE SPREAD AND ALLOWED TO DRY UNTIL SUITABLE.
6. DO NOT PLACE BACKFILL OR FILL MATERIAL ON SURFACES THAT ARE MUDDY, FROZEN, OR CONTAINING FROST OR ICE.



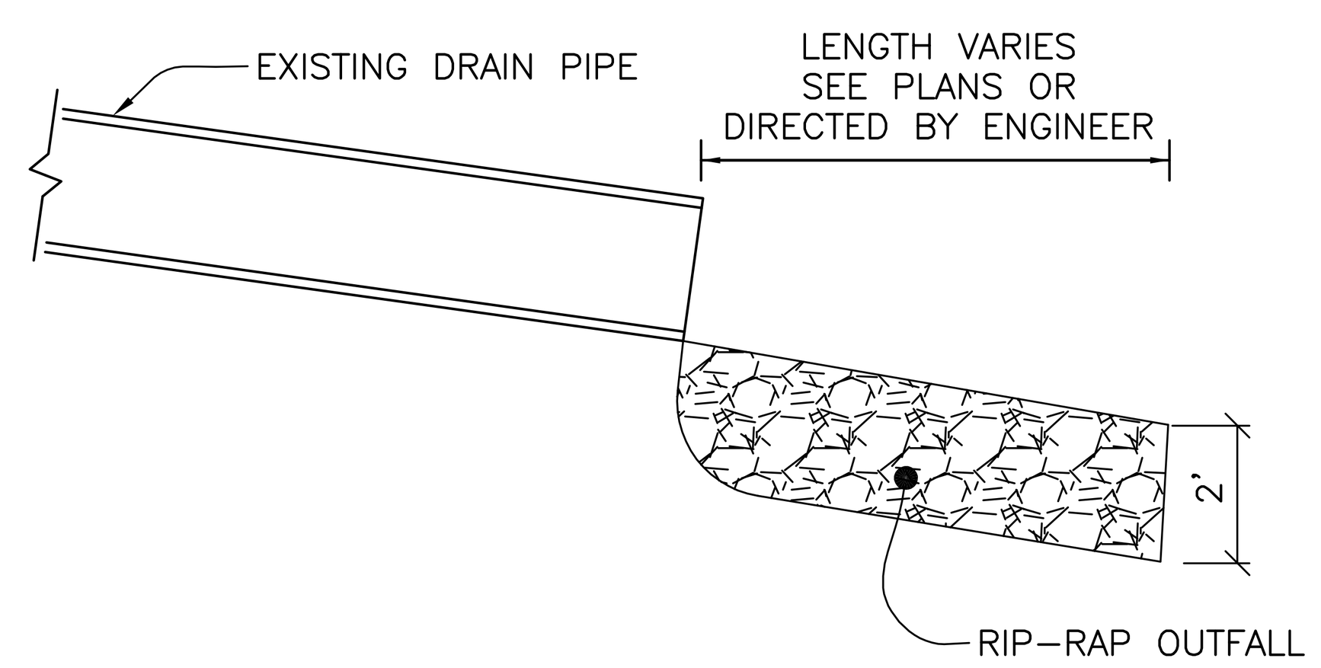
SECTION A-A
NO SCALE

**NOTE: THIS IS A CONCEPTUAL CROSS-SECTION, ACTUAL FIELD CONDITIONS MAY VARY



SECTION B-B
NO SCALE

**NOTE: THIS IS A CONCEPTUAL CROSS-SECTION, ACTUAL FIELD CONDITIONS MAY VARY



4 C4.2 TYPICAL RIP-RAP OUTFALL
NO SCALE

LEGEND

EXISTING INT. CONTOUR
EXISTING IDX. CONTOUR
PROPOSED INT. CONTOUR
100 PROPOSED IDX. CONTOUR
CLASS "E" RIP RAP
GRAD. #13 (2-3" ROCK)

KLINGNER & ASSOCIATES, P.C.
Engineers / Architects
616 North 24th Street, Quincy, IL Ph (217)223-3670 - Fax (217)223-3603
3318 Market Street, Hannibal, MO Ph (573)221-0020 - Fax (573)221-0012
610 N. Fourth Street, Suite 100, Burlington, IA Ph (319)753-1636 - Fax (319)752-3605
49 North Prairie Street, Galesburg, IL Ph (309)342-4042 - Fax (309)341-3781
Internet Address: www.klingner.com

NO.	APPR.	REVISION DESCRIPTION	DATE

FULL SCALE DRAWING: 30" x 42"

DESIGNED DMM | DRAWN DMM | CHECKED BCB | CHECK DATE -

INTERNET ADDRESS: www.klingner.com

ASH SETTLING POND BREACH RECONSTRUCTION AND STABILIZATION
INTERSTATE POWER & LIGHT
4282 SULLIVAN SLOUGH ROAD
BURLINGTON, IA 52601

FULL SIZED PLANS HAVE BEEN PREPARED USING STANDARD SCALES. REDUCED SIZED PLANS MAY NOT CONFORM TO STANDARD SCALES. USE GRAPHIC SCALES WHEN MAKING MEASUREMENTS ON REDUCED PLANS.

DRAWING DATE
10/24/08

SHEET TITLE
LEVEE BREACH STABILIZATION

SHEET
C4.3

PROJECT NO.
5749-4/08-2212

INTERSTATE POWER AND LIGHT

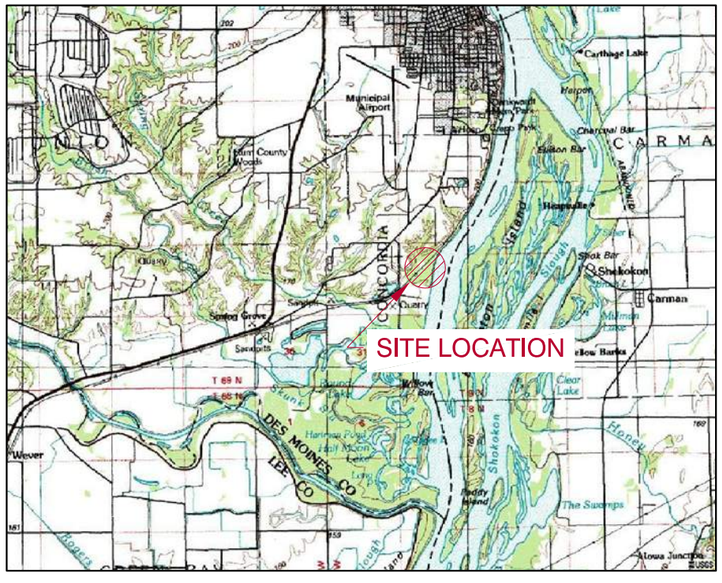
ECONOMIZER ASH PILE AND POND DESIGN
BURLINGTON GENERATING STATION

4282 SULLIVAN SLOUGH ROAD
BURLINGTON, IOWA

RECORD OF CONSTRUCTION DRAWINGS

NOVEMBER 2011

N



LOCATION MAP
NTS

GENERAL

G-1	COVER SHEET
G-2	PROJECT AREA SURVEY (PRE - CONSTRUCTION)

CIVIL

C-1	POST CONSTRUCTION TOPOGRAPHIC SURVEY
C-2	GRADING SECTIONS A & B
C-3	GRADING SECTION C
C-4	GRADING SECTION D
C-5	GRADING SECTION E
C-6	FINISHED GRADE STAKING POINTS (FOR CONSTRUCTION ONLY)
C-7	NOTES AND SPECIFICATIONS (SHEET 1)
C-8	NOTES AND SPECIFICATIONS (SHEET 2)
C-9	CONSTRUCTION COMPLETION PHOTOS (SHEET 1)
C-10	CONSTRUCTION COMPLETION PHOTOS (SHEET 2)

SHEET INDEX

N

AERIAL MAP
NTS

REV	DATE	BY	DESCRIPTION
5			
4			
3			
2			
1	11/23/11	RGM	RECORD OF CONSTRUCTION

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SCALE:	AS SHOWN
DATE:	8-22-11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	MWL

CLIENT / LOCATION
INTERSTATE POWER & LIGHT
ECONOMIZER ASH PILE AND POND DESIGN
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION
COVER SHEET

JOB 154.002.013
SHT. G-1
DWG. 154002013-G1

N

LEGEND:

- EDGE OF WATER
- 550 EXISTING CONTOUR (MAJOR)
- EXISTING CONTOUR (MINOR)
- POWER POLE
- GUARD POST
- TELEPHONE PEDESTAL
- CHAIN LINK FENCE
- OVERHEAD ELECTRIC
- DECIDUOUS TREE

PONDED WATER

APPROXIMATE EDGE OF WATER

APPROXIMATE EDGE OF WATER

APPROXIMATE EDGE OF WATER

CHAIN LINK FENCE

DITCH

DITCH

APPROXIMATE LOCATION PONDED WATER

PONDED WATER

CRUSHED STONE DRIVE

PAINTED NATURAL GAS PIPELINE MARK

CRUSHED STONE SHOULDER

℄ 12"ø± STEEL PIPE = 533.58

℄ 18"ø± CMP = 531.08

DITCH

℄ 12"ø± STEEL PIPE = 545.57

℄ 10"ø± PIPE = 549.50

CHAIN LINK FENCE

℄ 10"ø± PVC = 549.91

℄ 10"ø± SCHEDULE 80 PIPELINE INSIDE 15"ø± CMP= 548.18

10"ø± PVC PIPELINE (ABOVE GROUND)

GAS PIPELINE MARKER

℄ 15"ø± CMP = 530.07

℄ 15"ø± CMP = 530.25

CHAIN LINK FENCE

ELEVATED GAS PIPELINE

WEST EDGE OF VERTICAL 18"ø± CMP = 544.18

EAST EDGE OF VERTICAL 18"ø± CMP = 543.05

DITCH

℄ 12"ø± PVC = 549.45

DITCH

℄ 12"ø± PVC = 549.18

CONCRETE BARRIER

NATURAL GAS PIPELINE NOT LOCATED BY THIS SURVEY EXCEPT AS SHOWN

CONCRETE DRIVE

CHAIN LINK FENCE

CONCRETE DRAIN STRUCTURE

GUARD POST (TYP.)

RAILROAD TIE

CONCRETE DRIVE

SECURITY TELEPHONE BOX

CONCRETE PAD (GUARD HOUSE)

NOTES:

1. SURVEY PROVIDED BY KLINGNER & ASSOCIATES, BURLINGTON, IOWA, DATED: 7-19-11.

PRE-CONSTRUCTION PROJECT SURVEY

0 50 100

SCALE IN FEET

REV	DATE	BY	DESCRIPTION
5			
4			
3			
2			
1	11/21/11	RGM	RECORD OF CONSTRUCTION

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SCALE:	AS SHOWN
DATE:	8-22-11
DRAWN BY:	JFD
CHKD. BY:	
APPROVED:	

CLIENT / LOCATION

INTERSTATE POWER & LIGHT
ECONOMIZER ASH PILE AND POND DESIGN
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

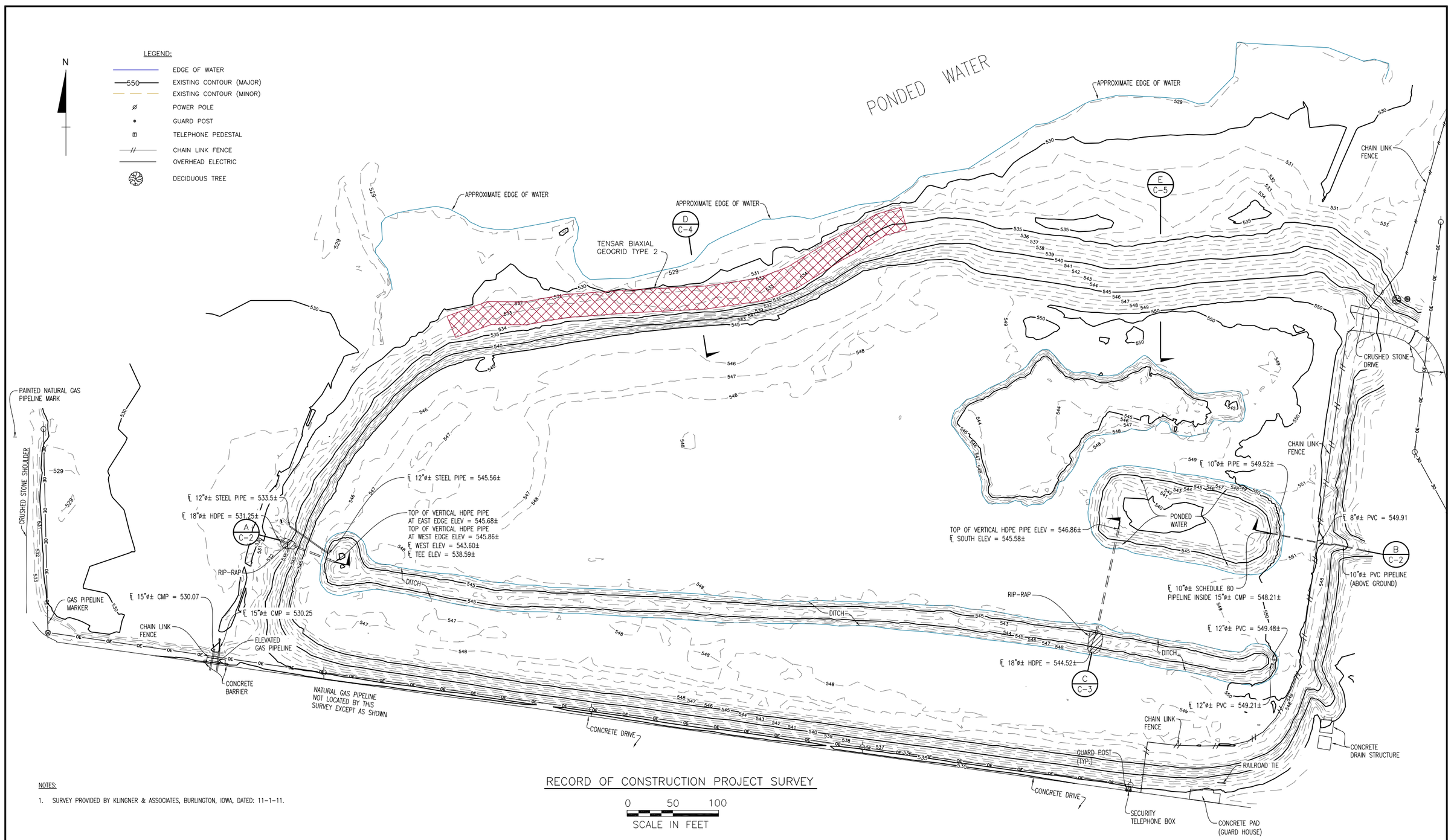
DRAWING DESCRIPTION

PROJECT AREA SURVEY
(PRE-CONSTRUCTION CONDITIONS)

JOB 154.002.013

SHT. G-2

DWG. 154002013-G2



NOTES:

1. SURVEY PROVIDED BY KLINGNER & ASSOCIATES, BURLINGTON, IOWA, DATED: 11-1-11.

RECORD OF CONSTRUCTION PROJECT SURVEY

0 50 100

SCALE IN FEET

REV	DATE	BY	DESCRIPTION
5			
4			
3			
2			
1	11/21/11	RGM	RECORD OF CONSTRUCTION

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SCALE:	AS SHOWN
DATE:	1-3-11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	MWL

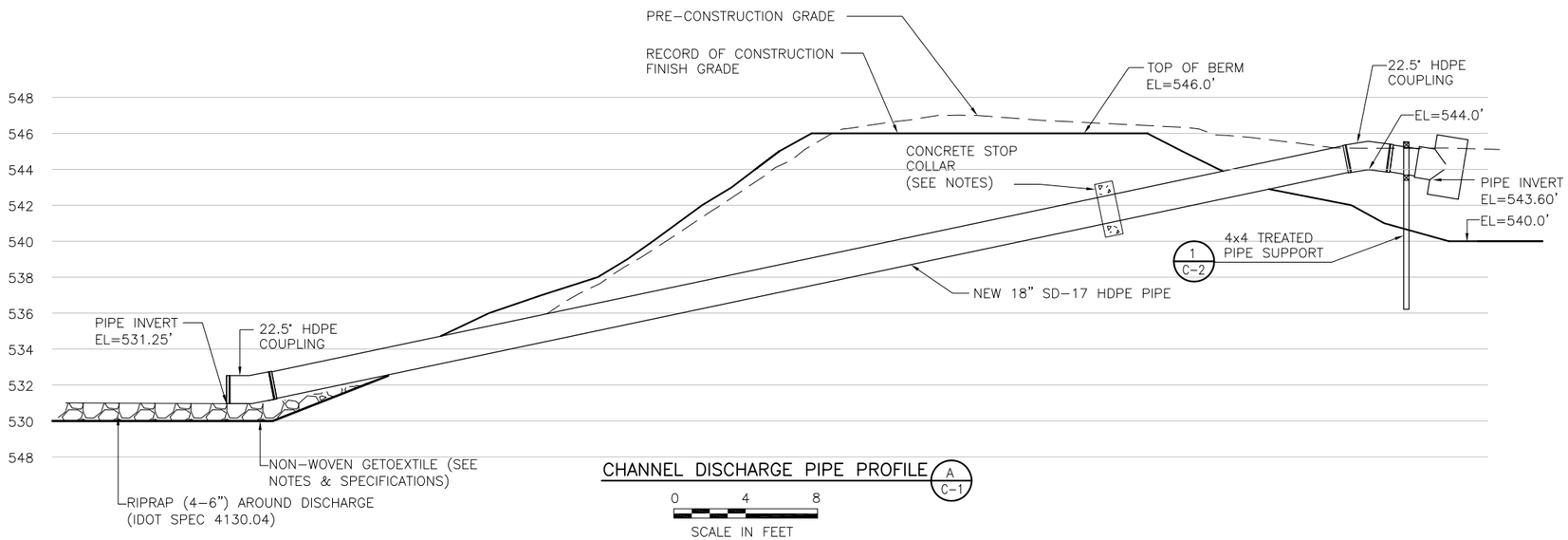
CLIENT / LOCATION

INTERSTATE POWER & LIGHT
ECONOMIZER ASH PILE AND POND DESIGN
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION

POST-CONSTRUCTION TOPOGRAPHIC SURVEY

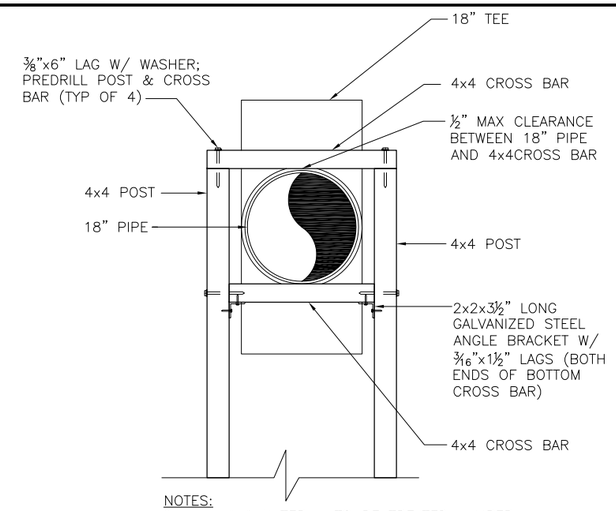
JOB	154.002.013
SHT.	C-1
DWG.	154002013-C1



CHANNEL DISCHARGE PIPE PROFILE (A C-1)

0 4 8

SCALE IN FEET

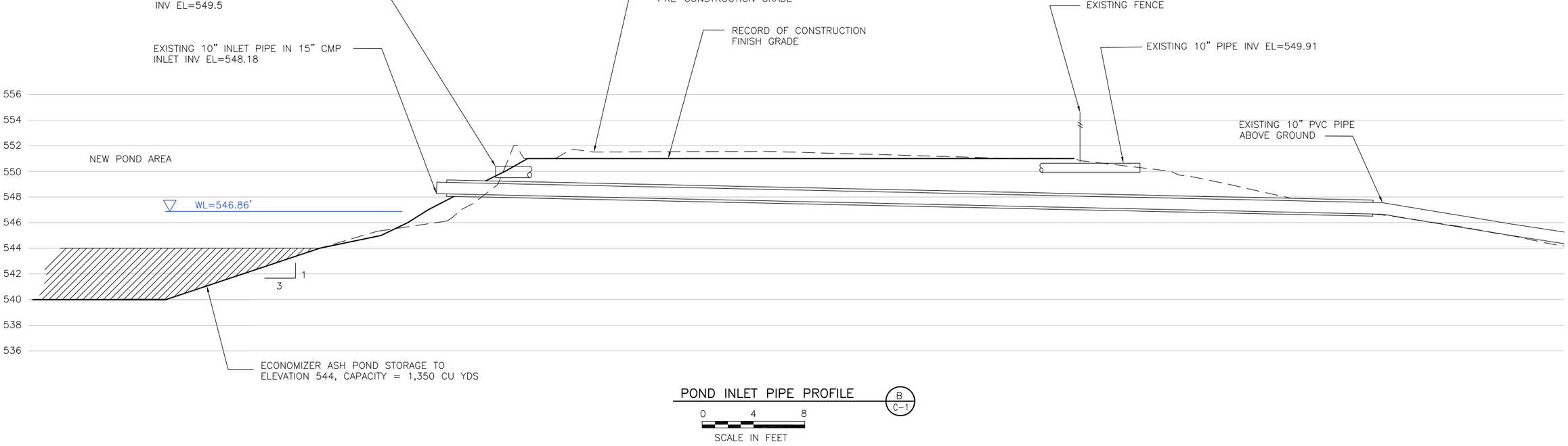


NOTES:
1. ALL 4x4 MATERIAL TO BE TREATED LUMBER.
2. ALL ANGLES AND FASTENERS TO BE GALVANIZED STEEL.
3. PIPE SUPPORT TO BE LOCATED ON 18" PIPE JUST BEFORE TEE ATTACHMENT.

