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January 19, 2017

**VIA E-PORTAL FILING**

Ms. Carlotta S. Stauffer  
Commission Clerk  
Florida Public Service Commission  
2540 Shumard Oak Boulevard  
Tallahassee, Florida 32399-0850

**Re: Docket No. 160159-GU – Petition for approval of Settlement Agreement Pertaining to Peoples Gas System’s 2016 Depreciation Study, Environmental Reserve Account, Problematic Plastic Pipe Replacement, and Authorized ROE**

Dear Ms. Stauffer:

Attached for filing with the Commission in the above docket on behalf of Peoples Gas System (“Peoples”), please find the Remediation Estimate Report referenced in Peoples’ Responses (No. 11) to Staff’s Fourth Data Request. Commission Staff have requested that this report be filed in order that it might become part of the exhibit for the hearing to be conducted in this docket on February 7, 2017.

Thank you for your usual assistance.

Sincerely,

  
ANSLEY WATSON, JR. *KF*

AWjr/a  
Attachment

cc: Walter Trierweiler, Esquire  
J. R. Kelly, Esquire



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Charles Rehwinkel, Esquire  
Stephanie Morse, Esquire  
Ms. Kandi M. Floyd



**PEOPLES GAS SYSTEM  
DOCKET NO. 160159-GU  
STAFF'S FOURTH DATA REQUEST  
REQUEST NO. 11  
BATES STAMPED PAGES: 39-01 – 39-72  
FILED: JANUARY 13, 2017  
SUPPLEMENTED: JANUARY 19, 2017**

- 11.** Please refer to PGS's response to Staff's Third Data Request, No. 13. Please identify the name of the environmental consulting firm reviewing the status of each MGP site, and provide the written report to the extent it is now available or becomes available prior to February 1, 2017.
  
- A.** The environmental firm that reviews and reports on the status of each each MGP site is Arcadis, Inc. PGS will provide the Remediation Estimate Report from the consultant when available.

Supplemental Response: See the attached Remediation Estimate Report.





Mr. Christopher M. Gasinski  
Senior Environmental Specialist  
Peoples Gas System/Tampa Electric Company  
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Subject:  
2017 Remediation Reserve Cost Estimates

Environmental

Dear Mr. Gasinski:

In response to your recent request, Arcadis U.S., Inc. (Arcadis) has prepared remediation reserve cost estimates for six former manufactured gas plant (MGP) sites located in Florida, where Peoples Gas System, a division of Tampa Electric Company (PGS-TECO), is a Potentially Responsible Party (PRP). The six sites include: (1) North Miami Beach Former MGP Site; (2) Tampa Former MGP Site; (3) Former Miami MGP Site; (4) Former Orlando Gasification Site; (5) West Florida Natural Gas Company Site; and, (6) Jacksonville Former MGP Site. The sites are currently in various phases of remedial characterization, evaluation of potential remedies, and/or implementation of regulatory-approved remedies.

Date:  
January 12, 2017

Contact:  
William D. Vogelsong

Phone:  
561-697-7046

Email:  
[William.Vogelsong@arcadis.com](mailto:William.Vogelsong@arcadis.com)

The reserve estimates have been developed based on Arcadis' remediation experience at MGP sites, documented field-tested technologies implemented at other MGP sites, site-specific conditions, and communications with project teams and applicable regulatory agencies. Where remedies have not been approved by the applicable regulatory agency, the reserves generally represent the minimum amount (i.e., reasonable "best case" scenario) for those components that can be reasonably estimated at this time. These estimates are for work projected to occur after January 1, 2017.

Our ref:  
WF900137.0065

Florida License Numbers

Engineering  
7917

Geology  
GB564

Surveying  
LB7062

In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) guidelines, the operation, maintenance and monitoring (OM&M) costs were generally assumed to occur over a maximum 30-year period, unless information was available suggesting that remediation goals could be achieved in a shorter time period. Consistent with PGS-TECO policy, the reserves are provided in current dollars and are not discounted.



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Presented below is a brief description of each site, the basis for the cost estimates, and a rationale for any appreciable change from the 2016 reserve estimate. An appendix is provided for each site summarizing capital costs and OM&M costs. Figures are included to support the basis of the cost estimate, along with detailed cost estimate tables for each site. The estimates do not have an allocation adjustment; therefore, an allocation factor must be applied to the total cost estimate to only account for PGS-TECO's share of the costs for the former Miami MGP and the former Orlando Gasification sites.

### **North Miami Beach Former MGP Site**

The North Miami Beach former MGP site is located at 15779 W. Dixie Highway, in North Miami Beach, Miami-Dade County, Florida (**Figure A-1 in Appendix A**). The site consists of two parcels, identified as the East and West Parcels. PGS-TECO sold the West Parcel in 2002. The results of previous and recent investigations generally characterized impacts to soils and groundwater as a result of historical activities associated with the former MGP operations. The results of these investigations have been reported to the Miami Dade Pollution Remediation Section Regulatory & Economic Resources (DRER) and the Florida Department of Environmental Protection (FDEP).

#### Background:

An interim remedial action plan (IRAP) was approved by DRER/FDEP to address MGP-impacts in unsaturated soils on the West and East Parcels. The IRAP for the West Parcel was implemented in 2014. Surface soils (0 to 2 feet below land surface [ft bls]) exceeding regulatory criteria and subsurface soils with visual impacts were excavated and disposed off-site in an approved disposal facility. The excavated area was backfilled with clean fill, which serves as an engineered soil cover for remaining subsurface soil that exceed regulatory criteria. As a result of this remedial action, PGS-TECO no longer retains liability for soils on the West Parcel property. In accordance with the Environmental Management Plan filed on the property deed in 2014, the land owner is responsible for the long-term OM&M of the engineered soil cover.

PGS-TECO retained ownership of the East Parcel, which is currently a natural gas gate station and active operations facility. The majority of the southern half of the parcel is covered with buildings or pavement and the northern half consists primarily of unpaved (lime rock) lay-down areas. Soils impacted primarily with total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAHs) require remediation (**Figure A-2 in Appendix A**). Fencing and locked gates restrict access reducing the potential of a trespasser being exposed to impacted surface soil. Workers are currently protected by Occupational Safety and Health Administration rules. PGS-TECO's hazard communications program for employees was supplemented with information on the specific chemicals present in soils and their potential hazards.

Groundwater flow is toward the east where it discharges into the Oleta River system. MGP-source materials have been identified within the surficial aquifer to maximum depths of about 67 ft bls. Groundwater is impacted primarily with benzene, ethylbenzene, toluene, and xylenes (collectively BTEX) and PAHs. Some off-site migration of impacted groundwater has occurred beneath City of North Miami Beach-owned property, Florida Department of Transportation (FDOT) and Florida East Coast (FEC) Railroad rights-of-way (ROW), the former Melting Pot property, and beneath and east of Biscayne Blvd (**Figure A-3 in Appendix A**). The Melting Pot property was purchased by PGS-TECO in 2014.



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A Remedial Action Plan (RAP) for groundwater was submitted to DRER and the FDEP in March 2014. The remedial approach involves the use of biosparge and soil vapor extraction (SVE) systems designed to provide a source of oxygen to aerobically biodegrade BTEX and PAHs dissolved in groundwater, at or near the downgradient perimeters of each parcel to prevent/minimize further off-site migration. Impacted groundwater that has migrated off-site would be remediated using monitored natural attenuation (MNA). A Remedial Action Plan Addendum (RAPA) and supplemental information were submitted through August 2015 to address comments by the regulatory reviewers. The agency conditionally approved the RAP in a letter dated November 19, 2015.

