Annual Inspection Report

GRAND HAVEN BOARD OF LIGHT AND POWER

J.B. SIMS GENERATING STATION

CCR Surface Impoundments
Annual Visual Inspection

Pursuant to 40 CFR 257.83

Unit 3 East and West Ash Pond Surface Impoundments

Submitted To: Grand Haven Board of Light and Power
17000 Easton Drive
Grand Haven, Michigan 49417

Submitted By: Golder Associates Inc.
15851 South US 27, Suite 50
Lansing, MI 48906 USA

June 28, 2017

Project No. 1775416

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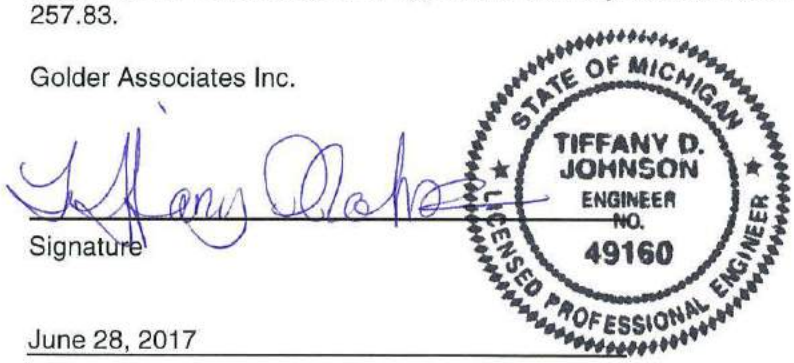
CERTIFICATION

Professional Engineer Certification Statement [40 CFR 257.83]

I hereby certify that, having reviewed the attached documentation and being familiar with the provisions of Title 40 of the Code of Federal Regulations Section 257.83 (40 CFR Part 257.83), I attest that this Annual Inspection Report is accurate and has been prepared in accordance with good engineering practices, including the consideration of applicable industry standards, and with the requirements of 40 CFR Part 257.83.

Golder Associates Inc.



Signature

June 28, 2017

Date of Report Certification

Tiffany D. Johnson, PE

Name

6201049160

Michigan P.E. #

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1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) promulgated the Resource Conservation and Recovery Act (RCRA) Coal Combustion Residuals (CCR) Rule (Rule) on April 17, 2015, with an effective date of October 19, 2015. The Rule requires owners or operators of existing CCR surface impoundments to have those units inspected on an annual basis by a qualified professional engineer in accordance with 40 CFR 257.83(b)(1). The annual qualified professional engineer inspections are required to be completed and the results documented in inspection reports (per 40 CFR 257.83(b)(2)) for CCR surface impoundments. Golder Associates Inc. (Golder) was retained by Grand Haven Board of Light and Power (GHBLP) J.B. Sims Generating Station (JBSGS) to perform the second annual inspection of the Unit 3 East and West Bottom Ash Ponds, the CCR surface impoundments located at the JBSGS (Site).

The CCR Rule establishes national minimum criteria and new CCR management obligations for existing, new, and lateral expansions of CCR disposal units. One of the new obligations pertains to inspections, specifically; CCR unit owners/operators must initiate the following activities:

- weekly inspections and monthly instrument monitoring of CCR Units by October 19, 2015; and
- annual inspections of CCR units by January 18, 2016.

This report presents the results of the second annual inspection of the Unit 3 Bottom Ash Ponds CCR surface impoundment unit at the JBSGS, located on Harbor Island, Grand Haven, Michigan. The inspection was conducted to comply with §257.83 of the CCR Rule.

Per 40 CFR 257.83(b)(1), Golder reviewed available information regarding the status and condition of the CCR units, and performed an onsite visual inspection on June 5, 2017. The inspection objectives included the following:

- Review of Operational Records (as applicable, see Section 3):
  - Design and construction information.
  - Results of previous structural stability assessments.
  - Results of previous annual inspections.
- A visual inspection to identify signs of distress or malfunction in the CCR units and appurtenant structures.
- A visual inspection of the hydraulic structures underlying the CCR units, or passing through the dike of the CCR units, for structural integrity and continued safe and reliable operation.

In accordance with §257.83(b)(2), this inspection report has been prepared by a qualified professional engineer documenting the operational records review, visual inspection, and identifying the following since the previous annual inspection:

- Any changes in geometry of the CCR surface impoundment since the previous annual inspection.
- The location and type of existing instrumentation and the maximum recorded readings for each instrument since the previous annual inspection.
- The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection.
- The storage capacity of the impounding structure at the time of inspection.
- The approximate volume of the impounded water and CCR at the time of inspection.
- Any appearances of an actual or potential structural weakness of the CCR units, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR units and appurtenant structures.
- Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection.