4x4 PIPE SUPPORT (1 C-2) (1 C-3)

0 1 2

SCALE IN FEET



POND INLET PIPE PROFILE (B C-1)

0 4 8

SCALE IN FEET

REV	DATE	BY	DESCRIPTION
5			
4			
3			
2	11/21/11	RGM	RECORD OF CONSTRUCTION
1	8/22/11	MWL	REVISED POND LOCATION

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SCALE:	AS SHOWN
DATE:	8-22-11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	MWL

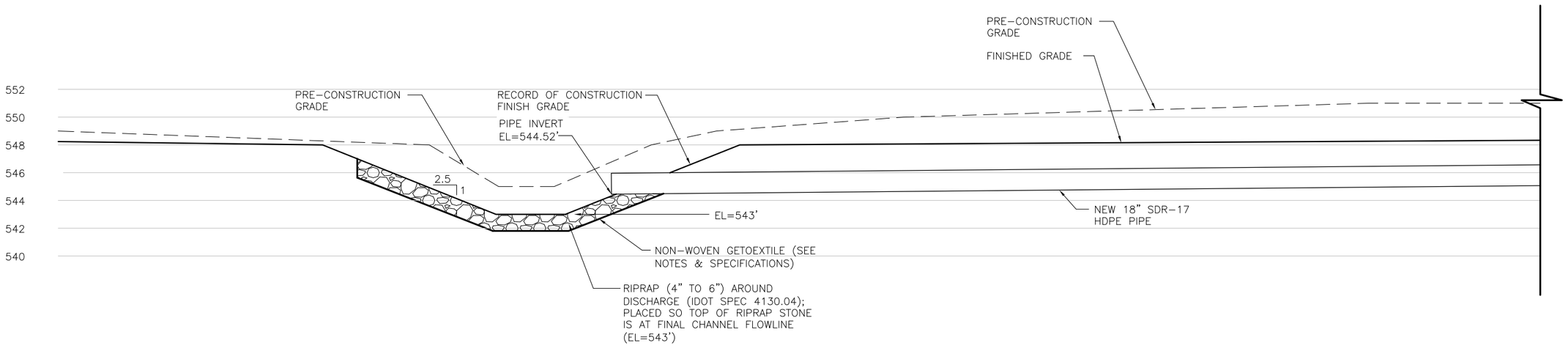
CLIENT / LOCATION

INTERSTATE POWER & LIGHT
ECONOMIZER ASH PILE AND POND DESIGN
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION

GRADING SECTIONS A & B

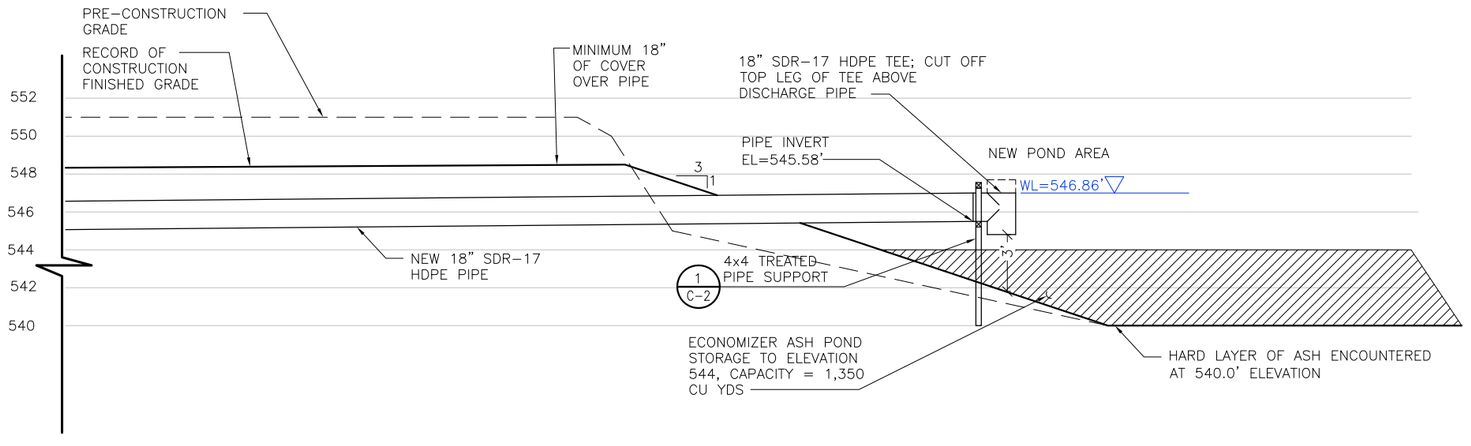
JOB 154.002.013
SHT. C-2
DWG. 154002013-C2



POND DISCHARGE PIPE PROFILE (C / C-1)

0 4 8

SCALE IN FEET



POND DISCHARGE PIPE PROFILE (CONT) (C / C-1)

0 4 8

SCALE IN FEET

REV	DATE	BY	DESCRIPTION
5			
4			
3			
2	11/21/11	RGM	RECORD OF CONSTRUCTION
1	8/22/11	MWL	REVISED POND LOCATION

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SCALE:	AS SHOWN
DATE:	8-22-11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	MWL

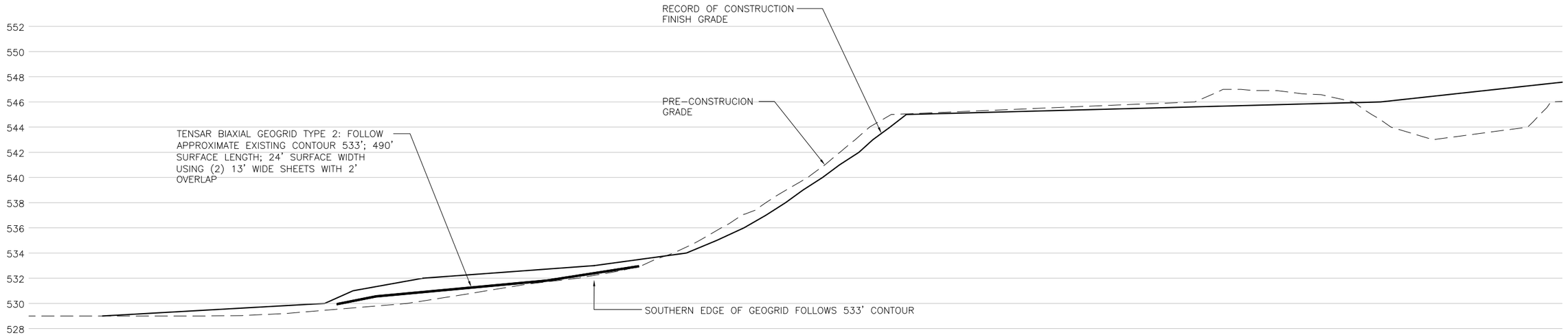
CLIENT / LOCATION

INTERSTATE POWER & LIGHT
ECONOMIZER ASH PILE AND POND DESIGN
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION

GRADING SECTION C

JOB	154.002.013
SHT.	C-3
DWG.	154002013-C3



TOE BERM SECTION — D / C-1

0 4 8

SCALE IN FEET

REV	DATE	BY	DESCRIPTION
5			
4			
3			
2			
1	11/21/11	RGM	RECORD OF CONSTRUCTION

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SCALE:	AS SHOWN
DATE:	8–22–11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	MWL

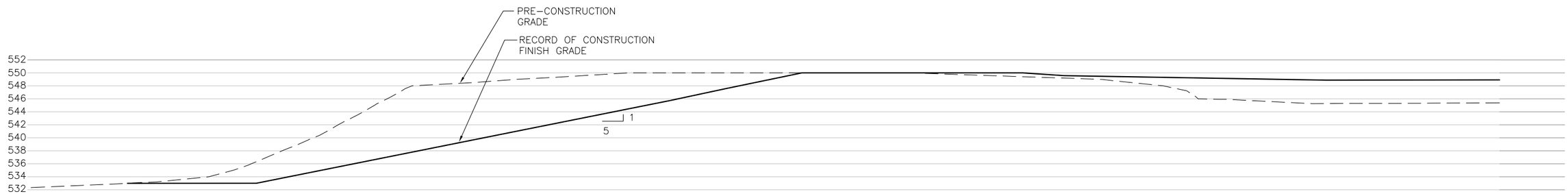
CLIENT / LOCATION

INTERSTATE POWER & LIGHT
ECONOMIZER ASH PILE AND POND DESIGN
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION

GRADING SECTION D

JOB 154.002.013
SHT. C–4
DWG. 154002013–C4



NORTH SLOPE SECTION (E / C-1)

0 8 16

SCALE IN FEET

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REV	DATE	BY	DESCRIPTION
5			
4			
3			
2			
1	11/21/11	RGM	RECORD OF CONSTRUCTION

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SCALE:	AS SHOWN
DATE:	8–22–11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	MWL

CLIENT / LOCATION

INTERSTATE POWER & LIGHT
ECONOMIZER ASH PILE AND POND DESIGN
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION

GRADING SECTION E

JOB 154.002.013
SHT. C–5
DWG. 154002013–C5

Point Number	Easting	Northing	Elevation
100	2300100.00	279300.00	548.92
101	2300150.00	279300.00	548.85
102	2300200.00	279300.00	549.33
103	2299500.00	279350.00	548.73
104	2299550.00	279350.00	549.00
105	2299600.00	279350.00	548.96
106	2299650.00	279350.00	548.87
107	2299700.00	279350.00	548.78
108	2299750.00	279350.00	548.72
109	2299800.00	279350.00	548.68
110	2299850.00	279350.00	548.64
111	2299900.00	279350.00	548.59
112	2299950.00	279350.00	548.53
113	2300000.00	279350.00	548.45
114	2300050.00	279350.00	548.35
115	2300100.00	279350.00	548.28
116	2300150.00	279350.00	548.17
117	2299250.00	279400.00	547.42
118	2299300.00	279400.00	548.00
119	2299350.00	279400.00	548.00
120	2299400.00	279400.00	548.56
121	2299450.00	279400.00	548.46
122	2299500.00	279400.00	548.35
123	2299550.00	279400.00	548.32
124	2299600.00	279400.00	548.27
125	2299650.00	279400.00	548.20
126	2299700.00	279400.00	548.15
127	2299750.00	279400.00	548.14
128	2299800.00	279400.00	548.11
129	2299850.00	279400.00	548.07
130	2300150.00	279400.00	548.22
131	2300200.00	279400.00	548.65
132	2299650.00	279450.00	548.05
133	2299700.00	279450.00	548.06
134	2299750.00	279450.00	548.07
135	2299800.00	279450.00	548.09
136	2299850.00	279450.00	548.11
137	2299900.00	279450.00	548.50
138	2299950.00	279450.00	548.50
139	2300000.00	279450.00	548.50
140	2300050.00	279450.00	548.34
141	2300100.00	279450.00	548.28
142	2300150.00	279450.00	548.74
143	2300200.00	279450.00	549.00
144	2299250.00	279500.00	548.02
145	2299300.00	279500.00	548.26
146	2299350.00	279500.00	548.50
147	2299400.00	279500.00	548.50
148	2299450.00	279500.00	548.50
149	2299500.00	279500.00	548.50
150	2299550.00	279500.00	548.50
151	2299600.00	279500.00	548.50
152	2299650.00	279500.00	548.50
153	2299700.00	279500.00	548.50
154	2299750.00	279500.00	548.50
155	2299800.00	279500.00	548.50
156	2299850.00	279500.00	548.55
157	2299900.00	279500.00	548.60
158	2299950.00	279500.00	548.42
159	2300000.00	279500.00	548.13
160	2299300.00	279550.00	548.15
161	2299350.00	279550.00	548.34
162	2299400.00	279550.00	548.50
163	2299450.00	279550.00	548.50
164	2299500.00	279550.00	548.50
165	2299550.00	279550.00	548.50
166	2299600.00	279550.00	548.50
167	2299650.00	279550.00	548.50
168	2299700.00	279550.00	548.50
169	2299750.00	279550.00	548.50
170	2299800.00	279550.00	548.50
171	2299850.00	279550.00	548.65
172	2299900.00	279550.00	548.70
173	2299950.00	279550.00	548.62
174	2300000.00	279550.00	548.33
175	2299350.00	279600.00	548.18
176	2299400.00	279600.00	548.33
177	2299450.00	279600.00	548.50
178	2299500.00	279600.00	548.50
179	2299550.00	279600.00	548.50
180	2299600.00	279600.00	548.50

Point Number	Easting	Northing	Elevation
181	2299650.00	279600.00	548.50
182	2299700.00	279600.00	548.50
183	2299750.00	279600.00	548.50
184	2299800.00	279600.00	548.50
185	2299850.00	279600.00	548.65
186	2299900.00	279600.00	548.79
187	2299950.00	279600.00	548.83
188	2300000.00	279600.00	548.54
189	2300050.00	279600.00	548.26
190	2300100.00	279600.00	548.25
191	2300150.00	279600.00	548.36
192	2300200.00	279600.00	548.47
193	2300250.00	279600.00	549.51
194	2299400.00	279650.00	548.08
195	2299450.00	279650.00	548.14
196	2299500.00	279650.00	548.19
197	2299550.00	279650.00	548.21
198	2299600.00	279650.00	548.23
199	2299650.00	279650.00	548.32
200	2299700.00	279650.00	548.50
201	2299750.00	279650.00	548.50
202	2299800.00	279650.00	548.50
203	2299850.00	279650.00	548.65
204	2299900.00	279650.00	548.79
205	2299950.00	279650.00	548.94
206	2300000.00	279650.00	548.82
207	2300050.00	279650.00	549.00
208	2300100.00	279650.00	549.00
209	2300150.00	279650.00	549.00
210	2300200.00	279650.00	549.10
211	2300250.00	279650.00	549.47
212	2299700.00	279700.00	548.07
213	2299750.00	279700.00	548.16
214	2299800.00	279700.00	548.31
215	2299850.00	279700.00	548.50
216	2299900.00	279700.00	548.75
217	2299950.00	279700.00	549.00
218	2300000.00	279700.00	549.56
219	2300050.00	279700.00	549.70
220	2300100.00	279700.00	549.72
221	2300150.00	279700.00	549.66
222	2300200.00	279700.00	549.66
223	2300250.00	279700.00	549.94
224	2299850.00	279750.00	548.17
225	2299900.00	279750.00	548.50
226	2299950.00	279750.00	549.06
227	2300000.00	279750.00	550.00
228	2300150.00	279750.00	550.00
229	2300200.00	279750.00	550.00
230	2300250.00	279750.00	550.00
231	2300300.00	279750.00	550.00
232	2299249.88	279714.43	529.00
233	2299285.97	279746.46	529.00
234	2299326.60	279762.43	529.00
235	2299342.70	279764.68	529.00
236	2299354.31	279771.69	529.00
237	2299380.10	279776.93	529.00
238	2299404.60	279774.34	529.00
239	2299450.58	279783.66	529.00
240	2299535.87	279794.17	529.00
241	2299542.90	279792.44	529.00
242	2299621.34	279797.45	529.00
243	2299670.17	279806.72	529.00
244	2299709.27	279823.73	529.00
245	2299783.10	279867.71	529.00
246	2299869.00	279859.65	533.00
247	2299797.79	279841.55	535.00
248	2299757.88	279819.37	535.00
249	2299723.97	279797.54	535.00
250	2299676.86	279777.15	535.00
251	2299623.05	279767.23	535.00
252	2299613.41	279767.96	535.00
253	2299540.56	279762.12	535.00
254	2299534.07	279763.72	535.00
255	2299455.40	279754.02	535.00
256	2299406.04	279744.02	535.00
257	2299381.54	279746.61	535.00
258	2299365.37	279743.32	535.00
259	2299352.95	279735.83	535.00
260	2299334.27	279733.21	535.00
261	2299300.94	279720.11	535.00

Point Number	Easting	Northing	Elevation
262	2299284.39	279707.31	535.00
263	2299271.72	279693.86	535.00
264	2299282.63	279683.57	535.00
265	2299294.50	279696.17	535.00
266	2299308.42	279706.93	535.00
267	2299338.11	279718.60	535.00
268	2299358.07	279721.40	535.00
269	2299370.90	279729.14	535.00
270	2299382.26	279731.45	535.00
271	2299406.75	279728.86	535.00
272	2299457.81	279739.21	535.00
273	2299533.16	279748.49	535.00
274	2299539.39	279746.96	535.00
275	2299613.19	279752.93	535.00
276	2299623.90	279752.12	535.00
277	2299680.46	279762.46	535.00
278	2299731.32	279784.45	535.00
279	2299765.71	279806.56	535.00
280	2299804.88	279828.50	535.00
281	2299868.12	279844.68	536.00
282	2299867.14	279830.94	545.00
283	2299813.19	279814.07	544.00
284	2299797.24	279807.09	544.00
285	2299719.40	279762.32	544.00
286	2299682.01	279748.58	544.00
287	2299665.40	279744.58	544.00
288	2299600.85	279738.87	544.00
289	2299400.72	279710.95	544.00
290	2299337.06	279697.41	544.00
291	2299318.26	279688.68	544.00
292	2299294.86	279669.99	544.00
293	2299295.56	279667.78	545.00
294	2299520.21	279710.97	545.00
295	2299656.98	279725.37	545.00
296	2299726.87	279746.29	545.00
297	2299776.98	279771.14	545.00
298	2299866.04	279783.58	548.00
299	2299745.92	279724.09	548.00
300	2299696.70	279706.78	548.00
301	2299650.07	279696.25	548.00
302	2299528.45	279686.12	548.00
303	2299427.73	279669.11	548.00
304	2299351.62	279649.56	548.00
305	2299320.16	279625.04	548.00
306	2299251.35	279535.71	548.00
307	2299233.68	279545.41	546.00
308	2299313.26	279632.34	546.00
309	2299347.12	279658.73	546.00
310	2299527.20	279696.05	546.00
311	2299648.55	279706.16	546.00
312	2299693.93	279716.41	546.00
313	2299742.02	279733.32	546.00
314	2299810.61	279767.41	546.00
315	2299915.57	279856.91	534.00
316	2300075.20	279835.36	533.00
317	2300157.49	279846.73	533.00
318	2300195.06	279845.50	533.00
319	2300220.49	279848.63	533.00
320	2300255.07	279862.99	533.00
321	2300304.41	279863.85	531.00
322	2300351.52	279846.93	532.00
323	2300367.86	279796.40	533.00
324	2300290.53	279771.73	550.00
325	2300161.94	279761.54	550.00
326	2300086.90	279750.65	550.00
327	2300063.12	279749.90	550.00
328	2300021.05	279754.46	550.00
329	2299978.64	279763.16	550.00
330	2299946.59	279772.74	549.00
331	2299909.62	279782.06	548.00
332	2299221.40	279514.34	546.00
333	2299216.85	279507.27	546.00
334	2299207.49	279507.35	546.00
335	2299201.60	279501.25	546.00
336	2299196.62	279479.96	546.00
337	2299200.18	279452.66	546.00
338	2299220.36	279452.60	546.00
339	2299238.65	279454.66	548.00
340	2299241.07	279466.92	543.00
341	2299213.42	279466.12	540.00
342	2299211.83	279479.14	540.00

Point Number	Easting	Northing	Elevation
343	2299214.90	279492.29	540.00
344	2299225.58	279492.19	540.00
345	2299241.46	279471.94	543.00
346	2299244.14	279484.16	548.00
347	2299372.24	279458.85	548.00
348	2299371.59	279446.37	543.00
349	2299370.08	279441.44	543.00
350	2299367.65	279429.17	548.00
351	2299580.17	279450.09	548.00
352	2299579.18	279437.63	543.00
353	2299578.78	279432.64	543.00
354	2299577.80	279420.18	547.99
355	2299658.13	279443.91	548.00
356	2299657.84	279431.41	543.00
357	2299657.44	279426.41	543.00
358	2299657.15	279413.92	548.00
359	2299778.13	279441.08	548.00
360	2299777.29	279428.61	543.00
361	2299777.34	279423.60	543.00
362	2299776.50	279411.13	548.00
363	2299866.50	279435.13	548.00
364	2299865.66	279422.66	543.01
365	2299865.32	279417.67	543.00
366	2299864.48	279405.20	547.98
367	2300027.38	279413.66	548.00
368	2300025.29	279401.34	543.00
369	2300024.45	279396.41	543.00
370	2300022.36	279384.09	547.99
371	2300161.26	279390.47	548.00
372	2300158.03	279378.40	543.02
373	2300156.74	279373.57	543.00
374	2300153.51	279361.49	547.96
375	2300193.65	279381.81	548.00
376	2300191.82	279369.36	543.00
377	2300190.53	279364.53	543.00
378	2300189.26	279351.93	548.00
379	2300175.63	279352.95	549.00
380	2300188.52	279346.95	550.00
381	2300212.39	279385.47	548.00
382	2300216.05	279373.51	543.00
383	2300217.51	279368.73	543.00
384	2300221.18	279356.78	548.00
385	2300222.64	279352.00	550.00
386	2300215.51	279402.68	550.00
387	2300222.52	279462.95	550.00
388	2300237.58	279376.81	548.00
389	2300237.96	279370.93	548.00
390	2300232.66	279359.61	548.00
391	2300236.17	279355.33	550.00
392	2300243.04	279369.97	550.00
393	2300242.45	279378.96	550.00
394	2300170.66	279286.12	549.00
395	2300169.60	279267.66	548.00
396	2300170.45	279274.86	549.00
397	2299967.39	279308.64	549.00
398	2299966.51	279298.07	549.00
399	2299965.50	279286.81	548.00
400	2299762.37	279325.22	549.00
401	2299761.53	279315.17	549.00
402	2299823.40	279299.91	548.00
403	2299530.76	279355.77	549.00
404	2299529.49	279347.27	549.00
405	2299497.48	279345.88	548.00
406	2299382.81	279379.44	549.00
407	2299381.56	279372.30	549.00
408	2299334.90	279370.05	548.00
409	2299309.27	279372.04	548.00
410	2299240.48	279381.53	547.00
411	2299195.46	279423.32	547.00
412	2300066.64	279586.44	548.00
413	2300045.82	279571.80	548.00
414	2300036.89	279520.57	548.00
415	2300051.54	279499.75	548.00
416	2300206.21	279472.81	548.00
417	2300227.03	279487.45	548.00
418	2300235.95	279538.68	548.00
419	2300221.31	279559.50	548.00
420	2300068.43	279561.77	540.00
421	2300061.57	279522.36	540.00
422	2300204.42	279497.48	540.00
423	2300211.28	279536.89	540.00

CONSTRUCTION USE ONLY

REV	DATE	BY	DESCRIPTION
5			
4			
3			
2	11/21/11	RGM	RECORD OF CONSTRUCTION
1	8/22/11	MWL	REVISED FOR NEW POND LOCATION

aether dbs
www.aetherdbs.com

SCALE:	AS SHOWN
DATE:	8-22-11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	MWL

CLIENT / LOCATION

INTERSTATE POWER & LIGHT
ECONOMIZER ASH PILE AND POND DESIGN
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION

FINISHED GRADE STAKING POINTS

JOB 154.002.013
SHT. C-6
DWG. 154002013-C6

GENERAL REQUIREMENTS

A. PERFORM ALL WORK IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES AND ORDINANCES.
B. ALL MATERIALS AND EQUIPMENT TO BE PROVIDED AS PART OF THIS PROJECT TO INCLUDE CERTIFICATION DOCUMENTATION (EX. UL 508A) REQUIRED BY APPLICABLE CODES AND ORDINANCES FOR INSTALLATION AND OPERATION OF SAID MATERIALS/EQUIPMENT AS INTENDED IN THIS PROJECT.
C. VERIFY LOCATIONS OF EXISTING UTILITIES PRIOR TO BEGINNING ANY EARTHWORK OR CONSTRUCTION.
D. PROTECT EXISTING STRUCTURES, PIPES, PUMPS, INSTRUMENTS, PAVEMENT, CONDUIT, AND OTHER ITEMS THAT ARE TO REMAIN.
E. INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS' SUPPLIED INSTALLATION DOCUMENTS AND THE REQUIREMENTS OF THE DRAWINGS.