*Basis of Cost Estimate:*

The basis for the cost estimate is the information presented in the RAP/RAPA and subsequent documents as follows:

- East Parcel Soil – The regulatory-approved IRAP for soils in the East Parcel requires installing asphalt pavement atop impacted soil areas currently unpaved to create a cap or engineering control. For the reserve cost estimate, it was assumed that the asphalt pavement cap will be the engineering control used to address impacted surface soil (0 to 2 ft bls). Some repairs/replacement of the existing asphalt parking areas will be required and an asphalt cap will be installed in areas where asphalt pavement and buildings do not currently exist (**Figure A-2 in Appendix A**). Design and construction of a stormwater management system to address additional stormwater runoff due to the asphalt cap are also part of the reserve cost estimate. OM&M costs over a 30-year period have been included to inspect and maintain the engineered cap.
- Groundwater – Groundwater migrating off-site from the West Parcel will be treated using a biosparge/SVE system with shallow wells install along the eastern perimeter of the West Parcel. Groundwater migrating off-site from the East Parcel will be treated using a second biosparging/SVE system with shallow and deep wells installed along the eastern perimeter of the East Parcel. It is assumed these two systems will operate for 30 years. A third biosparging/SVE system with shallow and deep wells will be installed on the former Melting Pot Restaurant property (**Figure A-3 in Appendix A**), which is now owned by PGS-TECO, as requested by DRER and the FDEP. This system is anticipated to operate for five years.

Construction of remediation systems was initiated in 2016 and installation of the biosparge and SVE well networks has been completed. Completion of construction and initiation of operation is anticipated for 2017. Groundwater monitoring will be completed to evaluate the effectiveness of the systems at on-site locations, along with natural attenuation for the off-site portions of the plume. Costs have been included to operate the biosparge systems (as described above) and implement the MNA program.

*Cost Estimate:*

A detailed cost estimate for the North Miami Beach Former MGP Site is provided in **Table A-1** included in **Appendix A**. A summary of the capital, OM&M, and total costs are provided in **Table 1**.



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The 2017 reserve decreased by approximately \$2.3M from the 2016 estimate due to completion of biosparge and SVE well installations and partial construction of the systems. In addition, the 30-year OM&M costs were adjusted to reflect the use of a gas generator in lieu of an electrical unit with gas provided by PGS-TECO, which results in a more cost-effective operation for the site.

### **Tampa Former MGP Site**

The Tampa former MGP Site is located at 1400 Channelside Drive in Tampa, Florida. The site is part of a historically commercial/industrial district just north of and adjacent to the Crosstown Expressway, and lies approximately 0.2 mile northwest of the northern terminus of Ybor Channel of the Port of Tampa. The property is currently used as the PGS-TECO Tampa Operations Center and covers approximately 6.5 acres on the north side of 12th Street (North Parcel) and approximately 1 acre on the south side of 12th Street (South Parcel). During MGP operations, the western and central portions of the North Parcel contained the majority of the MGP facilities and structures, such as oil tanks, tar tanks, tar separator, and gas holders (**Figure B-1 in Appendix B**). PGS-TECO purchased the S&S Craftsman property located east of the North Parcel in 2014.

#### Background:

Surface soils on both the North and South Parcels exceed regulatory criteria for commercial direct exposure, with the majority of the MGP-related impacts located on the North Parcel of the site. The primary constituents of concern in soils are benzo(a)pyrene (BaP) equivalents, cyanide, and arsenic. Although some samples of off-site surface soil exceed regulatory criteria, these exceedances are deemed to not be attributable to the MGP operations. Exceedances to regulatory criteria attributed to former MGP operations have not been identified in subsurface soils (2 to 6 ft bls) located in off-site areas.

The site is underlain by a surficial aquifer to depths between 25 and 40 ft bls. Groundwater impacts have been identified in the surficial aquifer and in an underlying calcareous clay unit to depths of approximately 120 ft bls. Constituents of concern in groundwater involve volatile organic compounds (VOCs), PAHs, cyanide, and metals. The presence of non-aqueous phase liquid (NAPL) has also been detected in both the surficial aquifer and the underlying calcareous clay unit. Recent assessment work indicates that dissolved groundwater impacts do not extend into the underlying Floridan Aquifer.

Dissolved groundwater impacts have been characterized by multiple sampling events and their distribution has been established. Off-site migration of impacted groundwater has occurred primarily to the south and southeast of the North Parcel, within the aquifers underlying commercial properties ROWs and Tampa-Hillsborough County Expressway Authority properties (**Figure B-2 in Appendix B**). Based on the results of pilot test activities conducted in 2014 and an evaluation of remedial alternatives, an IRAP was submitted in 2015 by Geosyntec Consultants (Geosyntec). The IRAP recommended the use of multi-phase extraction (MPE) technology coupled with MNA to address groundwater impacts.

The first phase of the on-site MPE system focused on the on-site source area. Construction of this portion was completed in the summer of 2015 and initiated operation during the third quarter of 2015 and continues to date. The second phase of the on-site MPE system was constructed in 2016, targeting the area of the plume located south of Adamo Drive (**Figure B-3 in Appendix B**). This portion supplements the initial phase and started operation in the second quarter of 2016.



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*Basis of Cost Estimate:*

- Soils – PGS-TECO is in negotiations with a developer interested in acquiring the former Tampa MGP site. It was assumed that the sale price for the property has been discounted to reflect the developer as the responsible party for any soil remediation that may be required by the FDEP; as a result of this arrangement, PGS-TECO will have no liability for soils at the site and costs for soil remediation have not been included in the reserve estimate.
- Groundwater – The cost estimate was developed based on communications with Geosyntec and information collected during current operation of the on-Site MPE system. It is anticipated that operation of both phases of the on-site MPE system will be completed by the second quarter of 2017. Following completion of the on-site area treatment, the MPE system will be relocated to the S&S Craftsman property (now owned by PGS-TECO), with an anticipated operation time of approximately 1.5 years (i.e., through 2019) to supplement remediation of the off-site portion of the groundwater plume. In addition, a long-term groundwater monitoring plan will be implemented to track the effectiveness of MNA in the remaining portions of the plume. The reserve estimate includes implementation of the MPE programs (as described above) and MNA for a 30-year period.

*Cost Estimate:*

The cost estimate for the Tampa Former MGP Site is provided in **Table B-1** in **Appendix B**. A summary of the capital, OM&M, and total costs are provided in **Table 1**.

The 2017 reserve decreased by approximately \$440,000 from the 2016 estimate due to continued operation of the first phase of the on-Site MPE system, as well as, construction and operation of the second phase of the on-Site MPE system. In addition, the OM&M and groundwater monitoring costs associated with implementation of the remedial strategy were adjusted based on actual costs incurred during the ongoing MPE operation.

**Former Miami MGP Site**

The Former Miami MGP Site is located at 1600 North Miami Avenue and 60 NW 17th Street, Miami, Florida (**Figure C-1** in **Appendix C**). The former MGP operated at the site between 1906 and 1958. The site consists of two parcels separated by a railroad ROW. Both parcels are owned by PGS-TECO and are referred to as the West Parcel and the East Parcel (**Figure C-2** in **Appendix C**). Assessment activities have been conducted at the site and reported since 1987.

The West Parcel is the location of a gate station, but little activity occurs on the parcel. The East Parcel is leased to CEMEX/Rinker for utilization as a cement mix plant. The PRPs for the Miami MGP site currently include PGS-TECO, Florida Power and Light (FPL), and Continental Holdings. Each PRP currently pays an equal portion of project costs, but this is expected to change during remedial design/remediation action.



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Background:

Surface soil on both the West and East Parcels is defined as the soil under the existing asphalt, concrete, and aggregate sub-base cap, which on average extends to 1.5 ft bls. Soil below portions of the existing surface covers exceeds regulatory criteria for commercial direct exposure and leachability criteria, primarily for BaP equivalents, BTEX, and naphthalene (**Figures C-3 and C-4 in Appendix C**).

Groundwater flow is to the east/southeast. Groundwater is impacted to a depth of about 75 ft bls with MGP-source materials, and contains dissolved BTEX, PAHs, arsenic, and cyanide. Some off-site migration of impacted groundwater has occurred primarily east and south of the East Parcel (on **Figures C-5, C-6, and C-7 in Appendix C**). The presence of MGP-related NAPL has been identified in the smear zone as a co-mingled petroleum discharge light non-aqueous phase liquid (LNAPL). NAPL is also present in localized areas beneath both parcels to depths of about 45 ft bls.