2.0 FACILITY DESCRIPTION

The Unit 3 East and West Bottom Ash Ponds are located adjacent to each other and are formed by earthen embankments or ring dikes with a common embankment between them. The impoundment areas range from 175 to 190 feet long by 71 to 80 feet wide with an approximate surface area of 0.2 and 0.3 acres for the east and west ponds, respectively. The ponds were designed by Black & Veatch in 1981 and are constructed with compacted clay embankments with 3 horizontal to 1 vertical (3H:1V) exterior slopes and 2H:1V interior slopes with an approximately 10 feet wide crest. The embankments are not regulated as dams by the Michigan Dam Safety office.

Both ponds were constructed with 3 feet of 3×10^{-7} centimeters per second (cm/sec) clay over the floor and are approximately 9 feet deep. The design bottom elevation of the ponds is Elevation (El) 585 feet above mean sea level (ft-msl) and the current crest elevation ranges from 591.2 to 592.7 ft-msl. Based on discussions with GHBLP personnel, normal operating conditions maintain a pond elevation of approximately El 588 to 590 ft-msl (1.2 to 4.7 feet of freeboard). The estimated storage capacity of each pond (with two feet of freeboard) is approximately 68,000 and 77,000 cubic feet for the East and West ponds, respectively.

A concrete overflow structure and sluice gate conduit between the east and west ponds allow for water level regulation between the two ponds and prevents overtopping of the embankment. These ponds do not have an outlet structure that discharges from the ponds. Water from the ponds is pumped back to the plant for reuse in plant operations after the bottom ash has settled out. A side stream from the recycled water is discharged to control solids in the recycled water and is regulated by the Michigan Department of Environmental Quality Permit number MI-0000278. Bottom ash is excavated from these ponds via crane or excavator and transported off-site. Periodically, GHBLP relines the ash ponds with clay to replace the clay liner that is removed during pond cleaning.

3.0 BACKGROUND AND DOCUMENT REVIEW SUMMARY

Golder performed a review of the following historic documentation relative to the Unit 3 East and West Bottom Ash Pond surface impoundments:

- City of Grand Haven, Michigan Board of Light and Power J.B. Sims Station, Unit 3 Ash Pond Construction Report (Black & Veatch, 1983)
- DRAFT - Coal Combustion Residue Impoundment, Round 12 - Dam Assessment Report, JB Sims Power Plant (Site 04), East and West Bottom Ash Ponds, Grand Haven Board of Power and Light, Grand Haven, Michigan, Prepared for: United States Environmental Protection Agency Office of Resource Conservation and Recovery, Prepared by: Dewberry & Davis, LLC Fairfax, Virginia, Dated October 2012 (EPA, 2012)
- Final Report of Evaluation For Grand Haven Power Plant Ash Impoundment Grand Haven, Michigan (Soils & Structures, 2014)
- Annual Ash Impoundment Inspection Report (Soils & Structures, July 2016)

4.0 2017 VISUAL INSPECTION

The 2017 onsite inspection of the Unit 3 East and West Bottom Ash Ponds was performed by Ms. Tiffany Johnson, P.E. and Mr. Brian Brown of Golder Associates Inc. (Golder) on June 5, 2017. Ms. Johnson is a Professional Engineer, licensed in the State of Michigan. Golder's inspectors were directed by Mr. Paul Cederquist, Environmental Compliance Specialist for the GHBLP JBSGS.

The inspection provides the following information as stipulated in 40 CFR 257.83(b)(2):

- Any changes in geometry of the CCR surface impoundment since the previous annual inspection.
  - There were no noted changes in the geometry of the Unit 3 East and West Bottom Ash Ponds, since the previous annual inspection.
- The location and type of existing instrumentation and the maximum recorded readings for each instrument since the previous annual inspection.
  - There is currently no instrumentation in place designed to monitor for the structural stability of the Unit 3 East and West Bottom Ash Ponds.
- The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection.
  - Minimum: Approximately 585 ft-msl (empty) (assumed based on visual observation)
  - Maximum: Approximately 590 ft-msl (1 to 3 feet below the crest) (assumed based on visual observation)
  - Present Depth: West pond has been dewatered, East pond's water depth is approximately 5 feet (based on visual observation).
- The storage capacity of the impounding structure at the time of inspection.
  - With two feet of freeboard - approximately 68,000 and 77,000 cubic feet for the East and West ponds, respectively (based on review of available information).
- The approximate volume of the impounded water and CCR at the time of inspection.
  - Water = East pond impounded approximately 68,000 cubic feet of water, West pond had been dewatered.
  - CCR = East pond impounded approximately 40,000 to 50,000 cubic feet of CCR (based on review of available information), West pond was dewatered and CCR removal was taking place at the time of inspection.

- Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit and appurtenant structures.
  - None were observed.
- Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection.
  - None were observed.

Based on the June 5, 2017 visual inspection, the overall condition of the Unit 3 East and West Bottom Ash Ponds is acceptable. There were no structural weaknesses or safety issues observed within the upstream, downstream, crest or hydraulic structures that would likely impact operations.

5.0 CLOSING

This report has been prepared in general accordance with normally accepted civil engineering practices to fulfill the Resource Conservation and Recovery Act (RCRA) reporting requirements in accordance with 40 CFR 257.83(b). Based on review of information provided by GHBLP and Golder's on-site visual inspection, the overall condition of the Unit 3 East and West Bottom Ash Ponds is acceptable. Golder's assessment is limited to the information provided by GHBLP and to the features that could be visually inspected in a safe manner. Golder cannot attest to the condition of subsurface or submerged structures.

Sincerely,

GOLDER ASSOCIATES INC.

Tiffany Johnson, P.E.
Associate

David M. List, P.E.
Principal

CCR SURFACE IMPOUNDMENT VISUAL INSPECTION CHECKLIST

Facility Name: **J.B. Sims Generating Station (JBSGS*) Unit 3 East and West Bottom Ash Ponds***

Owner: ***Grand Haven Board of Light and Power (GHBLP)***

Purpose of Facility: **These ponds are used to treat bottom ash from the power plant. The ash is sluiced to the treatment ponds where it is allowed to settle. The ash ponds are operated in a cyclic manner with the active pond receiving ash and other waste streams while the inactive pond is being cleaned of accumulated ash.**

Location: **Harbor Island, Grand Haven, Michigan**

Inspected By: ***Tiffany Johnson, P.E. and Brian Brown*** *Inspection Date:* ***June 5, 2017***

Weather: ***71-degrees, cloudy skies, wind 5 – 10 mph.***

ITEM	Acceptable	Monitor/Maintain	Investigate	Repair	REMARKS
1. General Conditions					
a. Year Minimum Water Elevation	-				Elevation: Approximately 585 to 588 ft-msl (or empty) (assumed based on visual)
b. Year Average Water Elevation	-				Elevation: Approximately 588 to 590 ft-msl (assumed based on visual) (1 to 3 feet below crest)
c. Year Maximum Water Elevation	-				Elevation: Approximately 588 to 590 ft-msl (assumed based on visual) (1 to 3 feet below crest)
d. Current water level					Current water level: West pond is dry, East pond is approximately 4 feet below the crest.
e. Current storage capacity	-				Volume: With two feet of freeboard - approximately 68,000 and 77,000 cubic feet for the east and west ponds, respectively
f. Current volume of impounded water					Volume: Approximately 68,000 cubic feet in the east pond, the west pond is dry.
g. Alterations	X				n/a
h. Development of downstream plain	X				n/a
i. Grass cover	X				
j. Settlement/misalignment/cracks	X				None observed.
k. Sudden drops in water level?	X				The west pond was intentionally drained for cleaning.
2. Inflow Structure					
a. Settlement	X				
b. Cracking	X				
c. Corrosion	X				
d. Obstacles in inlet	X				
e. Riprap/erosion control	X				
3. Outflow Structure					
a. Settlement	X				
b. Cracking		X			Minor cracking visible on the West Pond side of the concrete overflow structure separating the East and West ponds.
c. Corrosion	X				
d. Obstacles in outlet	X				
e. Riprap/erosion control	X				
f. Seepage	X				