APPLICABLE CODES AND CERTIFICATIONS

A. 2009 UNIFORM PLUMBING CODE (UPC) AS AMENDED BY IOWA
B. 2009 INTERNATIONAL MECHANICAL CODE (IMC)
C. NATIONAL FIRE PROTECTION AGENCY (NFPA)
D. IOWA DEPARTMENT OF TRANSPORTATION 2011 STANDARD SPECIFICATIONS
E. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM), VARIOUS STANDARDS LISTED
F. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI), VARIOUS STANDARDS LISTED
G. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

EXISTING SURVEYS AND BASE MAPS

A. ELEVATIONS WITHIN THE PROJECT AREA AND CONTROL POINTS WERE OBTAINED IN A SURVEY CONDUCTED BY KLINGER & ASSOCIATES, BURLINGTON, IOWA (DATED 07/19/11).

EXISTING INFLUENT WATER CHARACTERISTICS

A. ECONOMIZER ASH POND INFLOW (10" SCHEDULE 80 PVC PIPE):
   1. AVE: 1,600 GPM
   2. MAX: 3,200 GPM
B. ECONOMIZER ASH PILE SOUTH CHANNEL INFLOW (TWO 12-INCH PVC PIPES)
   1. MAX: 4,000 GPM PER 12-INCH PIPE
   2. FLOW INTO CHANNEL FROM TWO 12-INCH PIPES NOT CONTINUOUS AND IS DEPENDENT ON STORM WATER ACCUMULATION AT THE FACILITY

CIVIL NOTES

TEMPORARY FACILITIES AND CONTROL

A. DUST CONTROL: THE CONTRACTOR SHALL PROVIDE POSITIVE METHODS AND APPLY DUST CONTROL WATER TO MINIMIZE RAISING DUST FROM CONSTRUCTION OPERATION, AND PROVIDE POSITIVE MEANS TO PREVENT AIRBORNE DUST FROM DISPERSING INTO THE ATMOSPHERE. CHEMICAL DUST SUPPRESSANT SHALL NOT BE USED. DUST SUPPRESSANTS SHALL BE APPROVED BY OWNER PRIOR TO USE.
B WATER CONTROL
   1. THE CONTRACTOR SHALL PROVIDE METHODS TO CONTROL SURFACE WATER TO PREVENT DAMAGE TO THE PROJECT, THE SITE, OR ADJOINING PROPERTIES. THE CONTRACTOR SHALL CONTROL FILL, GRADING AND DITCHING TO DIRECT SURFACE DRAINAGE AWAY FROM EXCAVATIONS, PITS, TUNNELS AND OTHER CONSTRUCTION AREAS; AND TO DIRECT DRAINAGE TO PROPER RUNOFF.
   2. THE CONTRACTOR SHALL PROVIDE, OPERATE, AND MAINTAIN HYDRAULIC EQUIPMENT OF ADEQUATE CAPACITY TO CONTROL SURFACE EROSION.
   3. THE CONTRACTOR SHALL DISPOSE OF DRAINAGE WATER IN A MANNER TO PREVENT FLOODING, EROSION, OR OTHER DAMAGE TO ANY PORTION OF THE SITE OR TO ADJOINING AREAS.
C. EROSION CONTROL
   1. THE CONTRACTOR SHALL PLAN AND EXECUTE CONSTRUCTION AND EARTHWORK USING METHODS TO CONTROL SURFACE DRAINAGE FROM CUTS AND FILLS AND STOCKPILES IN ORDER TO PREVENT EROSION AND SEDIMENTATION; AND SHALL:
      A. HOLD THE NUMBER AND SIZE OF AREAS OF BARE SOIL EXPOSED AT ONE TIME TO A MINIMUM, AND
      B. PROVIDE TEMPORARY CONTROL MEASURES SUCH AS BERMS, DIKES, SILT FENCE, SILT DAMS, DRAINS, ETC., AS NEEDED FOR EROSION CONTROL.
   2. THE CONTRACTOR SHALL CONSTRUCT FILLS BY SELECTIVE PLACEMENT TO ELIMINATE ERODIBLE SURFACE SOILS.
   3. THE CONTRACTOR SHALL INSPECT EARTHWORK TO DETECT ANY EVIDENCE OF THE START OF EROSION, AND APPLY CORRECTIVE MEASURES AS REQUIRED TO CONTROL EROSION.
   4. TEMPORARY PERIMETER EROSION CONTROL:
      A. THIS SYSTEM CONSISTS OF A CONTINUOUS BARRIER ADJACENT TO AN AREA OF CONSTRUCTION TO INTERCEPT WATER BORNE SILT AND PREVENT IT FROM LEAVING THE AREA OF CONSTRUCTION. THE BARRIER SHALL BE OF SUFFICIENT LENGTH AND HEIGHT TO CAPTURE ALL CONSTRUCTION RUNOFF.
      B. SILT FILTER FENCE SHALL BE SUPPORTED ON POSTS AT LEAST 6 FT IN LENGTH AND SPACED ON 5 FT. CENTERS. THE FABRIC SHALL BE INSTALLED IN A BACKFILLED TRENCH 6 INCHES DEEP AND SECURELY ATTACHED TO THE POSTS BY ANY METHOD APPROVED BY THE ENGINEER.
      C. PERIMETER EROSION BARRIER SHALL BE A MANUFACTURED SILT FENCE (SUPAC4-1/2 NP(UV) OR APPROVED EQUAL) MADE OF WOVEN POLYPROPYLENE WITH PRE-SEWN POST POCKETS AND TOP AND BOTTOM TENSIONING ROPES.

DEMOLITION

A. REGULATORY REQUIREMENTS
   1. CONFORM TO APPLICABLE CODE FOR DEMOLITION OF STRUCTURES, SAFETY OF ADJACENT STRUCTURES, DUST CONTROL, AND DISPOSAL.
   2. CONFORM TO APPLICABLE REGULATORY PROCEDURES WHEN DISCOVERING HAZARDOUS OR CONTAMINATED MATERIALS.
B. SCHEDULING
   1. SCHEDULE WORK TO PRECEDE CONCURRENTLY WITH THE INSTALLATION OF THE REPLACEMENT SYSTEMS.
   2. SCHEDULE WORK AS TO MINIMIZE IMPACT ON FACILITY OPERATIONS.
   3. SCHEDULE WORK TO MINIMIZE THE TIME THAT TEMPORARY SYSTEMS MAY BE NEEDED TO MAINTAIN SYSTEM FUNCTIONALITY.
C. DEMOLITION REQUIREMENTS
   1. THE CONTRACTOR SHALL EXERCISE EXTREME CARE TO PREVENT DAMAGE TO STRUCTURES, UTILITIES, AND FACILITIES NOT DESIGNATED TO BE REMOVED. THE CONTRACTOR SHALL EXERCISE CARE TO AVOID DAMAGING EXISTING PAVED AREAS AT THE SITE. THE COST FOR REPAIR OF ANY DAMAGE WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
   2. ALL SUPPORTS AND FOUNDATIONS FOR DEMOLISHED EQUIPMENT SHALL BE REMOVED ALSO UNLESS SPECIFIED ON THE DRAWINGS.
   3. CONTRACTOR SHALL REMOVE ALL ELECTRICAL WIRING, CONTROL/SIGNAL WIRING, AND CONDUIT FROM THE REMOVED EQUIPMENT TO THE NEAREST DISCONNECT POINT. THE ELECTRICAL/WEATHER/ACCESS INTEGRITY OF THE CONNECTION POINT MUST BE RESTORED AFTER DEMOLITION.
   4. DURING THE DEMOLITION WORK THE CONTRACTOR SHALL CONTINUOUSLY EVALUATE THE CONDITIONS OF THE STRUCTURES BEING DEMOLISHED AND TAKE IMMEDIATE ACTION TO PROTECT ALL PERSONNEL WORKING IN AND AROUND THE DEMOLITION SITE. NO AREA, SECTION, OR COMPONENT OF STRUCTURAL ELEMENTS WILL BE ALLOWED TO BE LEFT STANDING WITHOUT SUFFICIENT BRACING, SHORING, OR LATERAL SUPPORT TO PREVENT COLLAPSE OR FAILURE WHILE WORKMEN REMOVE DEBRIS OR PERFORM OTHER WORK IN THE IMMEDIATE AREA. STRUCTURAL COMPONENTS THAT ARE DESIGNED AND CONSTRUCTED TO STAND WITHOUT LATERAL SUPPORT OR SHORING, AND ARE DETERMINED TO BE IN STABLE CONDITION, MAY BE ALLOWED TO REMAIN STANDING WITHOUT ADDITIONAL BRACING, SHORING, OR LATERAL SUPPORT UNTIL DEMOLISHED. THE CONTRACTOR SHALL ENSURE THAT NO ELEMENTS DETERMINED TO BE UNSTABLE ARE LEFT UNSUPPORTED AND SHALL BE RESPONSIBLE FOR PLACING AND SECURING BRACING, SHORING, OR LATERAL SUPPORTS AS MAY BE REQUIRED AS A RESULT OF ANY CUTTING, REMOVAL, OR DEMOLITION WORK PERFORMED UNDER THIS CONTRACT.
   5. THE CONTRACTOR SHALL TAKE APPROPRIATE PRECAUTIONS TO PROTECT ALL IDENTIFIED COMMUNICATION LINES AND UTILITIES IN THE AREA OF THE PROPOSED DEMOLITION ACTIVITIES. THE CONTRACTOR SHALL VERIFY THAT ON-SITE ELECTRICAL WIRING ENTERING ALL STRUCTURES TO BE DEMOLISHED OR IN CLOSE ENOUGH PROXIMITY TO BE DAMAGED BY THE DEMOLITION OPERATIONS ARE DISCONNECTED AND/OR DE-ENERGIZED PRIOR TO PROCEEDING WITH DEMOLITION OPERATIONS. IF NOT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACCOMPLISHING THE SAME. THE CONTRACTOR SHALL COORDINATE WITH THE LOCAL ELECTRICAL UTILITY COMPANY FOR ANY NECESSARY RELOCATION OF UTILITIES AND BE RESPONSIBLE FOR ANY ASSOCIATED FEES OR EXPENSES.
   6. THE CONTRACTOR SHALL VERIFY THAT ON-SITE WATER LINES ENTERING ALL STRUCTURES TO BE DEMOLISHED OR IN CLOSE ENOUGH PROXIMITY TO BE DAMAGED BY THE DEMOLITION OPERATIONS ARE DISCONNECTED AND CAPPED PRIOR TO PROCEEDING WITH DEMOLITION OPERATIONS. THE CONTRACTOR SHALL MAKE EVERY EFFORT TO AVOID DAMAGE TO ANY EXISTING FIRE CONTROL HYDRANTS AND WILL REPAIR DAMAGED HYDRANTS AT NO ADDITIONAL COST.
   7. THE CONTRACTOR SHALL VERIFY THAT ON-SITE GAS LINES/MAINS ENTERING ALL STRUCTURES OR IN CLOSE ENOUGH PROXIMITY TO BE DAMAGED AS A RESULT OF THE DEMOLITION OPERATIONS BE CAPPED OR DISCONNECTED PRIOR TO PROCEEDING WITH THE DEMOLITION OPERATIONS.
   8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT COST OF UTILITIES DAMAGED DURING THE COURSE OF THE WORK CAUSED BY THE CONTRACTOR.
   9. THE CONTRACTOR SHALL PERFORM SUCH CLEANING OF THE REMOVED EQUIPMENT, MATERIALS, AND COMPONENTS AS REQUIRED FOR DISPOSAL.
   10. ALL DEMOLITION WORK IS TO BE COORDINATED WITH OWNER SO AS TO NOT INTERRUPT FACILITY OPERATIONS.
   11. MARK LOCATION OF UTILITIES.

EXCAVATION

A. CONTRACTOR RESPONSIBLE FOR JOINT UTILITY LOCATES FOR IDENTIFICATION OF BURIED PUBLIC UTILITIES.
B. UNDERPIN ADJACENT STRUCTURES WHICH MAY BE DAMAGED BY EXCAVATION WORK, INCLUDING UTILITIES AND PIPE CHASES.
C. EXCAVATE SUBSOIL REQUIRED TO ACCOMMODATE SITE STRUCTURES AND CONSTRUCTION OPERATIONS.
D. GRADE TOP PERIMETER OF EXCAVATION TO PREVENT SURFACE WATER FROM DRAINING INTO EXCAVATION.
E. NOTIFY OWNER OF UNEXPECTED SUBSURFACE CONDITIONS AND DISCONTINUE AFFECTED WORK IN AREA UNTIL NOTIFIED TO RESUME WORK.
F. CORRECT UNAUTHORIZED EXCAVATION AT NO EXTRA COST TO OWNER.
G. NON-NATIVE SOILS UNDER FOUNDATION AREAS TO BE REMOVED UNTIL NATIVE SOILS ARE ENCOUNTERED UNLESS APPROVED OTHERWISE BY OWNER.
H. WORK, INCLUDING PROVIDING SHEETING/BRACING AND EXCAVATION ACCESS, SHALL BE PERFORMED AS NECESSARY TO PROTECT LIFE OR PROPERTY AND CONFORM TO ALL APPLICABLE FEDERAL, STATE, AND OSHA CODES.
I. CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES AROUND OPEN EXCAVATIONS FOR THE DURATION THAT THE EXCAVATION IS OPEN.

EARTHWORK

A. GRADING. AS SHOWN ON THE DRAWINGS WITH THE FOLLOWING ADDITIONAL REQUIREMENTS:
   1. SLOPES ARE TO BE AS FOLLOWS:
      A. NORTH SIDE OF ECONOMIZER ASH PILE (EAST END): 5:1
      B. NORTH SIDE OF ECONOMIZER ASH PILE (WEST END – BERM): 5:1 FROM TOP OF PROPOSED BERM TO TOE
      C. PROPOSED ECONOMIZER ASH POND: 3:1
      D. ECONOMIZER ASH PILE SOUTH CHANNEL: 2.5:1
B. FILL MATERIAL
   1. GENERAL FILL
      A. EXISTING ECONOMIZER ASH PILE MATERIAL TO BE USED AS GENERAL FILL FOR GRADING.
      B. PRIOR TO EXCAVATION/PLACEMENT OF GENERAL FILL MATERIAL, VEGETATIVE MATERIAL TO BE STRIPPED AND STOCKPILED IN DESIGNATED LOCATION. SEE DRAWINGS.
   2. STRUCTURAL AGGREGATE
      A. PIT RUN STONE (MIXTURE OF GRAVEL, CRUSHED STONE, AND SAND), FREE OF SHALE, CLAY, FRIABLE MATERIAL AND DEBRIS MEETING ASTM D2940 AND IOWA DEPARTMENT OF TRANSPORTATION REQUIREMENT 4120.04 FOR STRUCTURAL BASES AND SUB-BASES AND STATE DEPARTMENT OF TRANSPORTATION REQUIREMENTS FOR STRUCTURAL BASES AND SUB-BASES.
      B. GRADATION FOR BASE MATERIAL SHALL BE REASONABLE CLOSE TO 100% PASSING 1.5 INCH SIEVE, 95+/-5% PASSING 1 INCH SIEVE, 75+/-% PASSING ½ INCH SIEVE, 43+/-13% PASSING NO. 4 SIEVE, 25+/-15% PASSING NO. 16 SIEVE, AND A MAXIMUM 8+/-4% PASSING NO. 200 SIEVE.
      C. GRADATION FOR SUB-BASE MATERIAL SHALL BE REASONABLE CLOSE TO MINIMUM 90% PASSING 1.5 INCH SIEVE AND MAXIMUM 12 PERCENT PASSING NO. 200 SIEVE.
   3. TOP SOIL (IF REQUIRED): REMOVE, STOCKPILE, AND REINSTALL AFTER ROUGH GRADING IS COMPLETE.
   4. SAND (IF REQUIRED): NATURAL RIVER OR BANK SAND, WASHED.
   5. CLAY (IF REQUIRED)
      A. CLAY FILL SHALL BE SUITABLE COHESIVE OR MIXTURE OF COHESIVE AND NON-COHESIVE MATERIAL(S) EXCAVATED FROM OFF-SITE BORROW AREA(S).
      B. THE CLAY FILL SHALL BE RELATIVELY FREE FROM GRASS, ROOTS, BRUSH, OR OTHER ORGANIC MATERIALS.
      C. NO DEBRIS OR REFUSE SHALL BE PRESENT IN ANY OF THE CLAY FILL.
      D. CLAY FILL SHALL BE FREE OF FROZEN MATERIALS AND FREE FROM ANY ROCK OR MASSES OF UNBROKEN EARTH HAVING A MAXIMUM DIMENSION GREATER THAN 2 INCHES.
      E. ALL MATERIAL LARGER THAN ½-INCH SHALL BE WELL-ROUNDED.
   6. NON-STRUCTURAL AGGREGATE (IF REQUIRED): PIT RUN STONE, FREE OF SHALE, CLAY, FRIABLE MATERIAL AND DEBRIS.
   7. RIPRAP: IOWA DEPARTMENT OF TRANSPORTATION REQUIREMENT 4130.04 FOR EROSION STONE
C. PLACING FILL MATERIALS
   1. FILLING AND BACKFILLING:
      A. DO NOT USE FROZEN FILL MATERIALS.
      B. PLACE AND COMPACT IN LAYERS NOT MORE THAN 12 INCHES THICK PRIOR TO COMPACTION, UNLESS OTHERWISE INDICATED.
      C. FILL AND COMPACT SO THAT EACH LIFT OF MATERIAL DOES NOT SETTLE AND RUTTING IS NOT OBSERVED.
      D. FILL AND COMPACT TO A THICKNESS TO ALLOW OBTAINING FINAL GRADE.
      E. FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED NO STEEPER THAN 2:1. SEE DESIGN DRAWINGS FOR FILL SLOPES.
   2. COMPACTION
      a. AFTER PLACEMENT OF GENERAL FILL MATERIAL IN 12-INCH LIFTS, MATERIAL TO BE COMPACTED AFTER EVERY LIFT UTILIZING EARTH-MOVING EQUIPMENT (DOZER, GRADER, ETC.) AT NO LESS THAN 4 PASSES EACH DIRECTION IN THE AREA OF THE PLACED FILL MATERIAL. RUTTING MATERIAL MUST BE REMOVED AND COMPACTED WITH STABLE MATERIAL PRIOR TO PLACEMENT OF NEXT 12-INCH LIFT.
      b. FINAL LIFT TO BE COMPACTED AND GRADED SO THAT NO RUTTING IS OBSERVED
      c. SUBGRADE MATERIAL UNDER FLOW PIPES TO BE COMPACTED TO MAXIMUM DRY DENSITY
      d. CLAY, IF NECESSARY, MUST BE COMPACTED TO 95% OF STANDARD PROCTOR MAXIMUM DRY DENSITY.
      e. FOR CLEAN SAND AND GRAVEL FILL OPTIMUM MOISTURE CONTENT MAY BE OUTSIDE OF THE SPECIFIED RANGE PROVIDED MAXIMUM DENSITY IS OBTAINED.
      f. WORK THAT DOES NOT MEET THE SPECIFICATIONS SHALL BE REMOVED AND REPLACED OR REMOVED, DRIED AND RE-COMPACTED AND RETESTED TO DEMONSTRATE COMPLIANCE WITH THE SPECIFICATION.
C. CONCRETE
   1. CONCRETE: SHALL MEET IOWA DEPARTMENT OF TRANSPORTATION REQUIREMENT 4103

GEOGRID

A. TYPE: TENAX MS MULTILAYERED GEOGRID, OR SIMILAR.
B. PROPERTIES

PROPERTY	DETAIL
STRUCTURE	INTEGRALLY FORMED BIAXIAL GRID
MESH TYPE	RECTANGULAR APERTURES
POLYMER TYPE	POLYPROPYLENE
CARBON BLACK CONTENT	0.5% (ASTM D4218)
NUMBER OF LAYERS	1
ROLL WIDTH (METERS)	4
ROLL LENGTH (METERS)	50.0

REV	DATE	BY	DESCRIPTION
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2			
1	11/21/11	RGM	RECORD OF CONSTRUCTION

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SCALE:	AS SHOWN
DATE:	8-22-11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	MWL

CLIENT / LOCATION
INTERSTATE POWER & LIGHT
ECONOMIZER ASH PILE AND POND DESIGN
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION
NOTES AND SPECIFICATIONS
(SHEET 1)

JOB 154.002.013
SHT. C-7
DWG. 154002013-C7

GEOGRID (CONT)

TECHNICAL CHARACTERISTIC	TEST METHOD	MD (MACHINE DIRECTION-LONGITUDINAL TO ROLL)	TD (TRANSVERSE DIRECTION-ACROSS ROLL WIDTH)
STRENGTH AT 2% STRAIN (KN/M)	ISO 10319	6.0	9.0
STRENGTH AT 5% STRAIN (KN/M)	ISO 10319	11.8	19.6
PEAK TENSILE STRENGTH (KN/M)	ISO 10319	19.2	28.8

C. PROVIDE A SMOOTH FAIRLY LEVEL SURFACE UPON WHICH TO PLACE THE GEOGRID FREE OF DEBRIS, ROOTS, AND STONES TO PREVENT DAMAGE FROM TEARING DURING GEOGRID PLACEMENT AND COVERING.
D. FILL DEPRESSIONS OR HOLES SO THAT THE GEOGRID WILL NOT HAVE TO BRIDGE THEM AND POSSIBLY BE TORN WHEN MATERIALS ARE INSTALLED OVER GEOGRID.
E. PLACE GEOGRID RELATIVELY FLAT WITH A MINIMUM OF WRINKLES.
F. PROVIDE A MINIMUM OVERLAP OF 12 INCHES.
G. INSTALL IN ACCORDANCE WITH THE SUPPLIED MANUFACTURER'S INSTALLATION DOCUMENTS.