A RAP was prepared by Arcadis and submitted by the PRPs to DRER in October 2013. A subsequent RAPA was submitted in April 2014 in response to comments received from DRER. The original remedial approach described in the 2013/2014 documents included limited soil excavation, in situ soil stabilization/solidification (ISS) of impacted soil, bioremediation for treatment of impacted groundwater, and capping; however, FPL retained the services of AECOM to evaluate other remedial alternatives and a different RAP was submitted in June 2015.

The 2015 RAP includes conducting source removal of impacted soil that will extend deeper than the previously proposed ISS work, groundwater recovery and treatment during the excavation efforts, and installation of a polishing system at the bottom of the excavation to address remaining mass and downgradient impacts via flux reduction. A long-term groundwater monitoring program will be implemented to track progress of the remedial strategy.

A new leasing agreement for the East Parcel was signed in 2016 with CEMEX/Rinker. As part of the negotiations, implementation of the new approach has been delayed until the new lease expires and the level of activity at the site facilitates execution of the RAP without adversely affecting normal business operations.

Basis of Cost Estimate:

The basis for the cost estimate is the information presented in the 2015 RAP. Given that implementation has been delayed, the current reserve has been developed by adjusting the estimate prepared in 2016 using an inflation factor derived from a model prepared by Arcadis. The level of effort for the main remediation components remains unchanged as follows:

- Soils – The proposed remedy includes soil removal via excavation of surface and subsurface soil in the West and East Parcels (approximately 57,000 tons), to depths ranging from 14 to 25 ft bls (**Figure C-8 in Appendix C**). Debris and MGP structures encountered during excavation, including a suspected tar well, will be removed and disposed of off-site at an approved disposal facility. Soil removal will also be completed in selected off-site and ROW locations.



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- Excavation dewatering – Water management will be conducted adjacent to or within the excavation areas. Dewatering and water treatment systems will be used for treating the water pumped from the excavation areas. The dewatering system will primarily consist of pumps installed in sumps within the excavation. Treatment will be provided using a combination of filter, anion exchangers, zeolite, and liquid phase carbon and activated alumina adsorbers.
- Groundwater – Shallow and deeper wells and piping systems will be installed during excavation activities as contingency measures for potential future use in treating groundwater; however, details of these systems will be dependent on the results of excavation activities. For the reserve cost estimate it was assumed that residual groundwater impacts will be remediated using MNA and it was assumed that groundwater monitoring will be conducted for a 30-year period.
- Engineering and institutional controls to restrict land use to commercial/industrial purposes and restrict installation of water supply or irrigation wells. Engineering controls following excavation will consist of a low permeability barrier such as concrete or asphalt including pre-existing or new surface cap (**Figure C-9, in Appendix C**). An inspection and maintenance program will be implemented via annual inspections and/or repairs.

Cost Estimate:

A summary cost estimate for the former Miami MGP site is provided in **Table C-1 in Appendix C**. A summary of the capital, OM&M, and total costs are provided in **Table 1**.

The 2017 reserve increased by approximately \$550,000 from the 2016 estimate as a result of the inflation factor applied to the previous assumptions. The cost estimate provided in these tables requires adjustment to account for PGS-TECO's allocation of costs for this site.

**Former Orlando Gasification Site**

The former Orlando gasification site is located on the northern and southern sides of West Robinson Street in Orlando Florida. The site consists of multiple parcels as shown on **Figure D-1 in Appendix D**. Parcel 1 is an open lot, while Parcels 2 through 6 have buildings and paved areas, and Parcel 7 is West Robinson Street. The site was developed as a MGP in 1888 and operated until approximately 1960. This site has been divided into two operable units (OUs), identified as OU1 and OU2.

Background:

OU1 comprises surface and subsurface unsaturated soils, and surficial aquifer groundwater. Impacts to surface (0 to 2 ft bls) and unsaturated subsurface soils (2 to 14 ft bls) are primarily limited to within the site boundaries. Surficial aquifer groundwater flow is to the north and groundwater impacts are mainly localized at on-site locations with limited off-site impacts. LNAPL is present within two on-site surficial aquifer wells located on the eastern side of Parcel 2. The United States Environmental Protection Agency (USEPA) issued a Record of Decision (ROD) in September 2013 for OU1. The ROD selected Remedial Alternative 8 from the OU1 Feasibility Study which includes a combination of soil excavation and ISS, hydraulic controls, engineered cap, groundwater monitoring, and institutional controls (**Figures D-1 through D-4 in Appendix D**). Remedial design is currently underway for OU1.



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OU2 involves Upper Floridan Aquifer (UFA) groundwater and is still in the Feasibility Study phase of the CERCLA process. UFA groundwater flow is to the northeast, and groundwater is impacted with BTEX and PAHs both upgradient and downgradient of the site between depths of about 200 to 250 ft bls. The extent of the UFA plume within this zone is defined by dissolved benzene (**Figure D-5 in Appendix D.**), while naphthalene is the most representative PAH constituent for OU2 (**Figure D-6 in Appendix D.**). LNAPL is present but its lateral extent cannot be precisely mapped due to the karstic nature of the aquifer. Groundwater modeling has been completed to evaluate alternatives for remediating the UFA, and a draft Feasibility Study was submitted to the USEPA and FDEP in April 2016 for review. The agencies responded with comments in letters dated May 26, 2016 (FDEP), and July 5, 2016 (USEPA). The Feasibility Study has not been approved, and the PRP Group is considering initiation of remedial efforts as pilot testing activities to collect information to address the comments and concerns by the regulatory reviewers.

*Basis of the OU1 Cost Estimate:*

The 2016 reserve cost estimate reflects completion of the remedial design and implementation of remedial action activities consistent with the ROD for OU1. The final design for the OU1 remedy has not been completed and a more recent cost estimate for implementation is not available; consequently, the estimate included in the 2013 Feasibility Study is still considered applicable and incorporates reasonable assumptions. To develop the current reserve, the 2013 estimate was adjusted using an inflation factor derived from a model prepared by Arcadis.

The level of effort for the main components of the remedy remains unchanged. The ROD includes the following elements:

- Institutional controls to restrict land use to commercial/industrial purposes and restrict installation of water supply or irrigation wells.
- Surface soil – Excavation and off-site disposal of surface soils or engineering controls to prevent direct exposure to soil exceeding regulatory criteria.
- LNAPL – Excavation and/or ISS of the area where LNAPL is present.
- Surficial aquifer groundwater – ISS containment wall to encapsulate the groundwater “source area” and elevated dissolved impacts to the west of the source area, to the extent implementable. For the reserve cost estimate it was assumed that MNA will be used to treat surficial aquifer groundwater located outside of the footprint of the ISS containment wall. The exact location of the ISS containment will be determined during remedial design.

*Basis of the OU2 Cost Estimate:*

The preferred remedy in the draft Feasibility Study prepared in 2016 includes groundwater extraction and treatment. Based on the recent results of groundwater modeling, the approach would involve groundwater extraction rates of up to 150 gallons per minute with a pumping period of approximately 12 years to achieve a level of mass reduction acceptable to the USEPA. Following active remediation, groundwater monitoring only will be implemented to track progress of the remedial strategy.



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The basis for the current reserve is the cost estimate developed for the preferred remedy in the 2016 Feasibility Study. The estimate includes the following elements:

- Institutional controls to restrict installation of water supply wells.
- UFA Groundwater – Design, construction, and operation of a groundwater extraction and treatment system for 12 years. Long-term MNA will be used to treat UFA groundwater located outside of the source areas.

Cost Estimate:

Detailed cost estimates for the Orlando Gasification Site are provided for OU1 (**Table D-1**) and OU2 (**Table D-2**) in **Appendix D**. A summary of the capital, OM&M, and total costs for these operable units are provided in **Table 1**. For the reserve, the cost estimate provided in these tables requires adjustment to account for PGS-TECO's allocation of costs for this site.

The 2017 OU1 reserve increased by approximately \$310,000 from the 2016 estimate as a result of the inflation factor applied to the 2013 assumptions. The estimate was also adjusted to reflect some of the pre-design activities completed in 2016.