4.	Upstream slope					
	a. Erosion		X			Minor rill erosion along the upstream slope, locations noted on Figure 2.
	b. Rodent burrows	X				
	c. Vegetation	X				
	d. Cracks/settlement	X				
	e. Riprap/other erosion protection	X				
	f. Slide, Slough, Scarp	X				
5.	Crest					
	a. Soil condition	X				
	b. Comparable to width from previous inspection	X				
	c. Vegetation	X				
	d. Rodent burrows	X				
	e. Exposed to heavy traffic		X			Inspection performed during the excavation of bottom ash from the West Pond. Crest shows signs of heavy vehicle traffic.
	f. Damage from vehicles/machinery	X				
6.	Downstream slope					
	a. Erosion		X			Minor rill erosion along the downstream slope, locations noted on Figure 2.
	b. Vegetation		X			Woody vegetation along the western slope of the West Pond. Sparse vegetation on the eastern slope of the East Pond.
	c. Rodent burrows		X			Rodent burrows visible on the south side of the East Pond. GHBLP personnel have installed rodent traps to mitigate further incidences. Location noted on Figure 2.
	d. Slide, Slough, Scarp	X				
	e. Drain conditions	X				
	f. Seepage	X				
7.	Toe					
	a. Vegetation	X				
	b. Rodent burrows	X				
	c. Settlement	X				
	d. Drainage conditions	X				
	e. Seepage	X				
	f. Other		X			Underground utility investigation holes encountered along the southern toe of the West Pond, locations noted on Figure 2.

Notes:

1.) A concrete overflow structure and sluice gate conduit between the east and west ponds allow for water level regulation between the two ponds and prevents overtopping of the embankment. These ponds do not have an outlet structure that discharges from the ponds. Water from the ponds is pumped back to the plant for reuse in plant operations after the bottom ash has settled out. A side stream from the recycled water is discharged to control solids in the recycled water and is regulated by the Michigan Department of Environmental Quality Permit number MI-0000278. Bottom ash is excavated from these ponds via crane or excavator and transported off-site. Periodically, GHBLP relines the ash ponds with clay to replace the clay liner that is removed during pond cleaning.

2.) From Soils and Structures: Final Report of Evaluation For Grand Haven Power Plant Ash Impoundment Grand Haven, Michigan (Soils & Structures, 2014), and Annual Ash Impoundment Inspection Report (Soils & Structures, 2016).

3.) Features observed and documented in this checklist were not considered a deficiency or release as classified under 40 CFR 257.83(b)(5) and required no immediate action beyond periodic inspection in accordance with the Operations and Maintenance Plan.

4.) ft-msl = feet above mean sea level.

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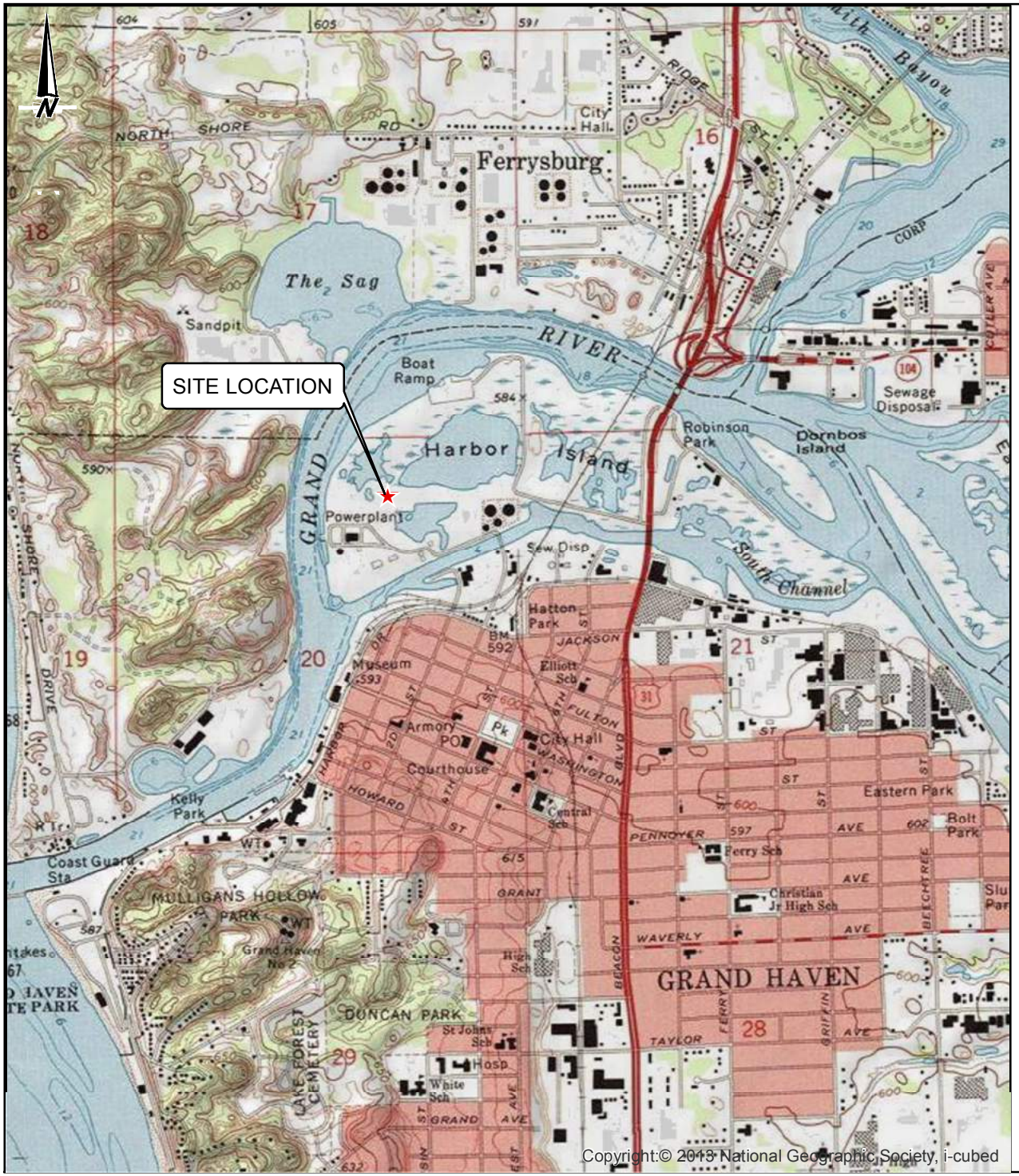