GEOTEXTILE FABRIC

A. TYPE: NON-WOVEN, FOR MATERIAL SEPARATION
B. PROPERTIES:

PROPERTY	METHOD	VALUE
MASS PER UNIT AREA	ASTM D-5261	10 OZ/SQ YD MIN.
TENSILE STRENGTH	ASTM D-4632	270 LB. MIN
ELONGATION AT BREAK	ASTM D-4532	50%
MULLEN BURST	ASTM D-3786	520 PSI MIN
PUNCTURE STRENGTH	ASTM D-4833	160 LBS
CBR PUNCTURE	ASTM D-6241	725 LBS
TRAPEZOIDAL TEAR	ASTM D-4533	105 LBS
APPARENT OPENING SIZE	ASTM D-4751	100 US SIEVE
PERMITIVITY	ASTM D-4491	1.20 SEC-1
WATER FLOW RATE	ASTM D-4491	85 G/MIN/SF
UV RESISTANCE AT 500 HOURS	ASTM D-4355	70%

C. PROVIDE A SMOOTH FAIRLY LEVEL SURFACE UPON WHICH TO PLACE THE GEOTEXTILE FREE OF DEBRIS, ROOTS, AND STONES TO PREVENT DAMAGE FROM TEARING OR PUNCTURE DURING GEOTEXTILE PLACEMENT AND COVERING.
D. FILL DEPRESSIONS OR HOLES SO THAT THE GEOTEXTILE WILL NOT HAVE TO BRIDGE THEM AND POSSIBLY BE TORN WHEN MATERIALS ARE INSTALLED OVER GEOTEXTILE.
E. PLACE GEOTEXTILE RELATIVELY FLAT WITH A MINIMUM OF WRINKLES.
F. PROVIDE A MINIMUM OVERLAP OF 12 INCHES.
G. IF THE GEOTEXTILE IS SEAMED, PROVIDE SEAM STRENGTH (FACTORY OR FIELD) WHICH MEETS OR EXCEEDS THE STRENGTH REQUIREMENTS IDENTIFIED ABOVE.

SURVEYING

A. SURVEYING: THE CONTRACTOR SHALL PERFORM ALL SURVEYS NECESSARY TO COMPLETE THE SCOPE OF WORK. ALL SURVEYS SHALL BE PERFORMED UNDER THE DIRECTION OF, AND CERTIFIED BY, A LAND SURVEYOR LICENSED IN THE STATE IN WHICH THE WORK IS PERFORMED.
B. THE HORIZONTAL AND VERTICAL DATUM USED ARE TO BE THOSE REFERENCED ON THE DRAWINGS. AT A MINIMUM, THE FOLLOWING CONSTRUCTION SURVEYS SHALL BE COMPLETED BY THE CONTRACTOR:
   1. POST-TOPOGRAPHIC SURVEY AFTER COMPLETION OF THE CONSTRUCTION ACTIVITIES WHICH INCLUDES NORTHING, EASTING, AND ELEVATIONS.
   2. NORTHING, EASTING, AND ELEVATIONS OF ALL AREAS THAT REQUIRED CUTS OR RECEIVED FILL MATERIAL.
   3. NORTHING, EASTING, PIPE INVERT ELEVATIONS FOR ALL NEW AND EXISTING PIPE STRUCTURES IN THE DESIGN DRAWINGS.
   4. NORTHINGS AND EASTINGS OF BURIED PIPES AND CONDUITS SURVEYED EVERY 20 FEET AT A MINIMUM.
   5. CONTOURS OF AREAS THAT WERE REGARDED AT A MINIMUM OF 50-FOOT GRID INTERVAL, AND ADDITIONAL POINTS AS NECESSARY TO PRODUCE A 1-FOOT CONTOUR INTERVAL TOPOGRAPHIC MAP.
C. COORDINATES AND ELEVATIONS OF THE EXISTING CONDITIONS WILL BE PROVIDED ON THE DRAWINGS.
D. QUALITY CONTROL SURVEYING/GRADE STAKING OF ON-SITE CONSTRUCTION ACTIVITIES TO BE CONDUCTED AS EARTHWORK ACTIVITIES PROGRESS TO CONFIRM IN ACCORDANCE WITH THE DRAWINGS.

PIPE NOTES

GENERAL REQUIREMENTS

A. PERFORM ALL WORK IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES AND ORDINANCES.
B. VERIFY LOCATIONS OF EXISTING UTILITIES PRIOR TO BEGINNING ANY EARTHWORK OR CONSTRUCTION.
C. PROTECT EXISTING STRUCTURES, PIPES, PUMPS, INSTRUMENTS, INSTRUMENTS AND ITEMS TO REMAIN.
D. WORK TO COMPLY WITH THE APPROPRIATE ASME B31 CODE.
E. PLASTIC PIPING TO BE INSTALLED IN ACCORDANCE WITH PIPE MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES.

PIPING AND FITTINGS

A. PVC PIPE
   1. SEE DRAWINGS
   2. CONFORM TO GRADE 1, GRAY, ASTM D1784, ASTM D1785, ASTM D3915, AND ASTM D2513 (GAS PRESSURE PIPE ONLY).
   3. FITTINGS:
      a. SOCKET END/FITTINGS: CONFORM TO ASTM D2466, ASTM D2467, ASTM D3915, AND ASTM F1970.
      b. THREADED END/FITTINGS: CONFORM TO ASTM D2464 AND ANSI B1.20.1.
      c. FLANGES: VAN STONE
      d. FITTINGS SHALL BE SAME GRADE AS AND CLASS AS PIPE.
   4. SOLVENT CEMENT FOR JOINING PVC PIPING: ASTM D2564. INCLUDE PRIMER ACCORDING TO ASTM F656.
B. HDPE PIPE
   1. SDR: SEE DRAWINGS
   2. CLASSIFIED AS TYPE III, CLASS C, CATEGORY 5, GRADE P34, CELL CLASSIFICATION PE 345434C, HDPE BLACK PIPE.
   3. CONFORMING TO ASTM D3261, AND D3350
   4. HDPE PIPING SHALL CONFORM TO ASTM D 3350. THE JOINTS SHALL BE BUTT FUSION WELDED, FLANGED OR FLUSH THREADED AS SHOWN ON THE DRAWINGS.
   5. FITTINGS
      a. ALL HDPE PIPE FITTINGS, AS SPECIFIED IN THE CONTRACT DOCUMENT, SHALL BE CLASSIFIED AS SOLID, TYPE III, GRADE PE 3408 HDPE FITTINGS
      b. PIPE AND FITTINGS SHALL BE JOINED USING FUSION THERMAL WELDING, FLANGES, OR FLUSH THREADED CONNECTIONS, EXCEPT AS SPECIFIED IN THE DRAWINGS

BURIED PIPE INSTALLATION

A. EXISTING UTILITIES, PIPING, AND STRUCTURES
   1. EXISTING UTILITIES AND STRUCTURES:
      A. EXISTING STRUCTURES, UTILITIES, AND PIPING ARE SHOWN ON THE DRAWINGS ONLY BY GENERAL LOCATION AND THE AETHER DBS WILL MAKE ALL OTHER KNOWN RECORDS AVAILABLE. HOWEVER, THE AETHER DBS DOES NOT GUARANTEE THE LOCATIONS AS SHOWN ON THE DRAWINGS.
      B. THE CONTRACTOR SHALL HAVE SOLE RESPONSIBILITY FOR PROVIDING TEMPORARY SUPPORT AND FOR PROTECTING AND MAINTAINING ALL EXISTING UTILITIES, PIPING, AND STRUCTURES IN THE PROJECT AREA DURING THE ENTIRE PERIOD OF CONSTRUCTION.
   2. DEVIATIONS OCCASIONED BY OTHER UTILITIES, PIPE, AND STRUCTURES:
      A. WHEREVER EXISTING UTILITIES, PIPE, OR STRUCTURES PRESENT OBSTRUCTIONS TO THE GRADE AND ALIGNMENT OF THE PIPE, THEY SHALL BE PERMANENTLY SUPPORTED, REMOVED, RELOCATED OR RECONSTRUCTED BY THE CONTRACTOR THROUGH COOPERATION WITH AETHER DBS. IN THOSE INSTANCES WHERE THE RELOCATION OR RECONSTRUCTION IS IMPRACTICABLE, A DEVIATION FROM THE GRADE WILL BE ORDERED AND THE CHANGE SHALL BE MADE IN THE MANNER DIRECTED WITH EXTRA COMPENSATION ALLOWED.
B. EXCAVATION
   1. UNDERPIN ADJACENT STRUCTURES WHICH MAY BE DAMAGED BY EXCAVATION WORK, INCLUDING UTILITIES, PIPE CHASES, BUILDINGS, FOUNDATIONS, ETC.
   2. EXCAVATE SUBSOIL REQUIRED TO ACCOMMODATE SITE STRUCTURES AND CONSTRUCTION OPERATIONS.
   3. GRADE TOP PERIMETER OF EXCAVATION TO PREVENT SURFACE WATER FROM DRAINING INTO EXCAVATION.
   4. PERFORM TRENCH EXCAVATION ADJACENT TO STRUCTURES TO PREVENT DAMAGE TO STRUCTURES. IF STRUCTURES ARE DAMAGED BY EXCAVATION, NOTIFY AETHER DBS AND REPLACE OR REPAIR.
   5. PROTECT EXCAVATIONS BY METHODS REQUIRED TO PREVENT CAVE IN OR LOOSE SOIL FROM FALLING INTO EXCAVATION.
   6. PROTECT EXCAVATION ACTIVITIES FROM UNDERMINING OR OTHERWISE IMPACTING THE EXISTING UNDERGROUND UTILITIES IN THE AREAS OF EXCAVATION AND CONSTRUCTION.
   7. PROVIDE SHEETING OR BRACING AS NECESSARY TO PROTECT LIFE OF PROPERTY AND CONFORM TO ALL APPLICABLE FEDERAL, PROVINCIAL, AND LOCAL CODES.
   8. PROTECT BOTTOM OF EXCAVATIONS AND SOIL ADJACENT TO AND BENEATH FOUNDATIONS FROM FREEZING.
   9. CUT OUT SOFT AREAS OF SUBGRADE NOT CAPABLE OF IN-PLACE COMPACTION. BACKFILL WITH FILL AND COMPACT TO DENSITY EQUAL OR GREATER THAN REQUIREMENTS FOR SUBSEQUENT BACKFILL MATERIAL.
C. PIPE TRENCH AND BACKFILL AND BEDDING MATERIALS
   1. PLACE PIPE BEDDING BELOW PIPE BARREL (BEFORE SETTING PIPE) IN MAXIMUM 12 INCHES LIFTS AND COMPACTED WITH A FLAT PLATE COMPACTER USING FOUR PASSES EACH DIRECTION. THE EXISTING MATERIALS SHALL BE USED AS PIPE BEDDING. ONLY STABLE MATERIALS SHALL BE USED. UNSTABLE MATERIALS MUST BE REMOVED AND REPLACED AS DESIGNATED BY AETHER DBS.
   2. EMPLOY A PLACEMENT METHOD THAT DOES NOT DISTURB OR DAMAGE PIPING IN TRENCHES.
   4. DO NOT BACKFILL OVER POROUS, WET, FROZEN OR SPONGY SUBGRADE SURFACES.
   5. MAKE GRADE CHANGES GRADUAL AND BLEND WITH SURROUNDING AREA. GRADE TO DRAIN. SEE DRAWINGS
   6. RESTORE SURFACE TO PRE-EXISTING CONDITIONS OR AS SHOWN IN THE DRAWINGS.
D. PLACEMENT OF PIPE WITHIN TRENCHES: INSTALL PIPE, FITTINGS, AND ACCESSORIES IN ACCORDANCE WITH SPECIFICATIONS AND MANUFACTURER'S INSTRUCTIONS AND AT THE GRADE AND SLOPE INDICATED ON THE DRAWINGS. BLOW OUT WITH COMPRESSED AIR ALL PIPING OR TUBING TO BE ERECTED AS REQUIRED TO REMOVE ALL FOREIGN MATERIAL.
E. LEAK TESTING SHALL BE CONDUCTED AS DETAILED IN FIELD QUALITY CONTROL.

FIELD QUALITY CONTROL

A. GENERAL: ALL PIPELINES SHALL BE TESTED FOR LEAKS AND EXFILTRATION AS SPECIFIED.
   1. TEMPORARY VALVES, PLUGS, BULKHEADS, AND OTHER PRESSURE TESTING AND WATER CONTROL EQUIPMENT AND MATERIALS SHALL BE PROVIDED BY THE CONTRACTOR SUBJECT TO AETHER DBS'S REVIEW. NO MATERIALS SHALL BE USED WHICH WOULD BE INJURIOUS TO PIPELINE STRUCTURE, FUTURE FUNCTION, AND SITE PERSONNEL. AIR TEST GAGES SHALL BE LABORATORY-CALIBRATED TEST GAGES AND SHALL BE RECALIBRATED BY A CERTIFIED LABORATORY AT THE CONTRACTOR'S EXPENSE PRIOR TO THE LEAKAGE TEST, IF REQUIRED BY AETHER DBS.
   2. UNLESS OTHERWISE SPECIFIED, WATER FOR TESTING SHALL BE FURNISHED BY THE CONTRACTOR. THE CONTRACTOR SHALL MAKE ALL NECESSARY PROVISIONS FOR CONVEYING THE WATER FROM THE SOURCE TO THE POINTS OF USE.
   3. EACH SECTION OF PIPE SHALL BE INSTALLED PRIOR TO TESTING.
   4. EACH SECTION OF PIPE SHALL BE TESTED AS A SINGLE UNIT USING PLUGS OR VALVES.
   5. ALL TESTING OPERATIONS SHALL BE PERFORMED IN THE PRESENCE OF AETHER DBS.

REV	DATE	BY	DESCRIPTION
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1	11/21/11	RGM	RECORD OF CONSTRUCTION

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SCALE:	AS SHOWN
DATE:	8-22-11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	MWL

CLIENT / LOCATION
INTERSTATE POWER & LIGHT
ECONOMIZER ASH PILE AND POND DESIGN
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION
NOTES AND SPECIFICATIONS
(SHEET 2)

JOB 154.002.013
SHT. C-8
DWG. 154002013-C8

18–INCH HDPE CHANNEL DISCHARGE PIPE (INLET)

18–INCH HDPE CHANNEL DISCHARGE PIPE (OUTLET)

18–INCH HDPE POND DISCHARGE PIPE (OUTLET)

18–INCH HDPE POND DISCHARGE PIPE (POND SIDE)

SOUTH CHANNEL

REV	DATE	BY	DESCRIPTION
5			
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1	11/21/11	RGM	RECORD OF CONSTRUCTION

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SCALE:	NONE
DATE:	1–3–11
DRAWN BY:	JFD
CHKD. BY:	CTS
APPROVED:	MWL

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ECONOMIZER ASH PILE AND POND DESIGN
BURLINGTON GENERATING STATION
BURLINGTON, IOWA

DRAWING DESCRIPTION

CONSTRUCTION COMPLETION PHOTOS (SHEET 1)

JOB 154.002.013

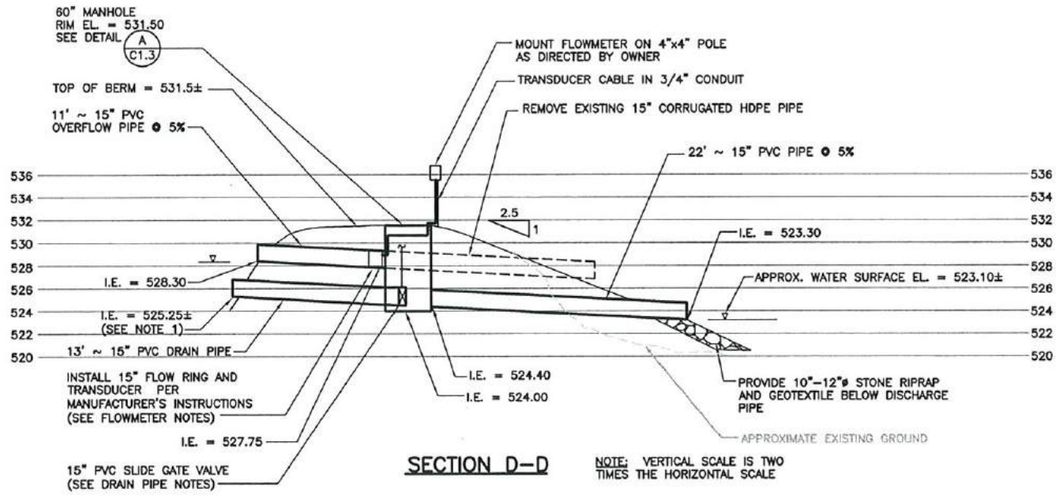
SHT. C–9

DWG. 154002013–C9

APPENDIX J – BGS Upper Ash Pond Drawings

Alliant Energy
Interstate Power and Light Company
Burlington Generating Station
Burlington, Iowa

History of Construction



SECTION D–D

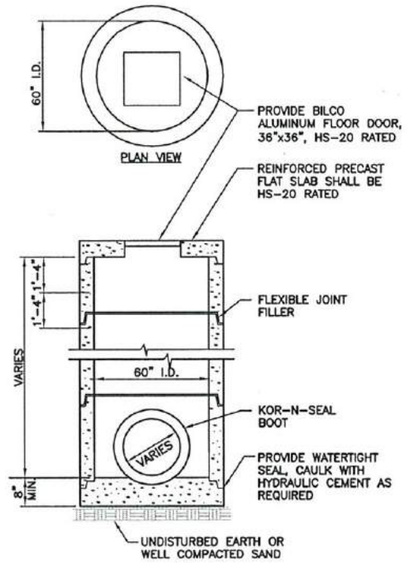
NOTE: VERTICAL SCALE IS TWO TIMES THE HORIZONTAL SCALE

DRAIN PIPE NOTES:

1. CONTRACTOR SHALL FIELD VERIFY THE BOTTOM ELEVATION OF ASH POND NO. 1 AND LOCATE DRAIN PIPE SUCH THAT THE UPSTREAM INVERT OF THE PIPE IS ±6" ABOVE THE BOTTOM OF POND.
2. SLIDE GATE VALVE SHALL BE 15-INCH AGRI-DRAIN HEAVY DUTY PVC MODEL VV15. ATTACH VALVE TO PVC PIPE WITH A 15" FEMALE-FEMALE PVC SDR 35 COUPLING.
3. PROVIDE OPERATOR EXTENSION SO THAT WHEN VALVE IS IN FULLY OPENED POSITION, THE TOP OF HANDLE IS ±12" BELOW MANHOLE COVER.
4. DRAIN PIPE SHALL BE OFFSET FROM OVERFLOW PIPE BY AT LEAST 12 INCHES.

FLOWMETER NOTES:

1. FLOWMETERS AND ACCESSORIES, EXCEPT AS NOTED BELOW, WILL BE FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR.
2. THE FLOW METER FOR ASH POND NO. 1 IS AN ISCO MODEL 2150 AREA-VELOCITY FLOW METER WITH 15" FLOW RING, AREA-VELOCITY SENSOR WITH 25' CABLE, MODEL 948 LEAD ACID RECHARGEABLE BATTERY, 40-WATT SOLAR PANEL WITH 15' CABLE, 2100 SERIES MOUNTING PLATE, AND ADDITIONAL CABLE FOR CONNECTING FLOW METER TO BATTERY.
3. THE FLOW METER FOR ASH SEAL WATER POND IS AN ISCO MODEL 2150 AREA-VELOCITY FLOW METER WITH 12" FLOW RING (VERIFY EXISTING PIPE SIZE), TWO AREA-VELOCITY SENSORS (ONE FOR FLOW, ONE FOR AUXILIARY TEMPERATURE) WITH 25' CABLES, TEMPERATURE PROBE MOUNTING PLATE, SENSOR CARRIER FOR EASE OF REMOVAL, MODEL 948 LEAD ACID RECHARGEABLE BATTERY, 40-WATT SOLAR PANEL WITH 15' CABLE, 2100 SERIES MOUNTING PLATE, AND ADDITIONAL CABLE FOR CONNECTING FLOW METER TO BATTERY.
4. THE FOLLOWING DATA RETRIEVAL EQUIPMENT WILL BE PROVIDED BY OWNER: ISCO FLOWLINK 5.0 SOFTWARE, RS 232 COMMUNICATION CABLE, ISCO MODEL 2101 FIELD WIZARD MODULE, AND AC POWER ADAPTER FOR FIELD WIZARD.
5. CONTRACTOR SHALL PROVIDE 4" BY 4" BY 10 FT MOUNTING POLES WITH 4' BURIAL DEPTH. LOCATE POLES AS DIRECTED BY OWNER AND AS REQUIRED FOR CONNECTION TO AREA VELOCITY PROBE.
6. CONTRACTOR SHALL PROVIDE INSULATED, LOCKABLE FRP ENCLOSURE TO MOUNT FLOW METER AND BATTERY AT EACH LOCATION. MINIMUM ENCLOSURE DIMENSIONS ARE 18" TALL BY 18" WIDE BY 12" DEEP. CONTRACTOR TO VERIFY DIMENSIONS WITH MANUFACTURER.
7. OWNER SHALL OBTAIN START-UP ASSISTANCE AND SOFTWARE TRAINING FROM MANUFACTURER.
8. FLOW RING SHALL BE INSTALLED AS FAR AS POSSIBLE INSIDE PIPE.