The 2017 OU2 reserve increased by approximately \$3M from the 2016 estimate as a result of using updated costs that incorporate the most recent groundwater modeling results and the preferred remedy in the draft Feasibility Study submitted in 2016.

**West Florida Natural Gas Company Site**

The West Florida Natural Gas Company site is comprised of parcels located at 613 Northwest Osceola Avenue and 209 Northeast 9th Street. Of the 8 acres, approximately 2 acres were used for MGP operations. The site is currently operating as ABC Svinga Brothers Corporation, and operations include the storage and sale of scrap metal.

Background:

Impacts to surface and unsaturated subsurface soils (2 to 25 ft bls) are confined to the site. Approximately 10,000 cubic yards of MGP-impacted soil was excavated and transported off-site for disposal at an approved landfill. Following source removal activities, a concrete cover was constructed on the former MGP operations area (**Figure E-1** of **Appendix E**).

A Feasibility Study Report was submitted to the USEPA by Arcadis in July 2009. Since submittal of the report, meetings have been held with the USEPA and their project manager to discuss potential remedial approaches. The agency desires to implement a technology or combination of technologies that have not been proven to be cost effective at other MGP sites. In addition, the USEPA requested additional pre-feasibility studies to better evaluate their "preferred" technologies.



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Implementation of the pre-feasibility studies was initiated in 2012 and has continued through 2015. These studies have included collection of groundwater samples, soils samples, and NAPL samples so that bench-scale lab testing could be performed to evaluate the effectiveness of in-situ chemical oxidation using various chemical oxidants to remediate NAPL. The results of the bench-scale testing are under review by the USEPA. More recently, the isotope composition of site-related constituents was evaluated, along with collection of samples for geochemical and microbial analyses to further assess the characteristics of the groundwater plume and ongoing attenuation processes.

The pre-feasibility studies have not resulted in any change to the site conceptual model. The work did not indicate any additional MGP-related extent of impacts that were not otherwise known or included in the 2009 Feasibility Study report for the site; however, the Feasibility Study Report has not been approved by the USEPA. The primary activities anticipated for 2017 are finalizing a revised Feasibility Study report for the USEPA and developing a proposed plan and ROD.

*Basis of Cost Estimate:*

At this time it is unknown what remedy will be selected by the USEPA, so the preferred remedy from the 2009 Feasibility Study (Alternative 4) was used as the basis for the current reserve. As part of the reserve development, the estimate provided in the 2009 Feasibility Study report was adjusted using an inflation factor derived from a model prepared by Arcadis. The preferred remedy includes the following:

- Institutional controls will be established to restrict property use to commercial/industrial purposes, and prohibit installation of water wells and use of groundwater. This approach will require annual inspections and maintenance of engineering controls such as the concrete cover, soil cover, and fence around the retention basin. A soil management plan will also be developed for impacted soils beneath the concrete/soil covers that may be disturbed in the future.
- Surface and unsaturated subsurface soils – These media will be addressed through maintenance of the existing soil and concrete covers as engineering controls, and extension of the concrete cover over exposed soils exceeding regulatory criteria (**Figures E-2 and E-3 in Appendix E**). The extension of the concrete cover has been completed.
- Groundwater – NAPL is present in the weathered and hard limestone units primarily beneath the concrete cover to a maximum depth of 190 ft bbs. Based on the most recent sampling conducted at the site, groundwater impacted with dissolved BTEX and PAHs is confined to the site (**Figure E-4 in Appendix E**). The reserve cost estimate for groundwater is based on long-term MNA augmented by enhanced aerobic biodegradation using slow-release, solid-phase oxygen.

*Cost Estimate:*

A detailed cost estimate for the West Florida Natural Gas Company site is provided in **Table E-1 in Appendix E**. A summary of the capital, OM&M, and total costs are provided in **Table 1**.

The 2017 reserve increased by approximately \$16,000 from the 2016 estimate as a result of the inflation factor applied to the 2009 assumptions. The estimate included in the 2009 Feasibility Study is still considered applicable and incorporates reasonable assumptions.



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### **Jacksonville Former MGP Site**

The Jacksonville former MGP site is located at 1445 West Church Street, Jacksonville, Florida. The PRPs for the site currently include PGS-TECO and Continental Holdings. This evaluation only discusses the portion of the former MGP property owned and operated by PGS-TECO, which is bounded by Beaver Street to the north, the Easton property to the east, the RockTenn (now WestRock) property to the west, and Church Street to the south. A rail yard operated by TTX is located across Church Street to the south (**Figure F-1 in Appendix F**).

#### Background:

Brown and Caldwell submitted an IRAP in October 2014 recommending activities to collect information for subsequent development of a RAP for the site. The IRAP proposed soil sampling, groundwater quality and hydraulic monitoring, NAPL characterization and recoverability evaluation, well abandonment and replacement, and collection of pre- and post-system startup data to evaluate the influence of the hydraulic capture system associated with the WestRock property. The IRAP was approved by the FDEP in December 2014, and implemented between September 2014 and August 2015.

Soil analytical results from 1998 and 2014 indicate that VOCs and semivolatile organic compounds (SVOCs) in surface soils (0 to 2 ft bls) have declined and natural attenuation of soil impacts is ongoing. VOCs and SVOCs concentrations do not longer exceed the direct exposure industrial/commercial soil criteria; however, exceedances of regulatory criteria remain at the site for BaP equivalents (**Figure F-2 in Appendix F**).

The results of groundwater monitoring events indicate the presence of VOCs and SVOCs in excess of the regulatory criteria for groundwater. Benzene and naphthalene are the most representative compounds with concentrations generally consistent throughout the monitoring period (**Figure F-3 in Appendix F**). The presence of three types of NAPL has been identified at the site including residual LNAPL, reddish-brown DNAPL, and green-greasy DNAPL. LNAPL and DNAPL samples were collected and analyzed (**Figure F-4 in Appendix F**). The results indicate a positive correlation between the NAPL constituents and the dissolved phase constituents.

A summary of the IRAP completed activities and results were submitted to the FDEP in the IRAP Summary Report dated October 30, 2015. The document recommended additional groundwater monitoring to evaluate plume stability and the effects of the operation of the WestRock's system, which started operation in late September 2015. The supplemental data will be used to assess the potential influence of the hydraulic containment system on remedial alternatives at the site.

#### Basis of Cost Estimate:

The cost estimate for the Jacksonville former MGP site is based on the results of the completed IRAP activities and recommendations in the IRAP Summary Report. A final remedy has not been developed or approved by the regulatory agency; however, the primary activities anticipated for 2017 are submittal and approval of a RAP. The current reserve has been developed by adjusting the estimate prepared in 2016 using an inflation factor derived from a model prepared by Arcadis. The estimate represents a reasonable scenario using the following assumptions:



Mr. Christopher M. Gasinski  
January 12, 2017

- Institutional controls will be established to restrict property use to commercial/industrial purposes, and prohibit installation of water wells and use of groundwater.
- Surface and soils – Limited excavation and off-site disposal of surface soil at locations exceeding direct exposure industrial/commercial criteria.
- Groundwater – For the reserve cost estimate it was assumed that residual groundwater impacts will be remediated using MNA and it was assumed that groundwater monitoring will be conducted for a 30-year period.

Cost Estimate:

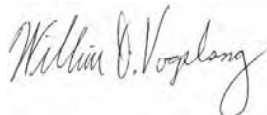
A detailed cost estimate for the Jacksonville former MGP site is provided in **Table F-1** in **Appendix F**. A summary of the capital, OM&M, and total costs are provided in **Table 1**.

The 2017 reserve increased by approximately \$40,000 from the 2016 estimate as a result of the inflation factor applied to the previous assumptions. The cost estimate reflects the current understanding of site conditions and “best case” scenario for remedial components that can be reasonably estimated at this time.

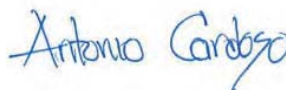
We appreciate the opportunity to provide PGS-TECO with cost estimates for the six former MGP sites. These estimates can be used to form the basis for the sites remediation reserves. If you have any questions please do not hesitate to contact us.