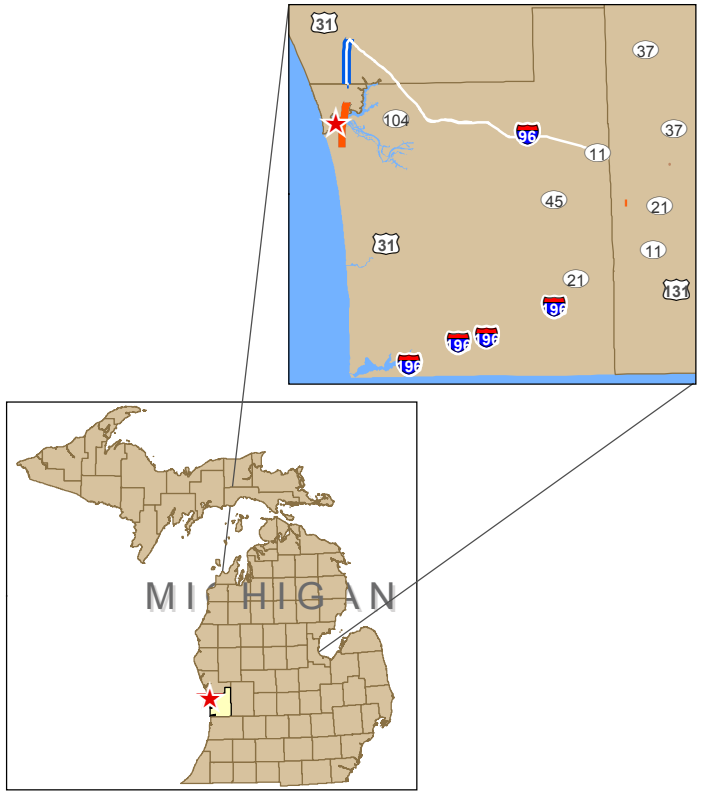

CLIENT
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HARBOR ISLAND DRIVE
GRAND HAVEN, MI

PROJECT
CCR RULE COMPLIANCE

TITLE
SITE LOCATION MAP

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-06-28
PREPARED	JJS
DESIGN	JJS
REVIEW	DML
APPROVED	TDJ

PROJECT No.	CONTROL	Rev.	FIGURE
1775461	1775461A000-GIS.mxd	0	1

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1" = 300' FEET

REFERENCE(S)

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HARBOR ISLAND DRIVE
GRAND HAVEN, MI

PROJECT
CCR RULE COMPLIANCE

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-06-28
DESIGNED	JJS
PREPARED	JJS
REVIEWED	DML
APPROVED	TDJ

TITLE
OVERALL SITE PLAN AND OBSERVATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
1775461			2

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At Golder Associates we strive to be the most respected global group of companies specializing in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organizational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

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