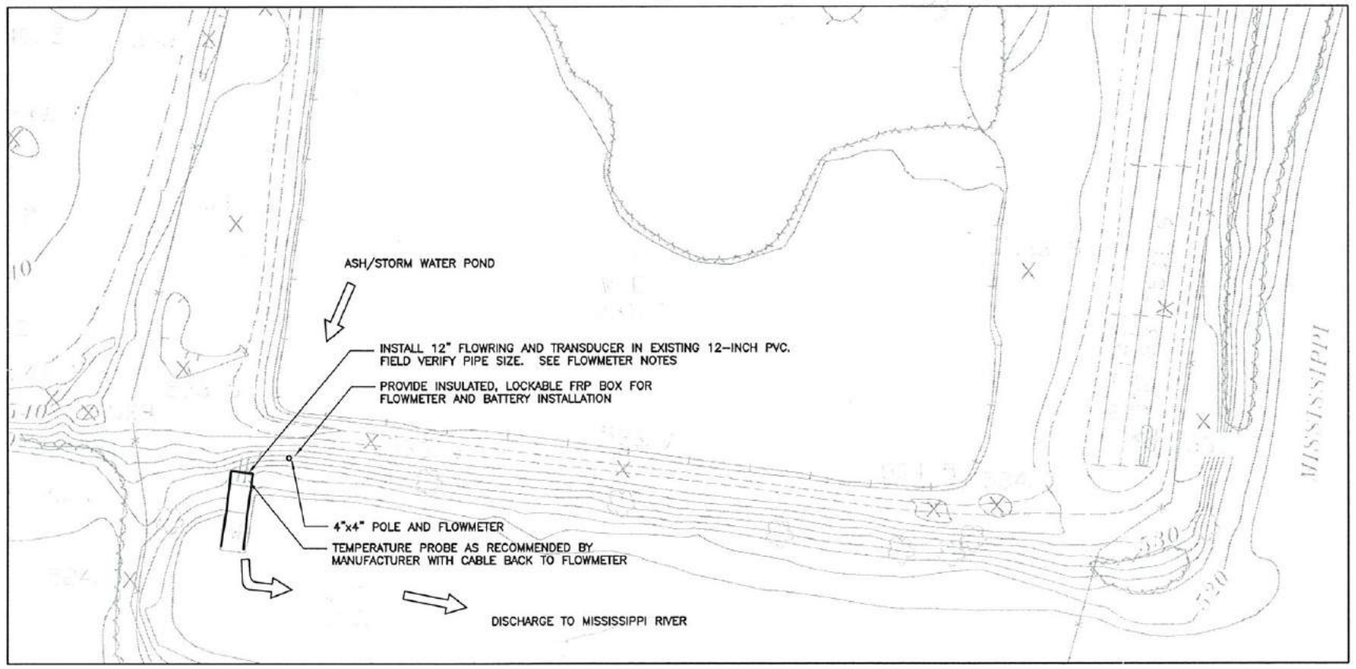


A / C1.3 STANDARD PRECAST MANHOLE

NO SCALE

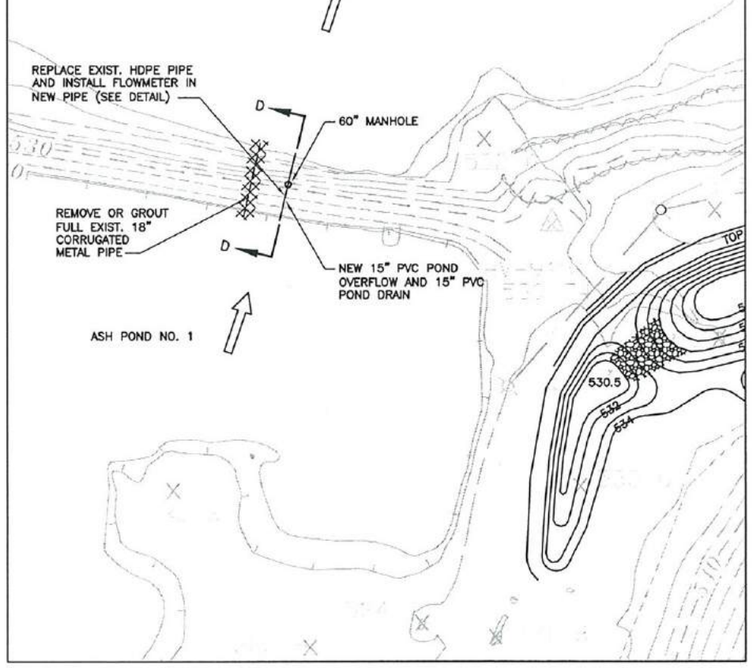
MANHOLE NOTES:

1. VARIATIONS IN DIMENSIONS AND DESIGN MAY BE PERMISSIBLE PROVIDING EQUIVALENT CAPACITY AND STRENGTH ARE ATTAINED.
2. PRECAST REINFORCED CONCRETE MANHOLE RISERS AND TOPS SHALL CONFORM TO ASTM C-478. JOINTS BETWEEN MANHOLE SECTIONS SHALL BE SEALED WITH RAM NEX, HANDLING HOLES SHALL BE FILLED WITH MORTAR, AND BOTH MADE WATER TIGHT.



FLOWMETER LOCATION PLANS

0 25' 50' 100'



CONTRACTOR SHALL CALL IOWA ONE CALL AT LEAST 48 HRS. PRIOR TO EXCAVATION.

1-800-292-8989

CALL BEFORE YOU DIG

NO.	REVISIONS	DATE:

DATE: AUGUST 2005
DES BY:CCG CHK BY:DKW
RECORD DRAWING
BY:
DATE:
CONTRACTOR:

FLOWMETER LOCATION PLANS AND DETAILS

COAL PILE RUNOFF DETENTION BASIN
BURLINGTON GENERATING STATION
INTERSTATE POWER AND LIGHT
BURLINGTON, IOWA

STRAND ASSOCIATES, INC.® ENGINEERS

SHEET C1.3

JOB NO. 1-292-008

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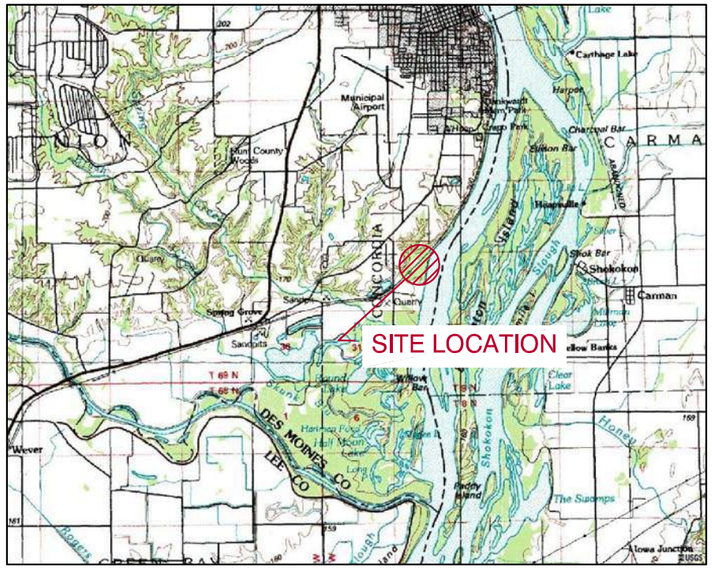
INTERSTATE POWER AND LIGHT

UPPER ASH POND OUTFALL CONSTRUCTION AS-BUILTS

BURLINGTON GENERATING STATION

4282 SULLIVAN SLOUGH ROAD
BURLINGTON, IOWA
JULY, 2011



LOCATION MAP
NTS

GENERAL

G-1	COVER SHEET
G-2	PROJECT AREA SURVEY
G-3	PROJECT AREA ENLARGEMENT
G-4	EXISTING CROSS-SECTION AT MANHOLE

CIVIL

C-1	DEMOLITION PLAN AND SECTION
C-2	PROPOSED FLUME PLAN AND SECTION
C-3	DETAILS
C-4	NOTES AND SPECIFICATIONS (SHEET 1 OF 2)
C-5	NOTES AND SPECIFICATIONS (SHEET 2 OF 2)
C-6	AS-BUILT PHOTOS

SHEET INDEX

AERIAL MAP
NTS

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the state of Iowa.

(signature) (date)

Printed or typed name:

License number:

My license renewal date is:

Pages or sheets covered by this seal:

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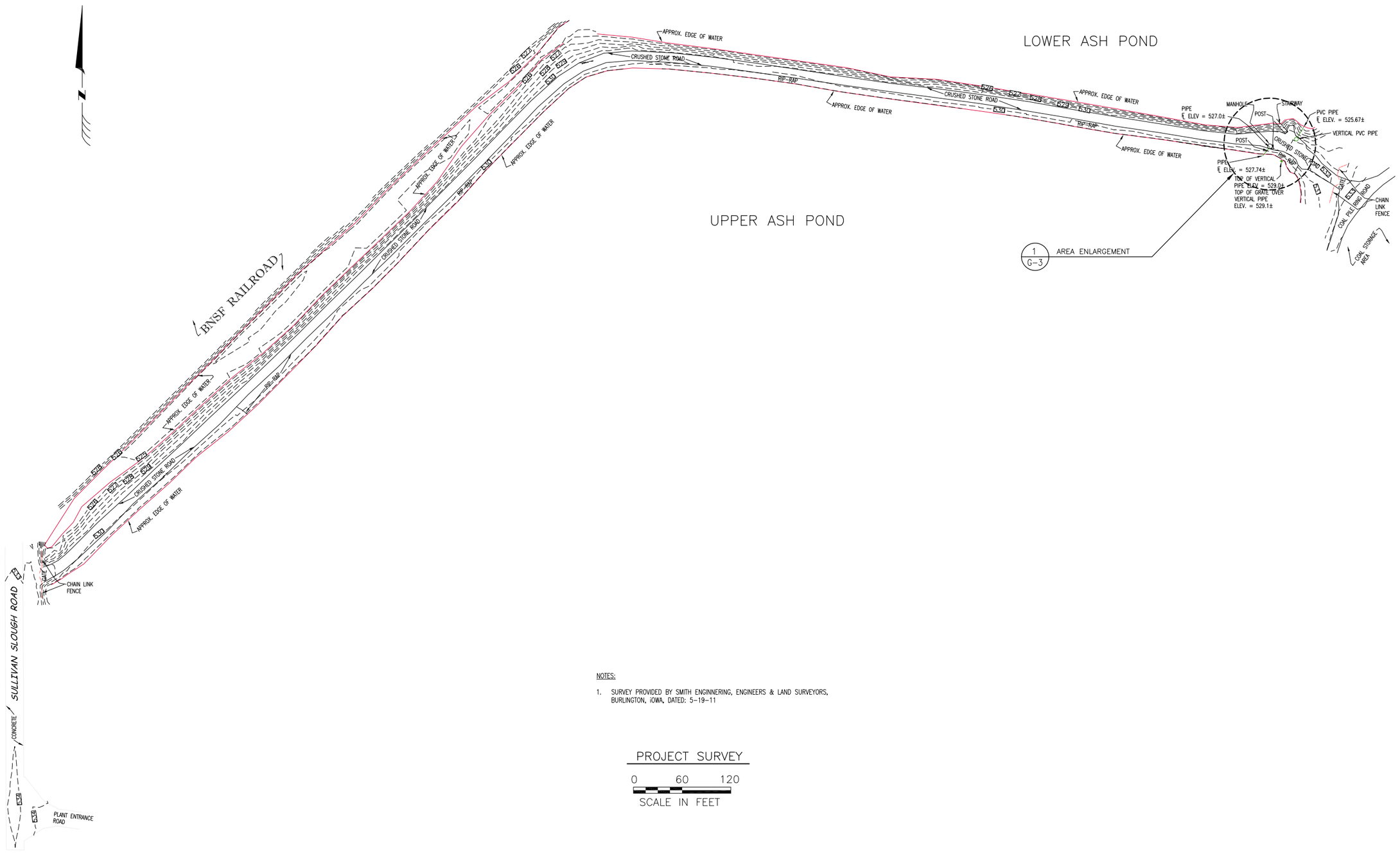
CHKD. BY:	
APPROVED:	

CLIENT / LOCATION
INTERSTATE POWER & LIGHT
UPPER ASH POND OUTFALL CONSTRUCTION AS-BUILTS
BURLINGTON GENERATING STATION
BURLINGTON, IA

DRAWING DESCRIPTION
COVER SHEET

JOB 154.002.010.001
SHT. G-1
DWG. 154002010-G1



NOTES:

1. SURVEY PROVIDED BY SMITH ENGINNERING, ENGINEERS & LAND SURVEYORS, BURLINGTON, IOWA, DATED: 5-19-11

PROJECT SURVEY

0 60 120

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APPROVED:	

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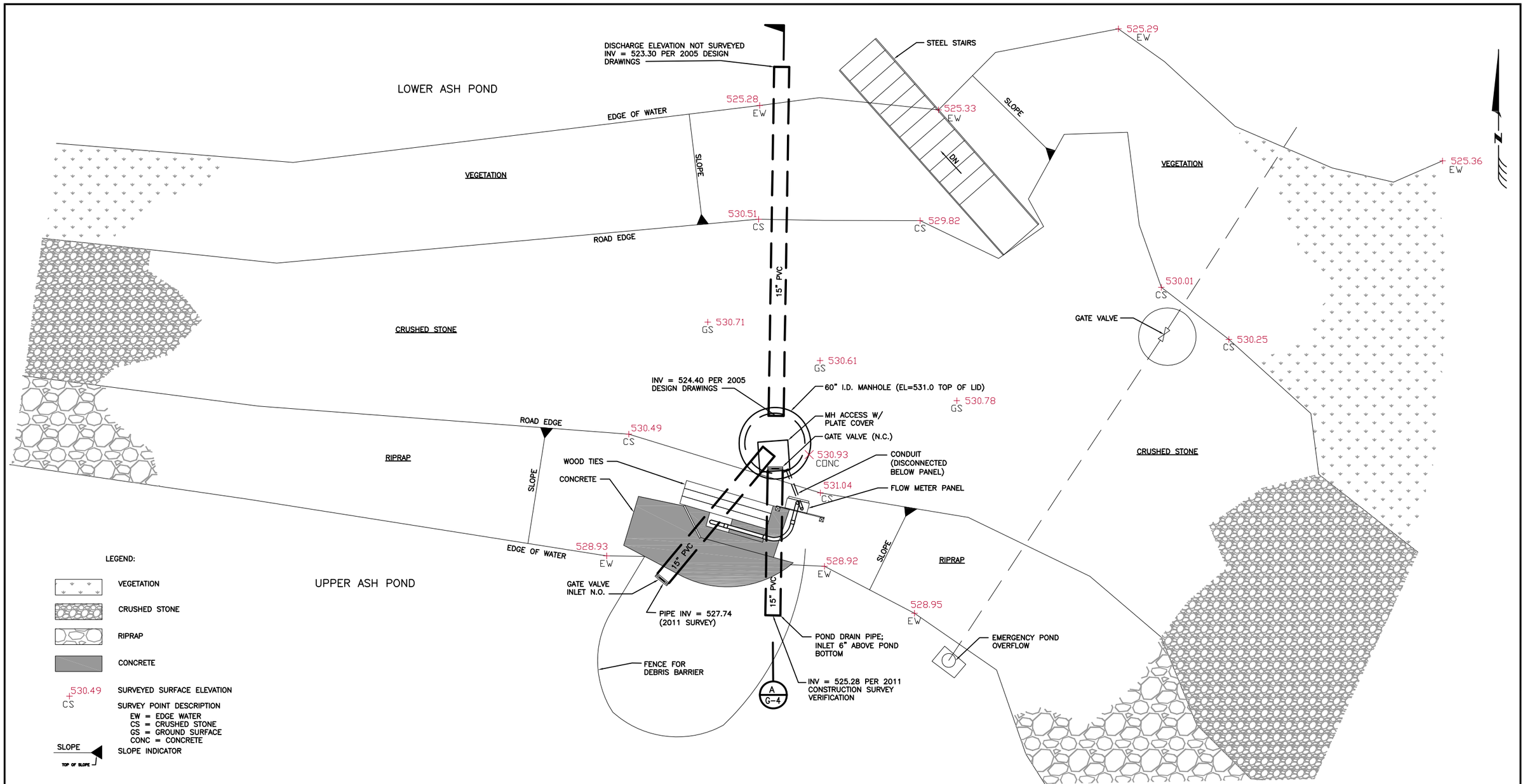
INTERSTATE POWER & LIGHT
UPPER ASH POND OUTFALL CONSTRUCTION AS-BUILTS
BURLINGTON GENERATING STATION
BURLINGTON, IA

DRAWING DESCRIPTION

PROJECT AREA SURVEY

JOB	154.002.010.001
SHT.	G-2
DWG.	154002010-G2



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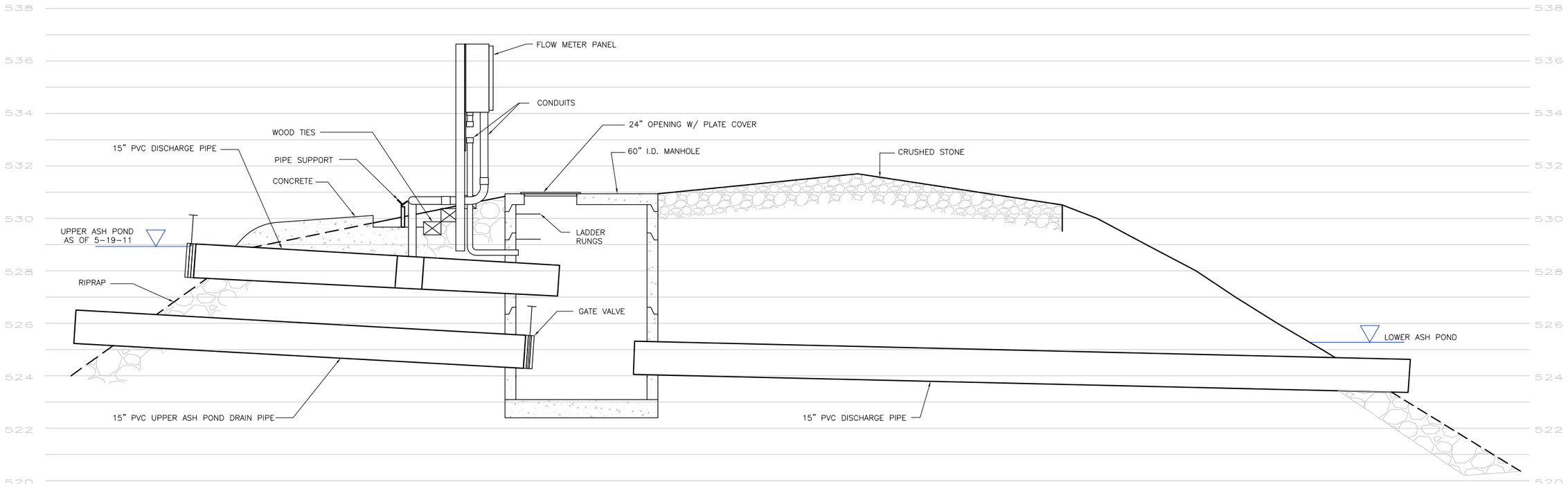
DRAWN BY:	JFD
CHKD. BY:	
APPROVED:	

CLIENT / LOCATION
INTERSTATE POWER & LIGHT
UPPER ASH POND OUTFALL CONSTRUCTION AS-BUILTS
BURLINGTON GENERATING STATION
BURLINGTON, IA

DRAWING DESCRIPTION
PROJECT AREA ENLARGEMENT

JOB 154.002.010.001
SHT. G-3
DWG. 154002010-G3



NOTE:

1. MISSISSIPPI RIVER WAS IN FLOOD STAGE DURING SURVEY ON 5-19-11.

CROSS SECTION AT MANHOLE (A / G-3)

0 2 4

SCALE IN FEET

REV	DATE	BY	DESCRIPTION
5			
4			
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SCALE:	AS SHOWN
DATE:	9-19-11
DRAWN BY:	JFD
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CLIENT / LOCATION

INTERSTATE POWER & LIGHT
UPPER ASH POND OUTFALL CONSTRUCTION AS-BUILTS
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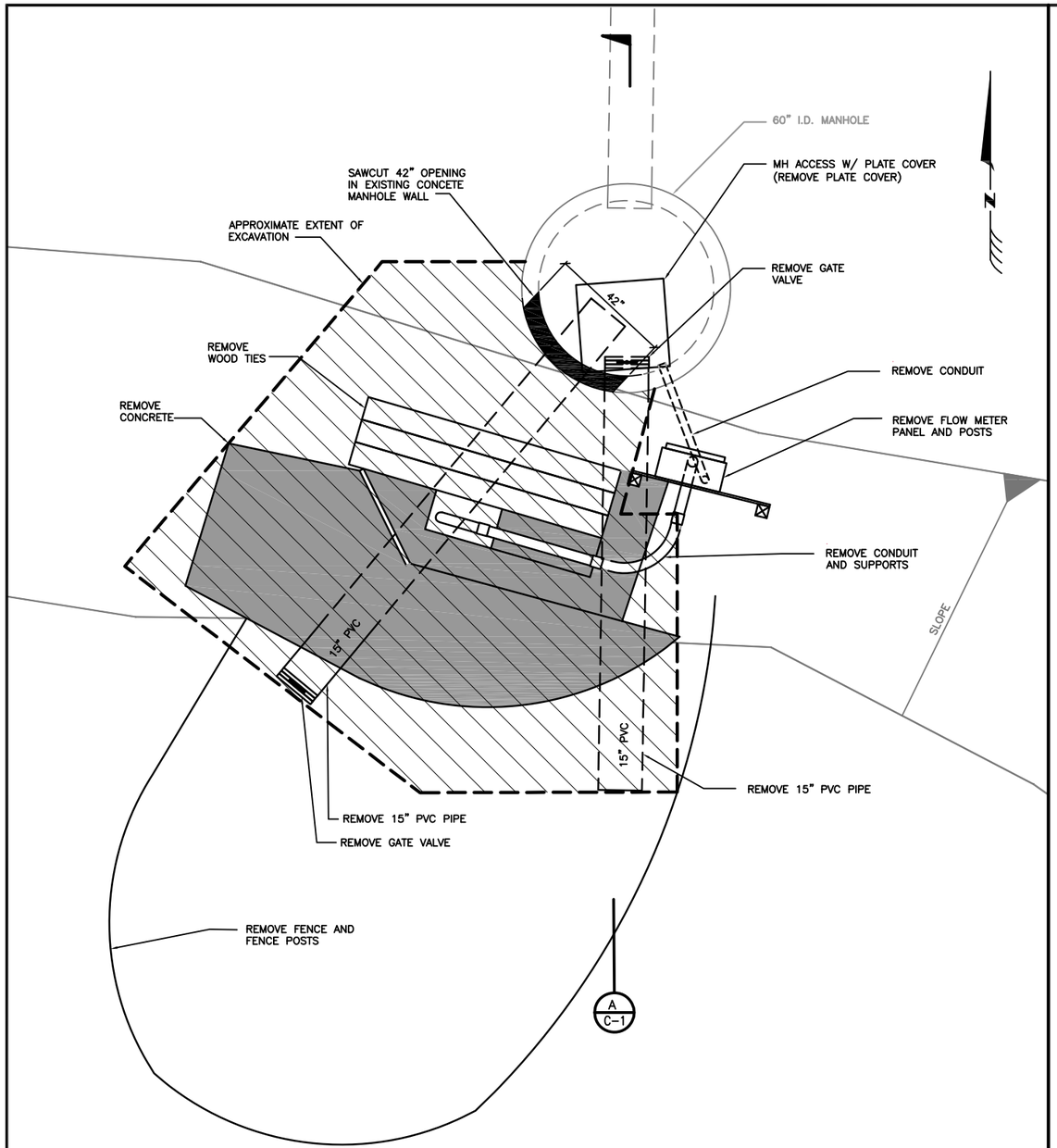
BURLINGTON, IA