Sincerely,

Arcadis U.S., Inc.



William D. Vogelsong  
Project Manager/Principal Hydrogeologist



Antonio Cardoso, E.I  
Senior Environmental Specialist



## TABLES



**Table 1**  
2017 Remediation Reserve Cost Estimates  
Peoples Gas System/Tampa Electric Company

Page 1 of 1

**SUMMARY OF COST ESTIMATES**

Project	Capital Costs	Operation, Maintenance & Monitoring Costs	Total Project Cost
North Miami Beach	\$5,492,000	\$9,361,000	\$14,853,000
Tampa	\$750,000	\$3,306,000	\$4,056,000
Miami <sup>(1)</sup>	\$12,623,177	\$2,711,004	\$15,334,970
Orlando OU1 <sup>(1)</sup>	\$16,694,905	\$4,134,922	\$20,829,826
Orlando OU2 <sup>(1)</sup>	\$5,800,000	\$13,349,000	\$19,149,000
Ocala	\$1,194,124	\$2,804,243	\$3,998,366
Jacksonville	\$680,328	\$2,278,068	\$2,958,396

Footnotes:

(1) An allocation factor needs to be applied to these sites to determine TECO's portion of these costs.



# APPENDIX A

North Miami





**Table A-1**  
Detailed Cost Estimate for North Miami Beach Former MGP Site

Page 1 of 4

**Alternative Summary: Soil Cover, Soil Excavation, Institutional Controls, Biosparging/Vapor Extractions, and Long-Term Groundwater Monitoring**

Date Created: 9/9/2014 Updated by: A. Cardoso  
Date Last Revised: 12/19/2016 Reviewed by:

**Project Summary**

Assumes institutional controls for on-site/off-site properties to restrict use of water supply wells and soil  
Excavation of soil in Western Parcel completed in 2014  
Engineering controls for surface & subsurface soils on Eastern Parcel  
Installation of 19 shallow biosparge points and 10 VE wells along a 400-foot long section on Western Parcel  
Installation of 30 shallow and 33 deep biosparge points, and 17 VE wells along a 600-foot long section on Eastern Parcel  
Installation of 14 shallow and 14 deep biosparge points, and 8 VE wells along a 300-foot long section on former Melting Pot property  
BS points will be installed at depths of approx. 40 ft (shallow) and 67 ft (deep) using a mini sonic rig  
Each BS point will be constructed using 2-inch diameter schedule 40 PVC pipe and 2-ft long well screen  
VE points will be installed at approx. 7 ft below ground surface using a mini sonic rig  
Each VE point will be constructed using 4-inch diameter schedule 40 PVC pipe and 5-ft long well screen  
Drilling activities for Eastern and Western Parcels, and the former Melting Pot property were completed in 2016  
The BS points will be valved and controlled at the central treatment system compounds  
The VE points will be valved and controlled at the central treatment system compounds  
Installation of five performance monitoring wells  
Operation of Eastern/Western Parcel Systems for 30 years, and operation of system at former Melting Pot property for 5 years  
For NAM 20 existing monitoring wells will be sampled on a quarterly basis for one year, semiannually thereafter for 30 years

Items	Unit	Unit Price	No. of Units	Extended Cost
<b>Pre-Remediation/Administrative Costs</b>				
Institutional Controls	LS	\$20,000	2	\$40,000
<b>Total Pre-Remediation/administrative Costs</b>				<b>\$40,000</b>
<b>Eastern Parcel Soils - Engineered Cover</b>				
<b>Capital Costs</b>				
Mobilization/Demobilization/Preliminary Grading	LS	\$30,000	1	\$30,000
Utility Clearance/ GPR	LS	\$3,500	1	\$3,500
Surveying	LS	\$25,000	1	\$25,000
Erosion Control	LF	\$2.25	2700	\$6,075
Truck Wash/Decontamination Pad	LS	\$10,000	1	\$10,000
Decon Water Management	Gal	\$0.45	50000	\$22,500
Dust Control	month	\$6,500	3	\$19,500
Asphalt Repair	SF	\$1.50	77,156	\$115,734
Subgrade Preparation	SF	\$0.80	140,083	\$112,066
Supply, Place & Compact 6" Limerock Sub base	SF	\$3.75	140,083	\$525,311
Supply and Place 4" Asphalt (2 lifts)	SF	\$1.75	140,083	\$245,145
Well Abandonment/Replace	LS	\$25,000	1	\$25,000
Stormwater Management System	LS	\$450,000	1	\$450,000
<i>Total Capital Costs</i>				<b>\$1,589,832</b>
As-Built/Construction Completion Report	LS	\$40,000	1	\$40,000
Design & Technical Support (10%)				\$158,983
Construction and H&S Oversight (5%)				\$79,492
Project Management (5%)				\$79,492
				\$357,966
<i>Contingency (10%)</i>				\$194,780
<b>Total Capital Costs - East Parcel Soils</b>				<b>\$2,143,000</b>
<b>Parcel Maintenance</b>				
Paved Area Maintenance	LS	\$5,000	1	\$5,000
Annual Inspections and Reporting	LS	\$5,000	1	\$5,000
<i>Total Costs</i>				<b>\$10,000</b>
<i>Contingency (20%)</i>				<b>\$2,000</b>
Annual O&M Cost - Soils				\$12,000
<b>Thirty year O&amp;M Cost - Soils</b>				<b>\$360,000</b>



**Table A-1**  
Detailed Cost Estimate for North Miami Beach Former MGP Site

Page 2 of 4

Items	Unit	Unit Price	No. of Units	Extended Cost
<b>Biosparge Costs West Parcel</b>				
<b>Capital Costs</b>				
Access Agreements and Permits	LS	\$10,000	1	\$10,000
Installation of BS points (completed in 2016)	\$/LF	\$90	0	\$0
Well Completion / Well Vaults	\$/each	\$475	27	\$12,825
Installation Of VE points (completed in 2016)	\$/LF	\$350	0	\$0
Well Completion /Well Vaults	\$/each	\$475	10	\$4,750
Disposal of IDW (completed in 2016)	\$/drum	\$100	0	\$0
Trenching, backfilling and Restoration	\$/LF	\$40	1,600	\$64,000
Installation of piping	\$/LF	\$45	1,600	\$72,000
VE Sump	LS	\$20,000	1	\$20,000
Crossing Hwy for pipe installation	LS	\$180,000	1	\$180,000
BS/VE Equipment	LS	\$175,000	1	\$175,000
Remote cabinets	LS	\$25,000	3	\$75,000
Equipment installation	LS	\$100,000	1	\$100,000
Install Performance MWs (completed in 2016)	\$/LF	\$120	0	\$0
Generator (1/2 of the cost)	LS	\$140,000	1	\$140,000
Generator installation and connections	LS	\$30,000	1	\$30,000
System Startup	LS	\$25,000	1	\$25,000
			<i>Subtotal</i>	\$908,575
Reporting (as-builts)	LS	\$35,000	1	\$35,000
Onsite Construction Management (5%)				\$45,000
Engineering Design and Technical Support (5%)				\$45,000
Project Management (5%)				\$45,000
				\$170,000
			<i>Contingency (5%)</i>	\$53,929
<b>Total Capital Costs - West Parcel Biosparge System</b>				<b>\$1,133,000</b>
<b>Biosparge System Operation and Maintenance (O&amp;M) Costs</b>				
System O&M Labor	\$/hr	\$80	160	\$13,000
Electrical Consumption (assuming generator with gas)	\$/HP/year	\$250	50	\$13,000
Phone Line for Telemetry	\$/month	\$100	12	\$1,200
Equipment Repair & Replacement	\$/year	\$7,500	1	\$7,500
Performance Monitoring	\$/year	\$10,000	1	\$10,000
				\$44,700
Reporting	LS	\$25,000	1	\$25,000
Engineering & Technical Support (15%)				\$6,705
Project Management (15%)				\$6,705
				\$38,410
			<i>Contingency (20%)</i>	\$16,622
Annual O&M Cost for One Biosparge System				\$99,700
<b>Thirty Year O&amp;M Costs - West Parcel Biosparge System</b>				<b>\$2,991,000</b>



**Table A-1**  
Detailed Cost Estimate for North Miami Beach Former MGP Site

Page 3 of 4

Items	Unit	Unit Price	No. of Units	Extended Cost
<b>Biosparge Costs East Parcel</b>				
<b>Capital Costs</b>				
Access Agreements and Permits	LS	\$25,000	1	\$25,000
Installation of BS points (completed in 2016)	\$/LF	\$90	0	\$0
Well Completion / Well Vaults	\$/each	\$475	63	\$29,925
Installation Of VE points (completed in 2016)	\$/LF	\$350	0	\$0
Well Completion /Well Vaults	\$/each	\$475	17	\$8,075
Disposal of IDW (completed in 2016)	\$/drum	\$100	0	\$0
Trenching, backfilling and Restoration	\$/LF	\$40	3,000	\$120,000
Installation of piping	\$/LF	\$45	3,000	\$135,000
Remote cabinets	\$/each	\$25,000	6	\$150,000
BS/VE Equipment	LS	\$250,000	1	\$250,000
Equipment installation	LS	\$150,000	1	\$150,000
Install Performance MWs (completed in 2016)	\$/LF	\$120	0	\$0
Generator (1/2 of the cost)	LS	\$140,000	1	\$140,000
Generator installation and connections	LS	\$30,000	1	\$30,000
System Startup	LS	\$25,000	1	\$25,000
			<i>Subtotal</i>	\$1,063,000
Reporting (as-builts)	LS	\$35,000	1	\$35,000
Onsite Construction Management (10%)				\$106,000
Engineering Design and Technical Support (5%)				\$53,000
Project Management (7%)				\$74,000
				\$268,000
			<i>Contingency (20%)</i>	\$266,200
<b>Total Capital Costs - East Parcel Biosparge System</b>				<b>\$1,597,000</b>
<b>Biosparge System O&amp;M Costs</b>				
System O&M Labor	\$/hr	\$80	160	\$13,000
Electrical Consumption (assuming generator with gas)	\$/HP/year	\$250	80	\$20,000
Phone Line for Telemetry	\$/month	\$100	12	\$1,200
Equipment Repair & Replacement	\$/year	\$7,500	1	\$7,500
Performance Monitoring	\$/year	\$10,000	1	\$10,000
				\$51,700
Reporting	LS	\$25,000	1	\$25,000
Engineering & Technical Support (15%)				\$7,755
Project Management (15%)				\$7,755
				\$40,510
			<i>Contingency (20%)</i>	\$18,442
Annual O&M Cost for One Biosparge System				\$110,700
<b>Thirty Year O&amp;M Costs - East Parcel Biosparge System</b>				<b>\$3,321,000</b>
<b>Biosparge Costs Former Melting Pot Parcel</b>				
<b>Capital Costs</b>				
Access Agreements and Permits	LS	\$10,000	1	\$10,000
Installation of BS points (completed in 2016)	\$/LF	\$90	0	\$0
Well Completion / Well Vaults	\$/each	\$475	28	\$13,300
Installation Of VE points (completed in 2016)	\$/LF	\$350	0	\$0
Well Completion /Well Vaults	\$/each	\$475	8	\$3,800
Disposal of IDW (completed in 2016)	\$/drum	\$100	0	\$0
Trenching, backfilling and Restoration	\$/LF	\$40	1,200	\$48,000
Installation of piping	\$/LF	\$45	1,200	\$54,000
BS/VE Equipment Trailer	LS	\$100,000	1	\$100,000
Concrete Pad and Enclosed Fence	LS	\$40,000	1	\$40,000
Electrical Power Drop and Connections	LS	\$40,000	1	\$40,000
System Startup	LS	\$25,000	1	\$25,000
			<i>Subtotal</i>	\$334,100



**Table A-1**  
Detailed Cost Estimate for North Miami Beach Former MGP Site

Page 4 of 4

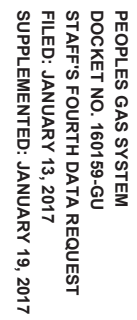
Items	Unit	Unit Price	No. of Units	Extended Cost
<b>Biosparge Costs Former Melting Pot Parcel</b>				
Reporting (as-builts)	LS	\$35,000	1	\$35,000
Onsite Construction Management (12%)				\$40,000
Engineering Design and Technical Support (12%)				\$40,000
Project Management (10%)				\$33,000
				\$148,000
			Contingency (20%)	\$96,420
<b>Total Capital Costs - Former Melting Pot Parcel Biosparge System</b>				<b>\$579,000</b>
<b>Biosparge System O&amp;M Costs</b>				
System O&M Labor	\$/hr	\$80	160	\$13,000
Electrical Consumption	\$/HP/year	\$1,000	32	\$32,000
Phone Line for Telemetry	\$/month	\$100	12	\$1,200
Equipment Repair & Replacement	\$/year	\$7,020	1	\$7,020.00
Performance Monitoring	\$/year	\$10,000	1	\$10,000
				\$63,200
Reporting	LS	\$25,000	1	\$25,000
Engineering & Technical Support (15%)				\$9,480
Project Management (15%)				\$9,480
				\$43,960
			Contingency (20%)	\$21,432
Annual O&M Cost for One Biosparge System				\$128,600
<b>Five Year O&amp;M Costs - Former Melting Pot Parcel Biosparge System</b>				<b>\$643,000</b>
<b>Groundwater Monitoring Costs (MNA)</b>				
<b>Year 1</b>				
Groundwater Monitoring Event (Quarterly)	\$/event	\$20,000	4	\$80,000
Reporting	LS	\$8,000	2	\$16,000
Project Management	LS	\$10,000	1	\$10,000
			Subtotal	\$106,000
			Contingency (20%)	\$21,200
			Annual Monitoring Costs (year 1)	\$127,200
<b>Years 2 - 30</b>				
Groundwater Monitoring Event (Semiannual)	\$/event	\$20,000	2	\$40,000
Reporting	LS	\$5,000	1	\$5,000
Project Management	LS	\$3,000	1	\$3,000
			Subtotal	\$48,000
			Contingency (20%)	\$9,600
			Annual Monitoring Costs (years 2-30)	\$57,600
<b>Total Groundwater Monitoring Costs</b>				<b>\$1,798,000</b>
<b>System Decommissioning Cost</b>				
Well Abandonment	\$/ft	\$20	5,850	\$117,000
Equipment Dismantling and Disposal	LS	\$30,000	3	\$90,000
			Subtotal	\$207,000
			Contingency (20%)	\$41,400
<b>Total Decommissioning Cost (three biosparge systems)</b>				<b>\$248,000</b>
<b>Total Capital Cost</b>				<b>\$5,492,000</b>
<b>Total O&amp;M Cost</b>				<b>\$9,361,000</b>
<b>Total Project Cost</b>				<b>\$14,853,000</b>



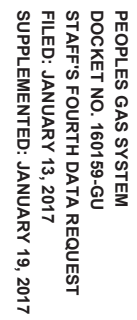


FIGURE  
**A-1**











## APPENDIX B

Tampa





**Table B-1**  
Detailed Cost Estimate for Tampa Former MGP Site

Page 1 of 2

**Alternative Summary: Multi-Phase Extraction and Natural Attenuation Monitoring**

Date Created: 12/7/2012 Updated by: A. Cardoso  
Date Last Revised: 12/20/2016 Reviewed by:

**Project Summary**

Soil remediation is not included in this estimate. These costs will be included in the property sale transaction.  
Groundwater remediation of source areas will be accomplished via Multi-Phase Extraction (MPE).  
Groundwater impacts outside of source areas will be treated via Monitored Natural Attenuation (MNA).  
MPE efforts will be focused on the source area (3/4 acre), defined as the area of measurable free product.  
Phase I of the on-Site MPE System was completed in 2015 and started operation in Q3 2015.  
Phase II of the on-Site MPE System was completed in 2016 and started operation in Q2 2016.  
Operation of the on-Site MPE system (Phase I and Phase II) is anticipated to be completed in Q2 2017.  
The MPE system will be relocated to the former S&S Craftsman property after on-Site operation is completed.  
Operation of the MPE system on the former S&S Craftsman property is anticipated for 1.5 years.  
The overall dissolved groundwater plume will be monitored to confirm natural attenuation process are being effective.  
Cost estimate has been updated based on conference call with Geosyntec on December 20, 2016.