DRAWING DESCRIPTION

EXISTING CROSS SECTION AT MANHOLE

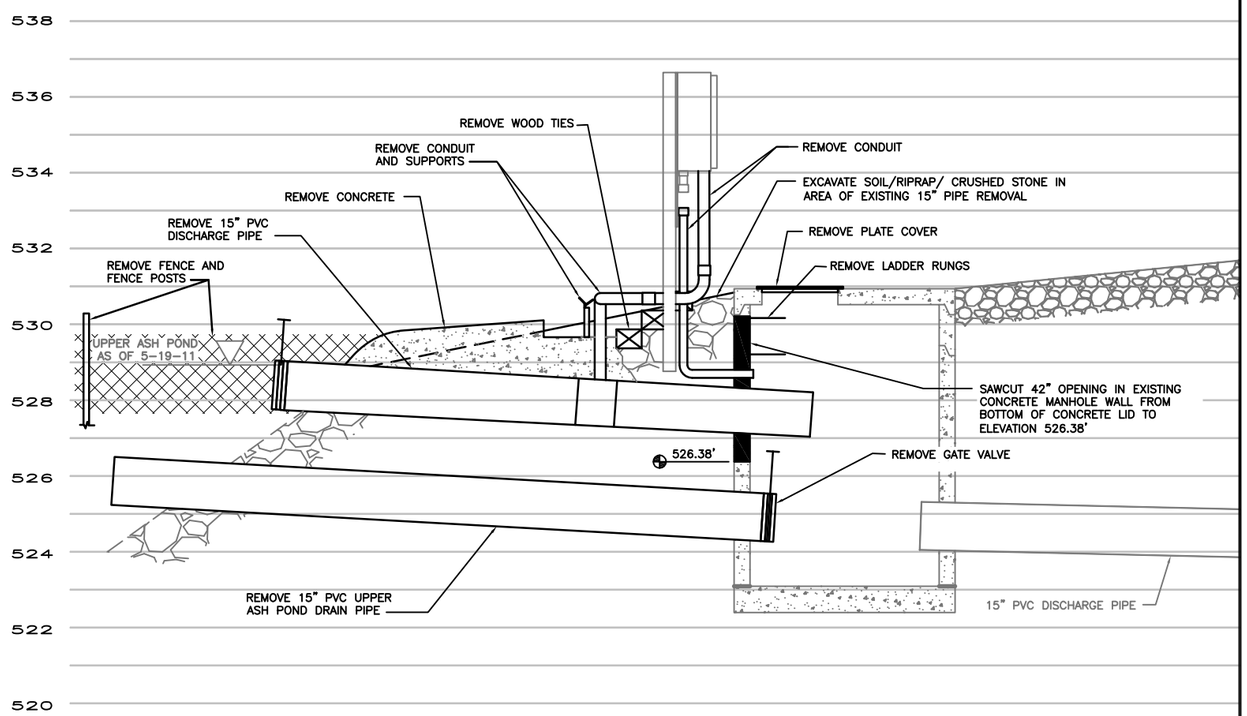
JOB	154.002.010.001
SHT.	G-4
DWG.	154002010-G4



DEMOLITION PLAN

0 2 4

SCALE IN FEET



NOTES:

1. WATER ELEVATION IN UPPER ASH POND TO BE LOWERED BY IPL PRIOR TO DEMOLITION ACTIVITIES.
2. CONTRACTOR TO ENSURE INTEGRITY OF PANEL BOX AND REPLACE SUPPORT STRUCTURE.
3. CONTRACTOR TO DISPOSE OF MATERIALS AT FACILITY IN LOCATION DETERMINED BY IPL.
4. EXCAVATED RIPRAP/CRUSHED STONE TO BE REUSED FOR FINAL GRADING AFTER INSTALLATION OF FLUME.

DEMOLITION SECTION A C-1

0 2 4

SCALE IN FEET

REV	DATE	BY	DESCRIPTION
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UPPER ASH POND OUTFALL CONSTRUCTION AS-BUILTS
BURLINGTON GENERATING STATION
BURLINGTON, IA

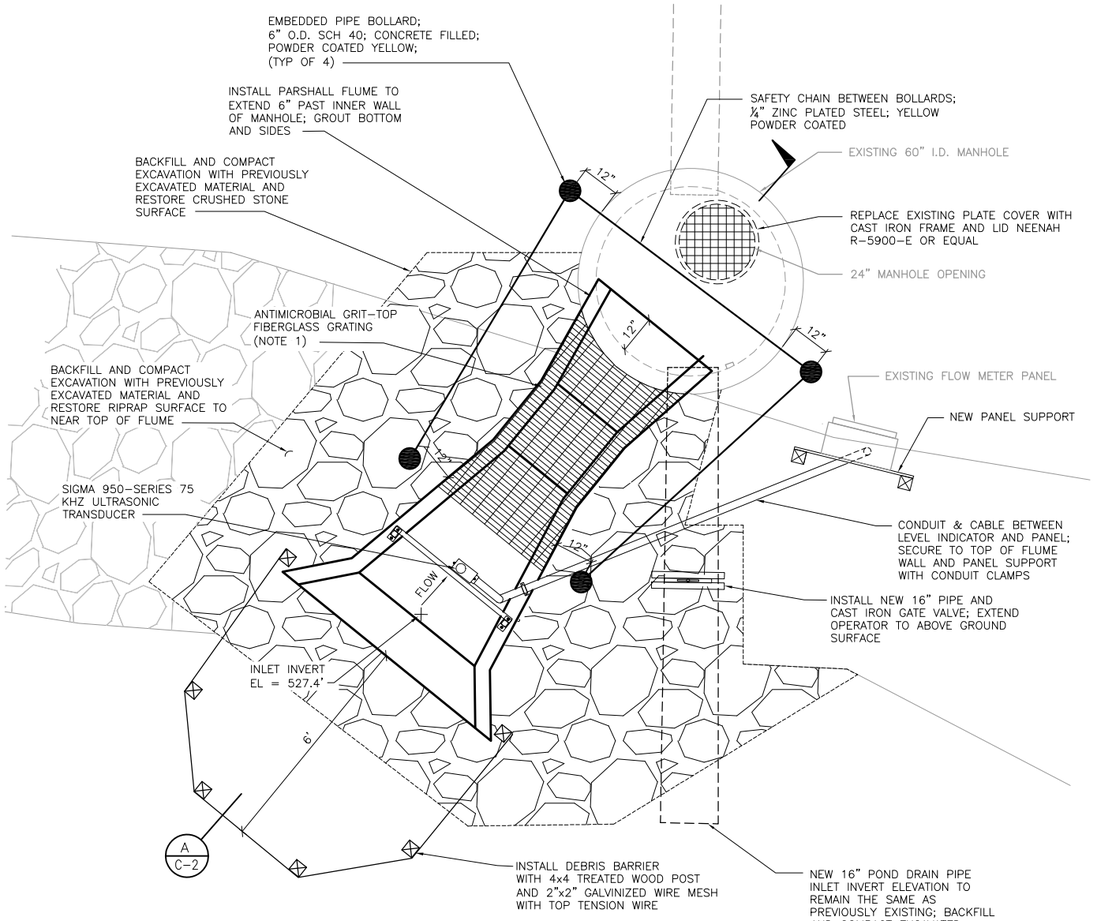
DRAWING DESCRIPTION

DEMOLITION PLAN AND SECTION

JOB 154.002.010.001

SHT. C-1

DWG. 154002010-C1



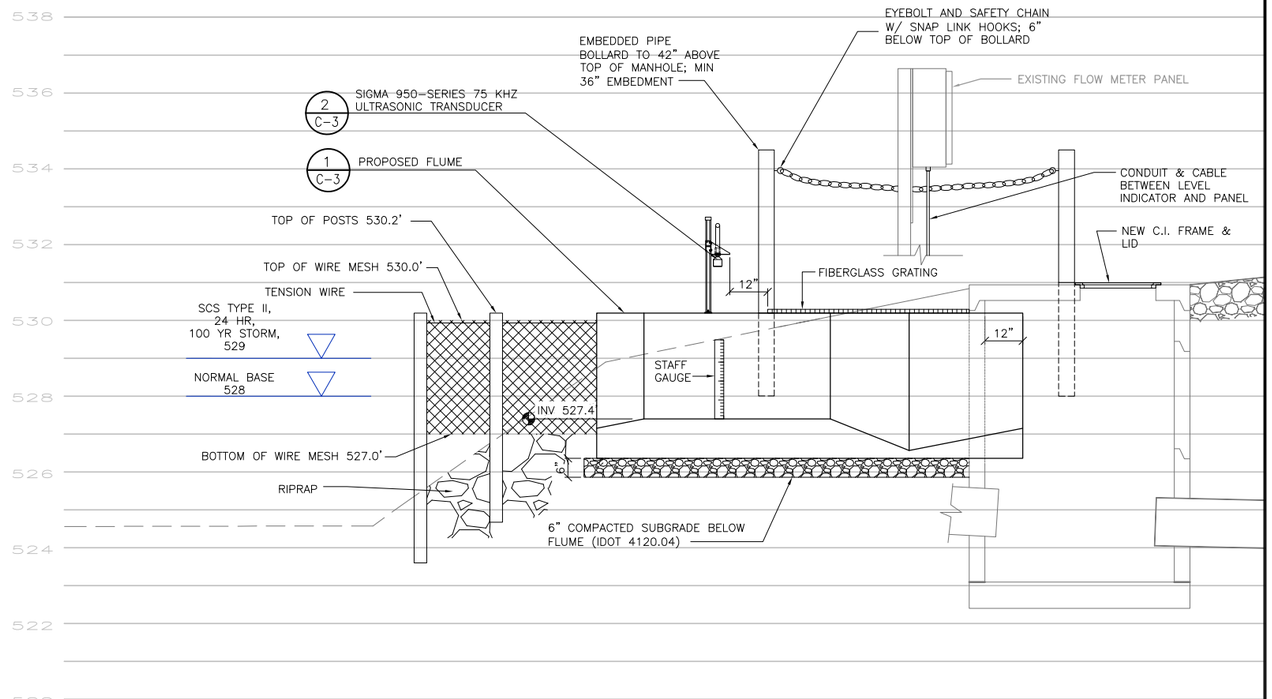
NOTES:

1. ANTIMICROBIAL GRIT-TOP FIBERGLASS GRATING; 2" HEIGHT x 2" OIPENING; SADDLE CLIP ANCHOR TO TOP OF FLUME WALLS; FLUSH WITH OUTHER EDGE OF FLUME WALLS.

PROPOSED FLUME LOCATION PLAN VIEW

0 2 4

SCALE IN FEET



NOTES:

1. HYDRAULIC CEMENT TO BE APPLIED IN SPACES BETWEEN PARHSALL FLUME EXTERIOR WALL AND MANHOLE STRUCTURE.
2. HYDRAULIC CEMENT TO BE APPLIED TO BOTTOM OF OPENING ON MANHOLE STRUCTURE IMMEDIATELY PRIOR TO PARSHALL FLUME INSTALLATION.

CROSS SECTION AT MANHOLE (A / C-2)

0 2 4

SCALE IN FEET

REV	DATE	BY	DESCRIPTION
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SCALE:	AS SHOWN
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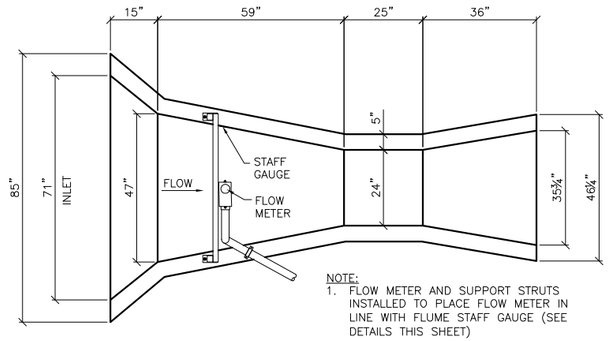
CLIENT / LOCATION

INTERSTATE POWER & LIGHT
UPPER ASH POND OUTFALL CONSTRUCTION AS-BUILTS
BURLINGTON GENERATING STATION
BURLINGTON, IA

DRAWING DESCRIPTION

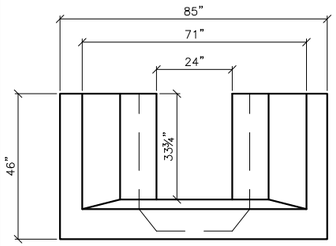
PROPOSED FLUME LOCATION
PLAN AND SECTION

JOB	154.002.010.001
SHT.	C-2
DWG.	154002010-C2

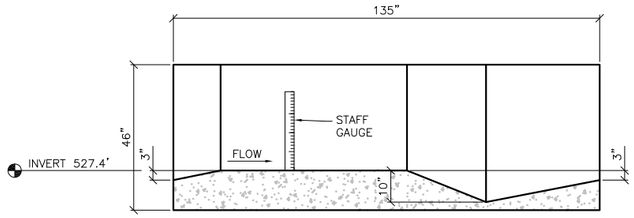


NOTE:
1. FLOW METER AND SUPPORT STRUTS INSTALLED TO PLACE FLOW METER IN LINE WITH FLUME STAFF GAUGE (SEE DETAILS THIS SHEET)

PLAN VIEW



INLET END VIEW

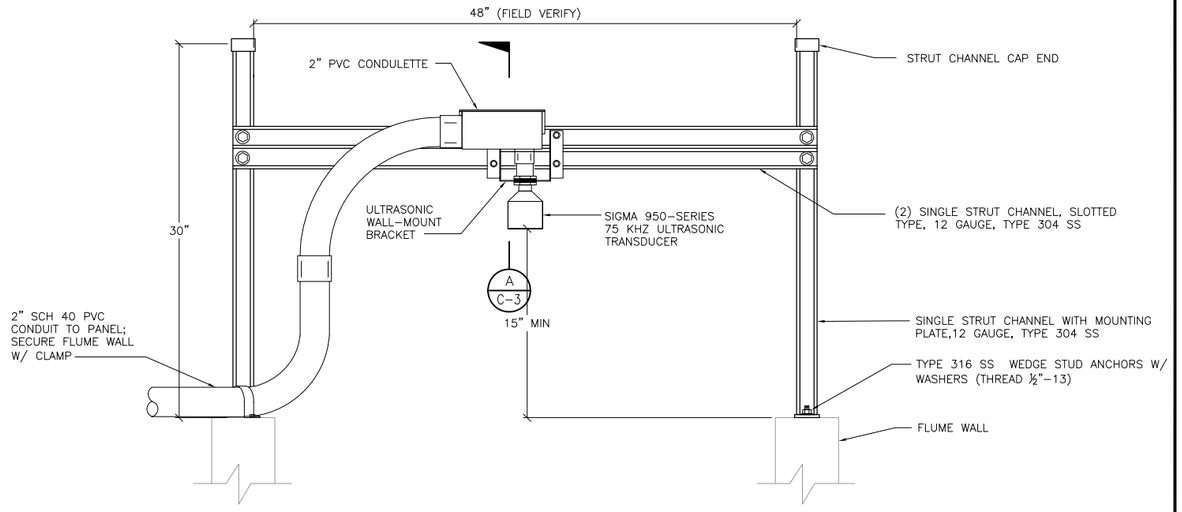


SECTION VIEW

FLUME DIMENSIONS (1 / C-2)

0 2 4

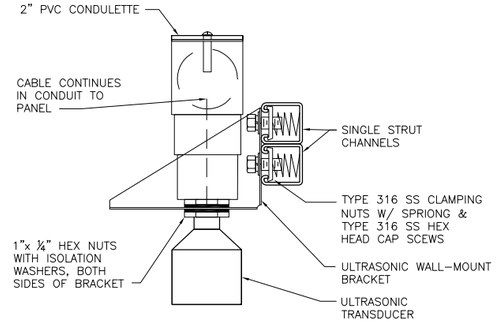
SCALE IN FEET



FLOW METER AND SUPPORT (2 / C-2)

0 6 12

SCALE IN INCHES



FLOW METER HANGING SUPPORT (A / C-3)

0 3 6

SCALE IN INCHES

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DRAWING DESCRIPTION

DETAILS

JOB	154.002.010.001
SHT.	C-3
DWG.	154002010-C3

GENERAL NOTES

GENERAL REQUIREMENTS

A. PERFORM ALL WORK IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES AND ORDINANCES.
B. ALL MATERIALS AND EQUIPMENT TO BE PROVIDED AS PART OF THIS PROJECT TO INCLUDE CERTIFICATION DOCUMENTATION (EX. UL 508A) REQUIRED BY APPLICABLE CODES AND ORDINANCES FOR INSTALLATION AND OPERATION OF SAID MATERIALS/EQUIPMENT AS INTENDED IN THIS PROJECT.
C. VERIFY LOCATIONS OF EXISTING UTILITIES PRIOR TO BEGINNING ANY EARTHWORK OR CONSTRUCTION.
D. PROTECT EXISTING STRUCTURES, PIPES, PUMPS, INSTRUMENTS, PAVEMENT, CONDUIT, AND OTHER ITEMS THAT ARE TO REMAIN.
E. INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS' SUPPLIED INSTALLATION DOCUMENTS AND THE REQUIREMENTS OF THE DRAWINGS.

APPLICABLE CODES AND CERTIFICATIONS

A. 2009 INTERNATIONAL MECHANICAL CODE (IMC)
B. 2009 UNIFORM PLUMBING CODE AS AMENDED BY IOWA
C. NATIONAL FIRE PROTECTION AGENCY (NFPA) 70: 2008 NATIONAL ELECTRICAL CODE (NEC)
D. IOWA DEPARTMENT OF TRANSPORTATION 2011 STANDARD SPECIFICATIONS
E. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM), VARIOUS STANDARDS LISTED
F. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI), VARIOUS STANDARDS LISTED INCLUDING
G. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

SUPPLIED EQUIPMENT

A. AETHER DBS TO SUPPLY SIGMA 950 SERIES 75 KHZ ULTRASONIC TRANSDUCER. AETHER DBS TO INSTALL AND SETUP
B. AETHER DBS TO SUPPLY PRE-CAST CONCRETE PARSHALL FLUME. CONTRACTOR TO INSTALL. SEE DRAWINGS
C. AETHER DBS TO SUPPLY SIGMA 950 SERIES 75 KHZ ULTRASONIC TRANSDUCER MOUNTING STRUCTURE. CONTRACTOR TO INSTALL. SEE DRAWINGS.
D. AETHER DBS TO SUPPLY FIBERGLASS GRATE FOR PARSHALL FLUME. CONTRACTOR TO INSTALL.
E. ALL OTHER MATERIALS, EQUIPMENT, AND SUPPLIES TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.

CIVIL NOTES

TEMPORARY FACILITIES AND CONTROL

A. DUST CONTROL: THE CONTRACTOR SHALL PROVIDE POSITIVE METHODS AND APPLY DUST CONTROL WATER TO MINIMIZE RAISING DUST FROM CONSTRUCTION OPERATION, AND PROVIDE POSITIVE MEANS TO PREVENT AIRBORNE DUST FROM DISPERSING INTO THE ATMOSPHERE. CHEMICAL DUST SUPPRESSANT SHALL NOT BE USED. DUST SUPPRESSANTS SHALL BE APPROVED BY OWNER PRIOR TO USE.
B WATER CONTROL
  1. THE CONTRACTOR SHALL PROVIDE METHODS TO CONTROL SURFACE WATER TO PREVENT DAMAGE TO THE PROJECT, THE SITE, OR ADJOINING PROPERTIES. THE CONTRACTOR SHALL CONTROL FILL, GRADING AND DITCHING TO DIRECT SURFACE DRAINAGE AWAY FROM EXCAVATIONS, PITS, TUNNELS AND OTHER CONSTRUCTION AREAS; AND TO DIRECT DRAINAGE TO PROPER RUNOFF.
  2. THE CONTRACTOR SHALL PROVIDE, OPERATE, AND MAINTAIN HYDRAULIC EQUIPMENT OF ADEQUATE CAPACITY TO CONTROL SURFACE EROSION.
  3. THE CONTRACTOR SHALL DISPOSE OF DRAINAGE WATER IN A MANNER TO PREVENT FLOODING, EROSION, OR OTHER DAMAGE TO ANY PORTION OF THE SITE OR TO ADJOINING AREAS.
C. EROSION CONTROL
  1. THE CONTRACTOR SHALL PLAN AND EXECUTE CONSTRUCTION AND EARTHWORK USING METHODS TO CONTROL SURFACE DRAINAGE FROM CUTS AND FILLS AND STOCKPILES IN ORDER TO PREVENT EROSION AND SEDIMENTATION; AND SHALL:
    A. HOLD THE NUMBER AND SIZE OF AREAS OF BARE SOIL EXPOSED AT ONE TIME TO A MINIMUM, AND
    B. PROVIDE TEMPORARY CONTROL MEASURES SUCH AS BERMS, DIKES, SILT FENCE, SILT DAMS, DRAINS, ETC., AS NEEDED FOR EROSION CONTROL.
  2. THE CONTRACTOR SHALL CONSTRUCT FILLS BY SELECTIVE PLACEMENT TO ELIMINATE ERODIBLE SURFACE SOILS.
  3. THE CONTRACTOR SHALL INSPECT EARTHWORK TO DETECT ANY EVIDENCE OF THE START OF EROSION, AND APPLY CORRECTIVE MEASURES AS REQUIRED TO CONTROL EROSION.
  4. TEMPORARY PERIMETER EROSION CONTROL:
    A. THIS SYSTEM CONSISTS OF A CONTINUOUS BARRIER ADJACENT TO AN AREA OF CONSTRUCTION TO INTERCEPT WATER BORNE SILT AND PREVENT IT FROM LEAVING THE AREA OF CONSTRUCTION. THE BARRIER SHALL BE OF SUFFICIENT LENGTH AND HEIGHT TO CAPTURE ALL CONSTRUCTION RUNOFF.
    B. SILT FILTER FENCE SHALL BE SUPPORTED ON POSTS AT LEAST 6 FT IN LENGTH AND SPACED ON 5 FT. CENTERS. THE FABRIC SHALL BE INSTALLED IN A BACKFILLED TRENCH 6 INCHES DEEP AND SECURELY ATTACHED TO THE POSTS BY ANY METHOD APPROVED BY THE ENGINEER.
    C. PERIMETER EROSION BARRIER SHALL BE A MANUFACTURED SILT FENCE (SUPAC4-1/2 NP(UV) OR APPROVED EQUAL) MADE OF WOVEN POLYPROPYLENE WITH PRE-SEWN POST POCKETS AND TOP AND BOTTOM TENSIONING ROPES.

DEMOLITION

A. REGULATORY REQUIREMENTS
  1. CONFORM TO APPLICABLE CODE FOR DEMOLITION OF STRUCTURES, SAFETY OF ADJACENT STRUCTURES, DUST CONTROL, AND DISPOSAL.
  2. CONFORM TO APPLICABLE REGULATORY PROCEDURES WHEN DISCOVERING HAZARDOUS OR CONTAMINATED MATERIALS.
B. SCHEDULING
  1. SCHEDULE WORK TO PRECEDE CONCURRENTLY WITH THE INSTALLATION OF THE REPLACEMENT SYSTEMS.
  2. SCHEDULE WORK AS TO MINIMIZE IMPACT ON FACILITY OPERATIONS.
  3. SCHEDULE WORK TO MINIMIZE THE TIME THAT TEMPORARY SYSTEMS MAY BE NEEDED TO MAINTAIN SYSTEM FUNCTIONALITY.
C. DEMOLITION REQUIREMENTS
  1. THE CONTRACTOR SHALL EXERCISE EXTREME CARE TO PREVENT DAMAGE TO STRUCTURES, UTILITIES, AND FACILITIES NOT DESIGNATED TO BE REMOVED. THE CONTRACTOR SHALL EXERCISE CARE TO AVOID DAMAGING EXISTING PAVED AREAS AT THE SITE. THE COST FOR REPAIR OF ANY DAMAGE WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
  2. ALL SUPPORTS AND FOUNDATIONS FOR DEMOLISHED EQUIPMENT SHALL BE REMOVED ALSO UNLESS SPECIFIED ON THE DRAWINGS.
  3. CONTRACTOR SHALL REMOVE ALL ELECTRICAL WIRING, CONTROL/SIGNAL WIRING, AND CONDUIT FROM THE REMOVED EQUIPMENT TO THE NEAREST DISCONNECT POINT. THE ELECTRICAL/WEATHER/ACCESS INTEGRITY OF THE CONNECTION POINT MUST BE RESTORED AFTER DEMOLITION.
  4. DURING THE DEMOLITION WORK THE CONTRACTOR SHALL CONTINUOUSLY EVALUATE THE CONDITIONS OF THE STRUCTURES BEING DEMOLISHED AND TAKE IMMEDIATE ACTION TO PROTECT ALL PERSONNEL WORKING IN AND AROUND THE DEMOLITION SITE. NO AREA, SECTION, OR COMPONENT OF STRUCTURAL ELEMENTS WILL BE ALLOWED TO BE LEFT STANDING WITHOUT SUFFICIENT BRACING, SHORING, OR LATERAL SUPPORT TO PREVENT COLLAPSE OR FAILURE WHILE WORKMEN REMOVE DEBRIS OR PERFORM OTHER WORK IN THE IMMEDIATE AREA. STRUCTURAL COMPONENTS THAT ARE DESIGNED AND CONSTRUCTED TO STAND WITHOUT LATERAL SUPPORT OR SHORING, AND ARE DETERMINED TO BE IN STABLE CONDITION, MAY BE ALLOWED TO REMAIN STANDING WITHOUT ADDITIONAL BRACING, SHORING, OR LATERAL SUPPORT UNTIL DEMOLISHED. THE CONTRACTOR SHALL ENSURE THAT NO ELEMENTS DETERMINED TO BE UNSTABLE ARE LEFT UNSUPPORTED AND SHALL BE RESPONSIBLE FOR PLACING AND SECURING BRACING, SHORING, OR LATERAL SUPPORTS AS MAY BE REQUIRED AS A RESULT OF ANY CUTTING, REMOVAL, OR DEMOLITION WORK PERFORMED UNDER THIS CONTRACT.
  5. THE CONTRACTOR SHALL TAKE APPROPRIATE PRECAUTIONS TO PROTECT ALL IDENTIFIED COMMUNICATION LINES AND UTILITIES IN THE AREA OF THE PROPOSED DEMOLITION ACTIVITIES. THE CONTRACTOR SHALL VERIFY THAT ON-SITE ELECTRICAL WIRING ENTERING ALL STRUCTURES TO BE DEMOLISHED OR IN CLOSE ENOUGH PROXIMITY TO BE DAMAGED BY THE DEMOLITION OPERATIONS ARE DISCONNECTED AND/OR DE-ENERGIZED PRIOR TO PROCEEDING WITH DEMOLITION OPERATIONS. IF NOT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACCOMPLISHING THE SAME. THE CONTRACTOR SHALL COORDINATE WITH THE LOCAL ELECTRICAL UTILITY COMPANY FOR ANY NECESSARY RELOCATION OF UTILITIES AND BE RESPONSIBLE FOR ANY ASSOCIATED FEES OR EXPENSES.
  6. THE CONTRACTOR SHALL VERIFY THAT ON-SITE WATER LINES ENTERING ALL STRUCTURES TO BE DEMOLISHED OR IN CLOSE ENOUGH PROXIMITY TO BE DAMAGED BY THE DEMOLITION OPERATIONS ARE DISCONNECTED AND CAPPED PRIOR TO PROCEEDING WITH DEMOLITION OPERATIONS. THE CONTRACTOR SHALL MAKE EVERY EFFORT TO AVOID DAMAGE TO ANY EXISTING FIRE CONTROL HYDRANTS AND WILL REPAIR DAMAGED HYDRANTS AT NO ADDITIONAL COST.
  7. THE CONTRACTOR SHALL VERIFY THAT ON-SITE GAS LINES/MAINS ENTERING ALL STRUCTURES OR IN CLOSE ENOUGH PROXIMITY TO BE DAMAGED AS A RESULT OF THE DEMOLITION OPERATIONS BE CAPPED OR DISCONNECTED PRIOR TO PROCEEDING WITH THE DEMOLITION OPERATIONS.
  8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT COST OF UTILITIES DAMAGED DURING THE COURSE OF THE WORK CAUSED BY THE CONTRACTOR.
  9. THE CONTRACTOR SHALL PERFORM SUCH CLEANING OF THE REMOVED EQUIPMENT, MATERIALS, AND COMPONENTS AS REQUIRED FOR DISPOSAL.
  10. ALL DEMOLITION WORK IS TO BE COORDINATED WITH OWNER SO AS TO NOT INTERRUPT FACILITY OPERATIONS.
  11. MARK LOCATION OF UTILITIES.

EXCAVATION

A. CONTRACTOR RESPONSIBLE FOR JOINT UTILITY LOCATES FOR IDENTIFICATION OF BURIED PUBLIC UTILITIES.
B. UNDERPIN ADJACENT STRUCTURES WHICH MAY BE DAMAGED BY EXCAVATION WORK, INCLUDING UTILITIES AND PIPE CHASES.
C. EXCAVATE SUBSOIL REQUIRED TO ACCOMMODATE SITE STRUCTURES AND CONSTRUCTION OPERATIONS.
D. GRADE TOP PERIMETER OF EXCAVATION TO PREVENT SURFACE WATER FROM DRAINING INTO EXCAVATION.
E. NOTIFY OWNER OF UNEXPECTED SUBSURFACE CONDITIONS AND DISCONTINUE AFFECTED WORK IN AREA UNTIL NOTIFIED TO RESUME WORK.
F. CORRECT UNAUTHORIZED EXCAVATION AT NO EXTRA COST TO OWNER.
G. NON-NATIVE SOILS UNDER FOUNDATION AREAS TO BE REMOVED UNTIL NATIVE SOILS ARE ENCOUNTERED UNLESS APPROVED OTHERWISE BY OWNER.
H. WORK, INCLUDING PROVIDING SHEETING/BRACING AND EXCAVATION ACCESS, SHALL BE PERFORMED AS NECESSARY TO PROTECT LIFE OR PROPERTY AND CONFORM TO ALL APPLICABLE FEDERAL, STATE, AND OSHA CODES.
I. CONTRACTOR SHALL PROVIDE AND MAINTAIN BARRICADES AROUND OPEN EXCAVATIONS FOR THE DURATION THAT THE EXCAVATION IS OPEN.

EARTHWORK

A. GRADING. AS SHOWN ON THE DRAWINGS WITH THE FOLLOWING ADDITIONAL REQUIREMENTS:
  1. MINIMUM PAVEMENT SLOPES ARE TO BE AS FOLLOWS:
    A. CONCRETE PAVEMENT: 0.5%
    B. ASPHALT PAVEMENT: 1.0%
    C. GRAVEL SURFACES: 1.0%
  2. MAXIMUM SLOPES ARE TO BE AS FOLLOWS:
    A. ROADWAYS: 4%
    B. LAWN AREAS: 4:1
    C. BERMS: 3:1
B. FILL MATERIAL
  1. GENERAL FILL
    A. SUBSOIL FREE OF ROOTS, ROCKS, AND DEBRIS.
    B. ON-SITE SOILS BELOW THE STRIPPED LAYER OF TOPSOIL THAT CONTAIN LESS THAN 1% BY WEIGHT ORGANIC CONTENT MAY BE USED AS GENERAL FILL.
    C. IF OFFSITE BORROW IS NEEDED, SILTY OR CLAYEY SANDS OR LOW PLASTICITY CLAYS (HAVING A UNIFIED SOIL CLASSIFICATION OF SM, SC, AND CL) SHALL BE USED.
    D. GENERAL FILL SOIL SHALL NOT CONTAIN ROCKS OR LUMPS LARGER THAN 6 INCHES IN GREATEST DIMENSION, WITH NOT MORE THAN 15% LARGER THAN 2 ½ INCHES. IMPORTED GENERAL FILL SHALL BE GRANULAR WITH A PLASTICITY INDEX OF 12 OR LESS OR LOW PLASTICITY CLAY (USCS SYMBOL CL).
  2. STRUCTURAL AGGREGATE
    A. PIT RUN STONE (MIXTURE OF GRAVEL, CRUSHED STONE, AND SAND), FREE OF SHALE, CLAY, FRIABLE MATERIAL AND DEBRIS MEETING ASTM D2940 AND IOWA DEPARTMENT OF TRANSPORTATION REQUIREMENT 4120.04 FOR STRUCTURAL BASES AND SUBBASES.
    B. GRADATION FOR BASE MATERIAL SHALL BE REASONABLE CLOSE TO 100% PASSING 1.5 INCH SIEVE, 95+/-5% PASSING 1 INCH SIEVE, 75+/-% PASSING ½ INCH SIEVE, 43+/-13% PASSING NO. 4 SIEVE, 25+/-15% PASSING NO. 16 SIEVE, AND A MAXIMUM 8+/-4% PASSING NO. 200 SIEVE.
    C. GRADATION FOR SUBBASE MATERIAL SHALL BE REASONABLE CLOSE TO MINIMUM 90% PASSING 1.5 INCH SIEVE AND MAXIMUM 12 PERCENT PASSING NO. 200 SIEVE.
  3. TOP SOIL
    A. REMOVE, STOCKPILE, AND REINSTALL AFTER ROUGH GRADING IS COMPLETE.
    B. IMPORTED TOPSOIL: FRIABLE LOAM FREE OF ROOTS, ROCKS, SUBSOIL, AND DEBRIS.
    C. INSTALLED DEPTH:
      1. FOR GRASS SEEDING: 6 INCHES.
      2. FOR SODDING: 4 INCHES.
      C. SHRUB BEDS: 18 INCHES.
    D. EXCAVATE AND PLACE TOPSOIL IN DRY WEATHER.
  4. SAND: NATURAL RIVER OR BANK SAND, WASHED.
  5. CLAY
    A. CLAY FILL SHALL BE SUITABLE COHESIVE OR MIXTURE OF COHESIVE AND NON-COHESIVE MATERIAL(S) EXCAVATED FROM OFF-SITE BORROW AREA(S).
    B. THE CLAY FILL SHALL BE RELATIVELY FREE FROM GRASS, ROOTS, BRUSH, OR OTHER ORGANIC MATERIALS.
    C. NO DEBRIS OR REFUSE SHALL BE PRESENT IN ANY OF THE CLAY FILL.
    D. CLAY FILL SHALL BE FREE OF FROZEN MATERIALS AND FREE FROM ANY ROCK OR MASSES OF UNBROKEN EARTH HAVING A MAXIMUM DIMENSION GREATER THAN 2 INCHES.
    E. ALL MATERIAL LARGER THAN ½-INCH SHALL BE WELL-ROUNDED.
  6. NON-STRUCTURAL AGGREGATE
    A. PIT RUN STONE, FREE OF SHALE, CLAY, FRIABLE MATERIAL AND DEBRIS.
C. PLACING FILL MATERIALS
  1. FILLING AND BACKFILLING:
    A. DO NOT USE FROZEN FILL MATERIALS.
    B. PLACE AND COMPACT IN LAYERS NOT MORE THAN 8 INCHES THICK PRIOR TO COMPACTION, UNLESS OTHERWISE INDICATED.
    C. FILL AND COMPACT SO THAT FINAL GRADE DOES NOT SETTLE.
    D. FILL AND COMPACT TO A THICKNESS TO ALLOW OBTAINING FINAL GRADE.
    E. ON-SITE SOIL TO BE REUSED AS GENERAL FILL SHALL BE CONDITIONED TO OPTIMUM TO 4% ABOVE OPTIMUM AT COMPACTION.
    F. FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED NO STEEPER THAN 2:1.
  2. COMPACTION: COMPACT TO 90 PERCENT OF MODIFIED PROCTOR MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 1557 AT A MOISTURE CONTENT RANGE OF -2% TO +4% OF OPTIMUM MOISTURE, UNLESS OTHERWISE NOTED OR EXCEPTED BELOW:
    A. GRANULAR FILL BASE COARSE UNDER PAVING OR AS ROAD SURFACE 95% OF MODIFIED PROCTOR.
    B. STRUCTURAL FILL UNDER REINFORCED CONCRETE FOOTINGS AND SLABS 95% OF MODIFIED PROCTOR.
    C. CLAY TO BE COMPACTED TO 95% OF STANDARD PROCTOR MAXIMUM DRY DENSITY.
    D. DENSITY TESTING TO BE PERFORMED ON COMPACTED FILL AT THE RATE OF ONE TEST PER 250 YD3 WITH NO LESS THAN ONE TEST PER FILL AREA.
    E. DENSITY AND MOISTURE TESTING BY NUCLEAR DENSITY GAUGE (ASTM 2922 AND ASTM D 3017), SAND CONE (ASTM D 1556) OR BALLOON METHOD (ASTM D2167).
    F. FOR CLEAN SAND AND GRAVEL FILL OPTIMUM MOISTURE CONTENT MAY BE OUTSIDE OF THE SPECIFIED RANGE PROVIDED MAXIMUM DENSITY IS OBTAINED.
    G. WORK THAT DOES NOT MEET THE REQUIRED TESTING SPECIFICATION SHALL BE REMOVED AND REPLACED OR REMOVED, DRIED AND RECOMPACTED AND RETESTED TO DEMONSTRATE COMPLIANCE WITH THE SPECIFICATION.
    H. SCARIFY, RESHAPE AND RECOMPACT AREAS REQUIRING PLANTING THAT ARE OVER-COMPACTED BY WHEEL TRAFFIC.

PRECAST STRUCTURES, LIDS, AND ACCESS HATCHES

A. LIDS AND ACCESS HATCHES:
  1. LIDS: MANHOLE ACCESS FRAME AND LID SHALL BE NEENAH FOUNDRY HEAVY DUTY R-5900-E OR APPROVED EQUAL.
B. PARSHALL FUME:
  1. PARSHALL FLUME TO BE USED SHALL BE A FOUR CORNERS PRE-CAST, INC. 24 INCH PARSHALL FLUME OR APPROVED EQUAL.
  2. PRE-CAST CONCRETE
  3. 4,000 PSI DESIGN MIX
  4. STEEL REBAR REINFORCED
C. INSTALLATION
  1. FROM BOTTOM OF EXCAVATION CLEAN AND SMOOTH TO CORRECT ELEVATION AS SHOWN IN DRAWINGS.
  2. INSTALL SUBGRADE IN ACCORDANCE WITH IOWA DOT SPECIFICATION 4120.04
  3. PROTECT EXISTING MANHOLE STRUCTURE, PIPES, AND ITEMS TO REMAIN
  4. INSTALL PARSHALL FLUME ON LEVEL SUBGRADE WITH INVERT ELEVATION SET AS SPECIFIED IN DRAWINGS.
  5. APPLY HYDRAULIC CEMENT (GROUT) TO THE INTERFACE BETWEEN THE MANHOLE AND THE PARSHALL FLUME STRUCTURES TO PROVIDE A WATER TIGHT SEAL.
  6. HYDRAULIC CEMENT (GROUT) TO BE APPLIED TO BOTTOM OF CUT PORTION OF MANHOLE PRIOR TO SETTING PARSHALL FLUME IN PLACE.

SURVEYING

A. COORDINATES AND ELEVATIONS OF THE EXISTING CONDITIONS WILL BE PROVIDED ON THE DRAWINGS.

PIPE NOTES

GENERAL REQUIREMENTS

A. PERFORM ALL WORK IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES AND ORDINANCES.
B. VERIFY LOCATIONS OF EXISTING UTILITIES PRIOR TO BEGINNING ANY EARTHWORK OR CONSTRUCTION.
C. PROTECT EXISTING STRUCTURES, PIPES, PUMPS, INSTRUMENTS, INSTRUMENTS AND ITEMS TO REMAIN.
D. WORK TO COMPLY WITH THE APPROPRIATE ASME B31 CODE.
E. PLASTIC PIPING TO BE INSTALLED IN ACCORDANCE WITH PIPE MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES.

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SCALE:	NONE
DATE:	9-19-11
DRAWN BY:	JFD
CHKD. BY:	
APPROVED:	

CLIENT / LOCATION
INTERSTATE POWER & LIGHT
UPPER ASH POND OUTFALL CONSTRUCTION AS-BUILTS
BURLINGTON GENERATING STATION
BURLINGTON, IA

DRAWING DESCRIPTION
NOTES AND SPECIFICATIONS

JOB 154.002.010.001
SHT. C-4
DWG. 154002010-C4

PIPING AND FITTINGS

A. PVC PIPE
   1. SEE DRAWINGS
   2. CONFORM TO GRADE 1, GRAY, ASTM D1784, ASTM D1785, ASTM D3915, AND ASTM D2513 (GAS PRESSURE PIPE ONLY).
   3. FITTINGS:
      A. SOCKET END/FITTINGS: CONFORM TO ASTM D2466, ASTM D2467, ASTM D3915, AND ASTM F1970.
      B. THREADED END/FITTINGS: CONFORM TO ASTM D2464 AND ANSI B1.20.1.
      C. FLANGES: VAN STONE
      D. FITTINGS SHALL BE SAME GRADE AS AND CLASS AS PIPE.
   4. SOLVENT CEMENT FOR JOINING PVC PIPING: ASTM D2564. INCLUDE PRIMER ACCORDING TO ASTM F656.

B. GASKETS: FULL-FACED GASKETS BETWEEN FLAT-FACED FLANGES AND RING GASKETS FOR RAISES FACE FLANGES. MINIMUM THICKNESS OF 1/8 INCH.
   1. MATERIALS: GASKET MATERIALS SHALL BE AS FOLLOWS BASED ON PIPE CONTENT.
      A. GENERAL WATER/WASTEWATER (BW, CIW, CON, CW, DCW, DHW, FB, HS, HWR, HWS, PW, PWH, PWS, RW, SW, TW, UW, WS, WW, GW, SD): NEOPRENE, BUNA-N, EPDM

C. PIPE FASTENERS
   1. TYPE 304 STAINLESS STEEL
      A. STUDS/BOLTS: ASTM A193-B8 CLASS 1, UNC. A320-B8 CLASS 1, UNC ALLOWED FOR PIPE PRESSURES LESS THAN 150 PSIG.
      B. HEX NUTS: DOUBLE ASTM A194-8, 18-8, UNC
      C. SAE FLAT WASHERS: 18-8
      D. SPLIT RING LOCK WASHERS: 18-8

BURIED PIPE INSTALLATION

A. EXISTING UTILITIES, PIPING, AND STRUCTURES
   1. EXISTING UTILITIES AND STRUCTURES:
      A. EXISTING STRUCTURES, UTILITIES, AND PIPING ARE SHOWN ON THE DRAWINGS ONLY BY GENERAL LOCATION AND THE AETHER DBS WILL MAKE ALL OTHER KNOWN RECORDS AVAILABLE. HOWEVER, THE AETHER DBS DOES NOT GUARANTEE THE LOCATIONS AS SHOWN ON THE DRAWINGS.
      B. THE CONTRACTOR SHALL HAVE SOLE RESPONSIBILITY FOR PROVIDING TEMPORARY SUPPORT AND FOR PROTECTING AND MAINTAINING ALL EXISTING UTILITIES, PIPING, AND STRUCTURES IN THE PROJECT AREA DURING THE ENTIRE PERIOD OF CONSTRUCTION.
   2. DEVIATIONS OCCASIONED BY OTHER UTILITIES, PIPE, AND STRUCTURES:
      A. WHEREVER EXISTING UTILITIES, PIPE, OR STRUCTURES PRESENT OBSTRUCTIONS TO THE GRADE AND ALIGNMENT OF THE PIPE, THEY SHALL BE PERMANENTLY SUPPORTED, REMOVED, RELOCATED OR RECONSTRUCTED BY THE CONTRACTOR THROUGH COOPERATION WITH AETHER DBS. IN THOSE INSTANCES WHERE THE RELOCATION OR RECONSTRUCTION IS IMPRACTICABLE, A DEVIATION FROM THE GRADE WILL BE ORDERED AND THE CHANGE SHALL BE MADE IN THE MANNER DIRECTED WITH EXTRA COMPENSATION ALLOWED.

B. EXCAVATION
   1. UNDERPIN ADJACENT STRUCTURES WHICH MAY BE DAMAGED BY EXCAVATION WORK, INCLUDING UTILITIES, PIPE CHASES, BUILDINGS, FOUNDATIONS, ETC.
   2. EXCAVATE SUBSOIL REQUIRED TO ACCOMMODATE SITE STRUCTURES AND CONSTRUCTION OPERATIONS.
   3. GRADE TOP PERIMETER OF EXCAVATION TO PREVENT SURFACE WATER FROM DRAINING INTO EXCAVATION.
   4. PERFORM TRENCH EXCAVATION ADJACENT TO STRUCTURES TO PREVENT DAMAGE TO STRUCTURES. IF STRUCTURES ARE DAMAGED BY EXCAVATION, NOTIFY AETHER DBS AND REPLACE OR REPAIR.
   5. PROTECT EXCAVATIONS BY METHODS REQUIRED TO PREVENT CAVE IN OR LOOSE SOIL FROM FALLING INTO EXCAVATION.
   6. PROTECT EXCAVATION ACTIVITIES FROM UNDERMINING OR OTHERWISE IMPACTING THE EXISTING UNDERGROUND UTILITIES IN THE AREAS OF EXCAVATION AND CONSTRUCTION.
   7. PROVIDE SHEETING OR BRACING AS NECESSARY TO PROTECT LIFE OF PROPERTY AND CONFORM TO ALL APPLICABLE FEDERAL, PROVINCIAL, AND LOCAL CODES.
   8. PROTECT BOTTOM OF EXCAVATIONS AND SOIL ADJACENT TO AND BENEATH FOUNDATIONS FROM FREEZING.
   9. CUT OUT SOFT AREAS OF SUBGRADE NOT CAPABLE OF IN-PLACE COMPACTION. BACKFILL WITH FILL AND COMPACT TO DENSITY EQUAL OR GREATER THAN REQUIREMENTS FOR SUBSEQUENT BACKFILL MATERIAL.

C. PIPE TRENCH AND BACKFILL AND BEDDING MATERIALS
   1. PLACE PIPE BEDDING BELOW PIPE BARREL (BEFORE SETTING PIPE) IN MAXIMUM 12 INCHES LIFTS AND COMPACT TO 95% OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY (ASTM D 1557). PIPE BEDDING TO BE 3/4 INCH CRUSHED STONE OR SAND.
   2. COVER PIPE WITH BEDDING IN MAXIMUM 12 INCHES LIFTS AND COMPACT TO 95% OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY (ASTM D 1557). BACKFILL TO BE 3/4 INCH CRUSHED STONE OR NATURAL SOILS.
   3. EMPLOY A PLACEMENT METHOD THAT DOES NOT DISTURB OR DAMAGE PIPING IN TRENCHES.
   4. DO NOT BACKFILL OVER POROUS, WET, FROZEN OR SPONGY SUBGRADE SURFACES.
   5. MAKE GRADE CHANGES GRADUAL AND BLEND WITH SURROUNDING AREA. GRADE TO DRAIN.
   6. RESTORE SURFACE TO PRE-EXISTING CONDITIONS.

D. PLACEMENT OF PIPE WITHIN TRENCHES: INSTALL PIPE, FITTINGS, AND ACCESSORIES IN ACCORDANCE WITH SPECIFICATIONS AND MANUFACTURER'S INSTRUCTIONS AND AT THE GRADE AND SLOPE INDICATED ON THE DRAWINGS. BLOW OUT WITH COMPRESSED AIR ALL PIPING OR TUBING TO BE ERECTED AS REQUIRED TO REMOVE ALL FOREIGN MATERIAL.

VALVE NOTES

GENERAL

A. LIKE OR SIMILAR VALVES SHALL BE BY ONE MANUFACTURER UNLESS NOTED OTHERWISE.
B. VALVES SHALL BE FOR NOT LESS THAN 125 PSI WATER WORKING PRESSURE, AND IN ANY EVENT SHALL BE COMPATIBLE IN WORKING PRESSURE TO THE PIPE AND FITTINGS TO WHICH THEY ARE ATTACHED. VALVES SHALL BE DESIGNED FOR THE SERVICE FOR WHICH THEY ARE ATTACHED.
C. ALL VALVE MATERIALS OF CONSTRUCTION SHALL BE SUITABLE WITH THE SERVICE LISTED.
D. SHUT OFF VALVES AT UTILITIES TO BE LOCKABLE IN BOTH THE OPEN AND CLOSED POSITION.

PRODUCTS

GATE VALVES

A. BURIED GATE VALVE, CAST IRON STEEL, CLASS 150 (VALVE SCHEDULE ID AEAB)
   1. CONNECTIONS: MECHANICAL
   2. BODY: CAST IRON STEEL
   3. DISC: SOLID WEDGE
   4. BONNET: BOLTED
   5. SEAL: BRONZE MOUNTED WITH O-RING SEAL
   6. STEM: NON-RISING STEM (NRS)
   7. NOMINAL VALVE SIZE: NPS 16"
   8. STANDARD OF ACCEPTANCE: RESILIENT WEDGE TYPE TO CONFORM TO AWWA C509. WATEROUS SERIES 500 AND AMERICAN FLOW CONTROL SERIES #500, BOTH WITH FUSION EPOXY COATING ON THE BOTTOM SIDE OF THE PACKING BOX, M & H STYLE 4067, STOCKHAM G-700 TO G-704, CLOW ULFM - AWWA R/W, U.S. PIPE METROSEAL 250, MUELLER RESILIENT WEDGE GATE VALVE #2360, KENNEDY KEN-SEAL II SERIES, AMERICAN FLOW CONTROL #2500 SERIES OR OTHERS WHICH ARE EQUAL.
   9. VALVE BOX: BOXES SHALL BE THREE-PIECE, CLOW F-2450H, MUELLER J-10380, OR EQUAL
   10. VALVE STEM: SHALL OPEN TO LEFT. ONE REMOVABLE T-WRENCH TO BE PROVIDED

VALVE SEATS/SEALS

B. VALVE SEATS, SEALS, GASKETS, FLOATS, SEALS, AND DIAPHRAGMS ARE IDENTIFIED BELOW. DESIGNATIONS BELOW IN PARENTHESIS CORRESPOND TO THE VALVE SERVICE.
   1. GENERAL WATER/WASTEWATER (BW, CIW, CON, CW, DCW, DHW, FB, HS, HWR, HWS, PW, PWH, PWS, RW, SW, TW, UW, WS, WW, GW, SD): NEOPRENE, BUNA-N, EPDM, 316 STAINLESS STEEL, POLYETHYLENE, CERAMIC

INSTALLATION

A. LOCATE GATE VALVE FOR EASY ACCESS AND PROVIDE SEPARATE SUPPORT WHERE NECESSARY.
B. INSTALL GATE VALVE IN HORIZONTAL PIPING WITH STEM AT OR ABOVE CENTER LINE OF PIPE.
C. INSTALL BURIED GATE VALVE IN A POSITION TO ALLOW FULL STEM AND HANDLE (LEVEL / GEAR) MOVEMENT ABOVE THE GROUND SURFACE.

ELECTRICAL NOTES

GENERAL ELECTRICAL NOTES:

A. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH ALL GOVERNING CODES INCLUDING THE LATEST VERSION OF THE NATIONAL ELECTRICAL CODE (NEC) INCLUDING ALL LOCALLY ADOPTED AMENDMENTS AND ALL APPLICABLE STATE AND LOCAL CODES FOR WHERE THE PROJECT SITE IS LOCATED. COMPLY WITH ALL APPLICABLE OSHA REGULATIONS.
B. CONTRACTOR SHALL FURNISH EQUIPMENT HAVING 22,000 AMPS SHORT CIRCUIT RATING.
C. THE DRAWINGS DEPICTING ELECTRIC WORK ARE DIAGRAMMATIC AND SHOW, IN THEIR APPROXIMATE LOCATION, SYMBOLS REPRESENTING ELECTRICAL EQUIPMENT AND DEVICES. THE EXACT LOCATION OF SUCH EQUIPMENT AND DEVICES SHALL BE ESTABLISHED IN THE FIELD IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION DRAWINGS AND DETAILS.
D. THE CONTRACTOR SHALL REFER TO SHOP DRAWINGS AND SUBMITTAL DRAWINGS FOR ALL EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS TO VERIFY ROUGH-IN AND CONNECTION LOCATIONS.
E. UNLESS SPECIFICALLY STATED TO THE CONTRARY, NO MEASUREMENT OF AN ELECTRIC DRAWING DERIVED BY SCALING SHALL BE USED AS A DIMENSION TO WORK BY. DIMENSIONS NOTED ON THE ELECTRIC DRAWINGS ARE SUBJECT TO MEASUREMENTS OF ADJACENT AND PREVIOUSLY COMPLETED WORK. ALL MEASUREMENTS SHALL BE PERFORMED PRIOR TO THE ACTUAL INSTALLATION OF EQUIPMENT
F. ALL SWITCHBOARDS, PANELBOARDS, CONTROL PANELS, AND MOTOR CONTROL CENTERS SHALL INCLUDE A WARNING LABEL INDICATING THE RISK OF ARC FLASH. THE WARNING LABEL SHALL COMPLY WITH N.E.C. ARTICLE 110.16 AND O.S.H.A. 29.
G. BRANCH WIRING SHALL BE COLOR CODED PER INDUSTRY STANDARDS. WHERE WIRES OF DIFFERENT SYSTEMS JUNCTION IN A COMMON BOX EACH CABLE SHALL BE GROUPED WITH ITS OWN SYSTEM AND IDENTIFIED USING TAGS OR IDENTIFICATION STRIPS.
H. ON ALL 3 PHASE SYSTEMS, EACH PHASE SHALL BE IDENTIFIED AT ALL TERMINALS USING CODE MARKER.
I. ALL COVER PLATES FOR CONTROL STATIONS CONTROLLING REMOTE EQUIPMENT SHALL BE ENGRAVED TO IDENTIFY THE DEVICE BEING CONTROLLED.
J. ALL MOTOR STARTERS, REMOTE DEVICES, ETC., SHALL BE IDENTIFIED WITH ENGRAVED LAMECOID NAMEPLATES FASTENED TO THE EQUIPMENT WITH ESCUTCHEON PINS. NAMEPLATES SHALL BE 1/8" 5 PLY LAMECOID WITH 1/2" BLACK LETTERS ON A WHITE BACKGROUND. ADHESIVE CLOTH LABELS, SIMILAR TO THOSE MANUFACTURED BY BRADY LABEL CO., MAY BE USED ON MOTOR SWITCHES AND CONTROLS ONLY, INDICATING THE NUMBER, DESIGNATION, SIZE AND USAGE OF THE MOTOR.
K. ALL ACCESS PANELS REQUIRED BY CODE OR OTHERWISE TO ELECTRICAL SERVICE EQUIPMENT SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.
L. OPENINGS IN FIRE RATED CONSTRUCTION AND ANNULAR SPACES AROUND CONDUITS, CABLE TRAYS, AND OTHER PENETRATING ITEMS SHALL BE PROTECTED IN ACCORDANCE WITH NEC ARTICLE 300-21 AND IN ACCORDANCE WITH THE ILLINOIS ADMINISTRATIVE CODE. THE FIRE RATING OF THE PROTECTIVE SEAL SHALL BE AT LEAST THAT OF THE FLOOR OR WALL INTO WHICH IT IS INSTALLED, SO THAT THE ORIGINAL FIRE RATING OF THE CONSTRUCTION IS MAINTAINED.
M. FIRESTOPPING MATERIALS SHALL INCLUDE, BUT NOT BE LIMITED TO, MORTARS, SEALANTS AND CAULKS, PUTTIES, COLLARS, INTUMESCENT WRAP STRIPS MASTICS, AND FIRESTOP PILLOWS. ALL MATERIALS AND METHODS USED SHALL BE RECOGNIZED BY AN INDEPENDENT TESTING AGENCY AND SHALL HAVE FLAME AND TEMPERATURE RATINGS ASSIGNED BY THAT AGENCY.
N. MATERIALS USING SOLVENTS OR THOSE REQUIRING HAZARDOUS WASTE DISPOSAL SHALL NOT BE USED.
O. ALL WALL OR FLOOR PENETRATIONS OPENINGS SHALL BE AS SMALL AS POSSIBLE.
P. ALL OPENINGS AND ANNULAR SPACES REQUIRED BY CODE TO BE PROTECTED, SHALL BE PROTECTED WHETHER SPECIFICALLY INDICATED ON THE PLANS OR NOT.
Q. THE FIRESTOP ASSEMBLIES SHALL MEET ASTM E-814 AND ALL OF THE FIRE TEST AND HOSE STREAM TEST REQUIREMENTS OF AN INDEPENDENT TESTING AGENCY.
R. INSTALLATION OF MATERIALS AND ASSEMBLIES SHALL BE IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
Q. UPON COMPLETION OF THE INSTALLATION, THE CONTRACTOR SHALL FURNISH CERTIFICATES OF APPROVAL FROM ALL AUTHORITIES HAVING JURISDICTION. THE CONTRACTOR SHALL DEMONSTRATE THAT ALL WORK IS COMPLETE AND IN PERFECT OPERATING CONDITION, WITH RACE WAY AND CONDUIT SYSTEM PROPERLY GROUNDED, ALL WIRING FREE FROM GROUNDS, SHORTS, AND THAT THE ENTIRE INSTALLATION IS FREE FROM ANY PHYSICAL DEFECTS.
R. THERE ARE NO HAZARDOUS AREA CLASSIFICATIONS ASSOCIATED WITH THIS PROJECT.

CONDUIT, CONDUIT FITTINGS AND CABLE

A. CONDUIT
   1. SEE DRAWINGS.
   2. ABOVEGROUND CONDUIT SHALL BE GALVANIZED RIGID CONDUIT (GRC). MANUFACTURED LENGTHS, FULL WEIGHT, HEAVY WALL, RIGID STEEL CONDUIT, PROTECTED INSIDE AND OUT BY HOT-DIPPED GALVANIZED OR ELECTRO-GALVANIZED COATING.
   3. EXTERIOR UNDERGROUND CONDUIT IN DIRECT CONTACT WITH THE EARTH AND CONDUITS EMBEDDED IN CONCRETE SHALL BE PVC EXCEPT THAT UNDERGROUND CONDUIT RUNS WHICH ENTER OR EXIT THE BUILDING ENVELOPE SHALL UTILIZE PVC COATED GALVANIZED RIGID CONDUIT FROM THE POINT OF PENETRATION OF THE BUILDING ENVELOPE AND THE NEXT 5' PORTION OF THE RUN IN DIRECT CONTACT WITH THE EARTH.
   4. PVC CONDUIT SHALL BE SCHEDULE 40 OR 80, HEAVY WALL RIGID PLASTIC MANUFACTURED TO NEMA TC-2 STANDARDS, UL LISTED AS REQUIRED BY NEC AND SUNLIGHT RESISTANT.
   5. PVC COATED RIGID METAL CONDUIT SHALL BE FULL WEIGHT 40 MIL THICK PVC COATING, BONDING TO GALVANIZED METAL SHALL BE STRONGER THAN PLASTIC TENSILE STRENGTH. PER NEMA STANDARDS PUBLICATION NO. RN 1 - 1980 AND ANSI C80.1.
   6. CONNECTIONS TO MOTORS AND EQUIPMENT SUBJECT TO VIBRATION SHALL USE LIQUID TIGHT FLEXIBLE STEEL CONDUIT. CONNECTIONS SHALL BE NOT OVER 3 FT. LONG IF POSSIBLE. LOCATE SO IT IS LEAST SUBJECT TO PHYSICAL ABUSE.
   7. LIQUIDTIGHT FLEXIBLE CONDUIT SHALL BE GALVANIZED SPIRAL STRIP FLEXIBLE STEEL WITH HEAVY WALL SUNLIGHT RESISTANT PVC JACKET.
   8. GRC FITTINGS SHALL BE STEEL OR MALLEABLE IRON AND SHALL BE ZINC GALVANIZED, OR CADMIUM PLATED. DO NOT USE ALUMINUM OR DIE CAST FITTINGS. DO NOT USE RUNNING THREADS. DO NOT USE SET SCREW OR INDENTOR TYPE FITTINGS. INSTALL ELECTRICAL FITTINGS IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS AND WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT FITTINGS SERVE INTENDED PURPOSES. PVC AND PVC COATED RIGID METAL CONDUIT FITTINGS SHALL MATCH CONDUIT TYPE AND MANUFACTURER.
   9. THE ELECTRICAL CONTRACTOR SHALL REAM INSIDE CIRCUMFERENCE AT BOTH ENDS OF EACH CONDUIT SEGMENT TO ELIMINATE BURRS, WHICH COULD DAMAGE CONDUCTOR/CABLE INSULATION.
   10. ELECTRICAL CONTRACTOR SHALL INSTALL ALL CONDUIT RUNS USING A LEVEL TO ASSURE HORIZONTAL CONDUITS ARE LEVEL AND VERTICAL CONDUITS ARE PLUMB. WHERE CONDENSATION MIGHT BE A PROBLEM HORIZONTAL CONDUITS SHALL BE INSTALLED WITH A SLIGHT PITCH TO LOW POINTS PROVIDED WITH WEEP HOLES FOR DRAINAGE.
   11. PIPING SHALL HAVE PRIORITY FOR INSTALLATION; ALL CONDUIT ROUTING SHALL BE FIELD COORDINATED IN COOPERATION WITH THE PROCESS PIPING AND OTHER TRADES.
   12. EXPANSION JOINTS SHALL BE INSTALLED AT EVERY BUILDING EXPANSION JOINT AND ADDITIONALLY AS MAY BE REQUIRED BY THE NEC.
   13. CONTRACTOR MAY COMBINE CONDUCTORS FROM MULTIPLE CONDUITS SUBJECT TO DE-RATING OF POWER CONDUCTOR AMPACITY PER THE NATIONAL ELECTRICAL CODE.

ELECTRICAL BOXES

A. INSTALLATION
   1. SEAL CONDUIT AT ENTRANCE TO WEATHERPROOF BOXES FOR INTERIOR AND EXTERIOR LOCATIONS EXPOSED TO WEATHER OR MOISTURE.
   2. INSTALL KNOCKOUT CLOSURES TO CAP UNUSED KNOCKOUT HOLES WHERE BLANKS HAVE BEEN REMOVED
   3. LOCATE BOXES SO AS TO ASSURE ACCESSIBILITY OF ELECTRICAL WIRING. RELOCATE BOXES RENDERED INACCESSIBLE BY THE INSTALLATION OF WORK BY OTHER TRADES.
   4. SECURE BOXES RIGIDLY TO THE SUBSTRATE UPON WHICH THEY ARE BEING MOUNTED, OR SOLIDLY EMBED BOXES IN CONCRETE OR MASONRY. DO NOT SUPPORT FROM CONDUIT.
   5. DO NOT BURN CONDUIT HOLES, USE KNOCK-OUT PUNCHES, OR HOLE SAWS.

B. PROVIDE OUTLET BOX ACCESSORIES AS REQUIRED FOR EACH INSTALLATION, SUCH AS MOUNTING BRACKETS, WALLBOARD HANGERS, EXTENSION RINGS, FIXTURE STUDS, CABLE CLAMPS, AND METAL STRAPS FOR SUPPORTING OUTLET BOXES, COMPATIBLE WITH OUTLET BOXES BEING USED AND MEETING REQUIREMENTS OF INDIVIDUAL WIRING SITUATIONS.

SUPPORTING DEVICES

A. METAL SUPPORTING DEVICES SHALL BE ZINC GALVANIZED OR CADMIUM PLATED STEEL OR MALLEABLE IRON.
B. CONDUIT SUPPORTS
   1. TWO HOLE GALVANIZED STEEL STRAPS.
   2. CONTINUOUS SLOT OR T-SLOT GALVANIZED STEEL CONCRETE INSERT CHANNEL.
C. SUPPORT CONDUIT AS FOLLOWS;
   1. SINGLE CONDUIT RUNS
      A. VERTICAL SURFACES: GALVANIZED, HEAVY DUTY, SHEET STEEL STRAPS; BACK STRAPS TO BE PROVIDED FOR ALL EXPOSED CONDUIT AND CONDUIT ON EXTERIOR WALLS.
      B. HORIZONTAL SURFACES: GALVANIZED, HEAVY DUTY, 2-HOLE STEEL PIPE STRAPS.
   2. MULTIPLE CONDUIT RUNS
      A. VERTICAL SURFACES: HORIZONTAL OR VERTICAL RACK CHANNEL WITH CONDUIT STRAPS AS REQUIRED.
      B. HORIZONTAL SURFACES: SINGLE OR DOUBLE RACK CHANNEL TRAPEZE, COMPLETE WITH CONDUIT STRAPS AS REQUIRED; ALL SUPPORTED WITH THREADED HANGER RODS.

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