Items	Unit	Unit Price	No. of Units	Extended Cost
<b>Pre-Remediation Costs</b>				
Pre-design investigation	LS	\$150,000	1	\$150,000
RAPMOD Phase III S&S Craftsman	LS	\$100,000	1	\$100,000
<b>Total Pre-Remediation Costs</b>				<b>\$250,000</b>
<b>Groundwater Remediation - Capital Costs</b>				
<b>Capital Costs</b>				
Remediation Well Network Installation	LS	\$100,000	1	\$100,000
Piping Installation and Connections	LS	\$150,000	1	\$150,000
MPE System Relocation S&S Craftsman	LS	\$250,000	1	\$250,000
<b>Total Capital Costs - MPE System</b>				<b>\$500,000</b>
<b>Groundwater Remediation - Operation and Maintenance (O&amp;M) Costs</b>				
<b>MPE System O&amp;M Costs (Phase I and Phase II)</b>				
<b>Year 1</b>				
Started operation in 3rd Quarter of 2015 and continuing system operation through Q2 2017.				
Treatment O&M and Reporting	\$/month	\$40,000	6	\$240,000
Annual O&M Costs				\$240,000
<i>Subtotal Operational Period (through Q2 2017)</i>				<i>\$480,000</i>
<b>Years 2 - 3 (Phase III)</b>				
Anticipated to operate for 1.5 year after relocation of MPE System to the S&S Craftsman property				
Treatment O&M and Reporting	\$/month	\$40,000	18	\$720,000
Annual O&M Costs				\$720,000
<i>Subtotal Operational Period (2018 and 2019)</i>				<i>\$1,080,000</i>
<b>Total O&amp;M Costs (3 years remaining) - MPE Systems</b>				<b>\$1,560,000</b>

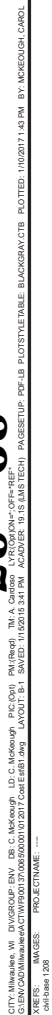


**Table B-1**  
Detailed Cost Estimate for Tampa Former MGP Site

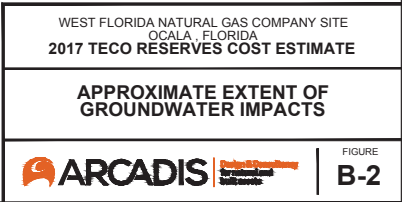
Page 2 of 2

Items	Unit	Unit Price	No. of Units	Extended Cost
<b>Groundwater Monitoring Costs - Monitored Natural Attenuation (MNA)</b>				
<b>Years 1 - 3 (MPE on-site and S&amp;S Craftsman)</b>				
Groundwater Monitoring Event	\$/event	\$45,000	2	\$90,000
Reporting	LS	\$20,000	1	\$20,000
Project Management	LS	\$10,000	1	\$10,000
			<i>Subtotal</i>	\$120,000
			<i>Contingency (10%)</i>	\$12,000
			<i>Annual Monitoring Costs (years 1-3)</i>	\$132,000
<b>Years 4 - 30</b>				
Groundwater Monitoring Event	\$/event	\$15,000	2	\$30,000
Reporting	LS	\$10,000	1	\$10,000
Project Management	LS	\$5,000	1	\$5,000
			<i>Subtotal</i>	\$45,000
			<i>Contingency (10%)</i>	\$4,500
			<i>Annual Monitoring Costs (years 4-30)</i>	\$50,000
			<b>Total Groundwater Monitoring Costs</b>	<b>\$1,746,000</b>
<hr/>				
<b>Total Capital Cost</b>				<b>\$750,000</b>
<b>Total O&amp;M Cost</b>				<b>\$3,306,000</b>
<b>Total Project Cost</b>				<b>\$4,056,000</b>

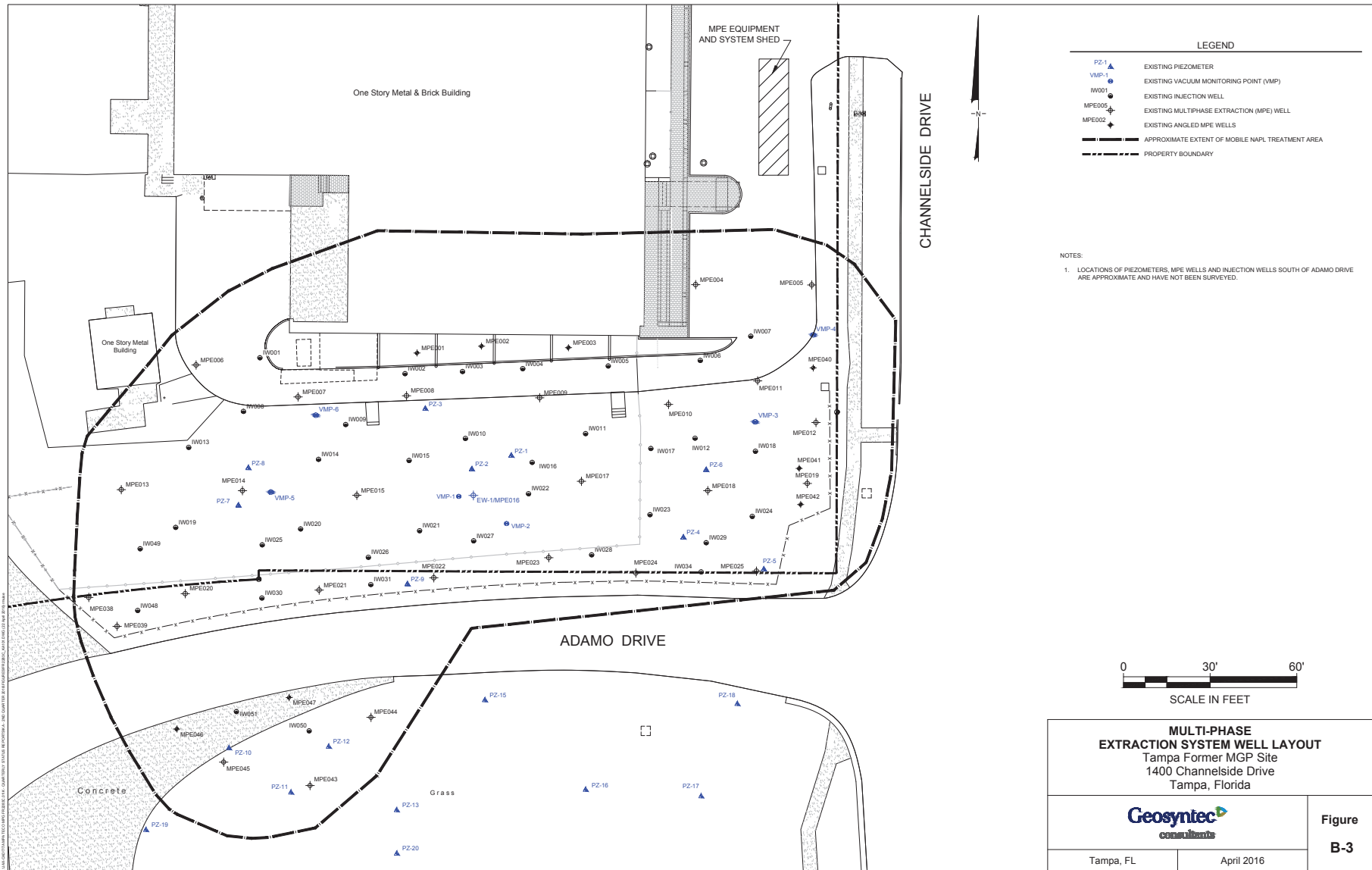














## APPENDIX C

Miami





**Table C-1**  
Detailed Cost Estimate for Former Miami MGP Site

Page 1 of 2

**Former Miami MGP - Currently Rinker/Peoples Gas Facility, Miami, Florida**

Date Created: 12/14/2015 Updated by: A. Cardoso  
Date Last Revised: 12/20/2016 Reviewed by:

**Project Summary**

Soil excavation of surface and subsurface soil in the West and East Parcels (approx. 57,000 tons)  
Soil excavation of surface soils in selected off-site and ROW locations  
Dewatering and water treatment will be completed during excavation  
Piping systems will be installed during excavation as contingency measures for potential future use in treating groundwater  
Long-term MNA will be used to treat residual groundwater impacts  
Assumes engineering and institutional controls to restrict land use to commercial/industrial and prohibit installation of water supply wells

Items	Unit	Unit Price	No. of Units	Extended Cost
<b>Capital Cost - Common Components</b>				
Institutional controls/Engineering controls	LS	\$120,000	1	\$120,000
Pre-design studies	LS	\$150,000	1	\$150,000
Site surveying and utility locate	LS	\$35,000	1	\$35,000
Permitting	LS	\$30,000	1	\$30,000
			<i>Subtotal</i>	\$335,000
		<i>Contingency</i>	20%	\$67,000
<b>Total Capital Cost for Common Components</b>				<b>\$402,000</b>
<b>Operation and Maintenance (O&amp;M) Costs</b>				
Annual inspection costs	LS	\$3,000	1	\$3,000
Engineered cap maintenance	LS	\$6,000	1	\$6,000
			<i>Subtotal for Engineering Controls</i>	\$9,000
Reporting				\$5,000
Program management (20%)				\$1,800
			<i>Subtotal</i>	\$15,800
		<i>Contingency</i>	20%	\$3,000
<b>Total Annual O&amp;M Cost for Engineering Controls</b>				<b>\$18,800</b>
<b>Total 30-year O&amp;M Cost</b>				<b>\$564,000</b>
<b>Capital Cost - Excavation</b>				
Mobilization/Demobilization	LS	\$80,000	1	\$80,000
Decontamination pad	LS	\$23,000	1	\$23,000
Air monitoring, odor control, dust control	Month	\$60,000	8	\$480,000
On site excavation (East and West Parcels)	CY	\$26	38,000	\$988,000
Material Handling & Logistics	CY	\$8	38,000	\$304,000
T&D of Non-Hazardous Soil (Assumes 100% of Total Volume)	Tons	\$55	57,000	\$3,135,000
Surface Restoration	SY	\$28	68,550	\$1,919,400
Wells and piping for potential future use	LS	\$80,000	1	\$80,000
Off site excavation (ROWs)	LS	\$365,000	1	\$365,000
Dewatering system	LS	\$200,000	1	\$200,000
Water management system	LS	\$500,000	1	\$500,000
			<i>Subtotal</i>	\$8,074,000
As-built Report	LS	\$100,000	1	\$100,000
On-Site Construction Management	%	8%	1	\$646,000
Design and Technical Support	%	8%	1	\$646,000
Project Management	%	5%	1	\$404,000
			<i>Subtotal of Capital Costs</i>	\$9,870,000
		<i>Contingency</i>	20%	\$1,974,000
<b>Total Capital Cost for Excavation</b>				<b>\$11,844,000</b>



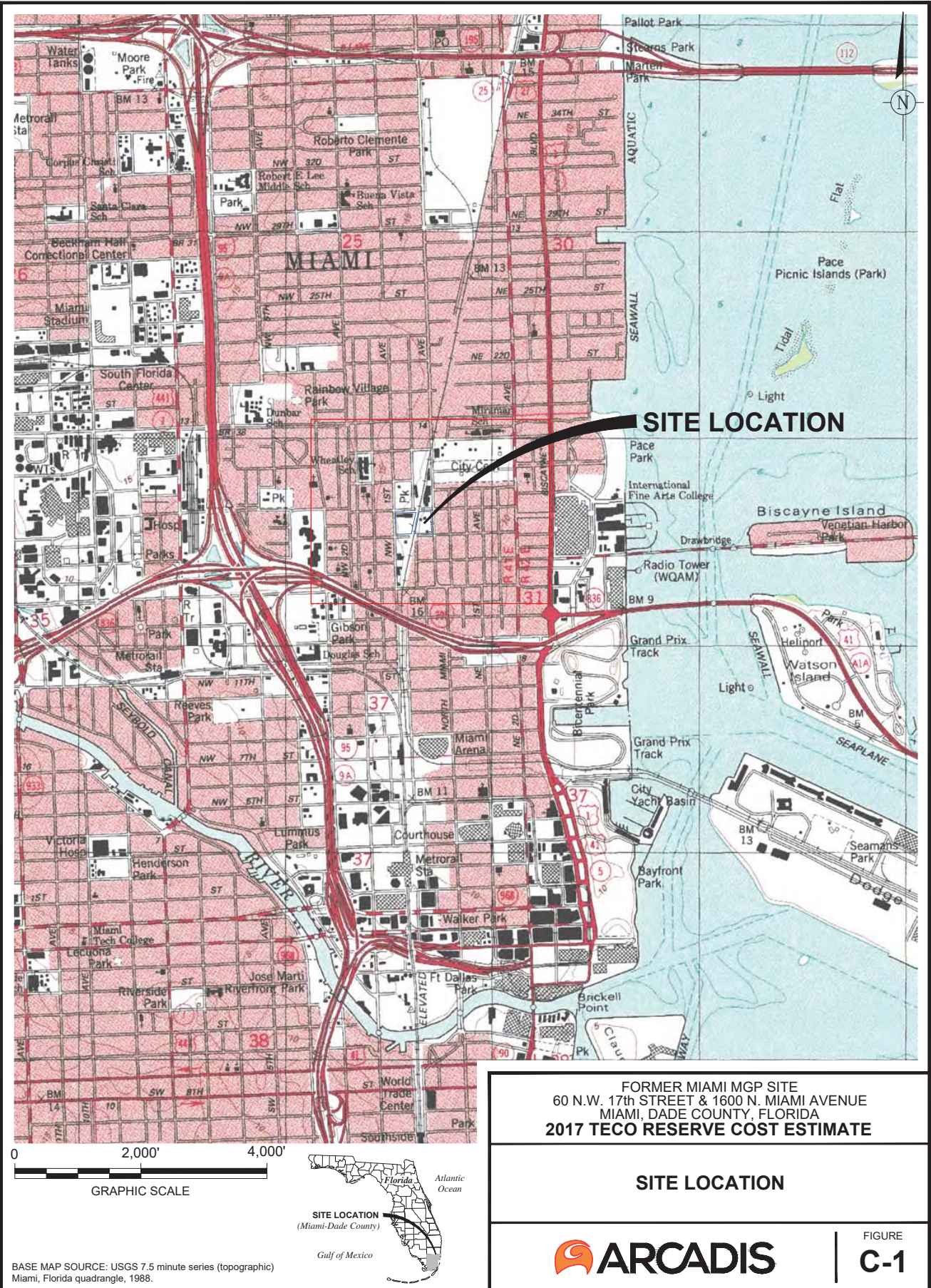
**Table C-1**  
Detailed Cost Estimate for Former Miami MGP Site

Page 2 of 2

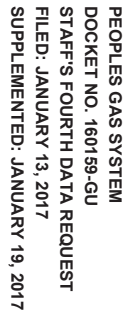
Items	Unit	Unit Price	No. of Units	Extended Cost
<b>Groundwater Monitoring Costs</b>				
<i>Year 1</i>				
Groundwater Monitoring Event (Quarterly)	\$/event	\$20,000	4	\$80,000
Reporting	LS	\$10,000	1	\$10,000
Project Management	LS	\$8,000	1	\$8,000
			<i>Subtotal</i>	\$98,000
			<i>Contingency (20%)</i>	\$19,600
			<i>Annual Monitoring Costs (year 1)</i>	\$117,600
<i>Years 2-30</i>				
Groundwater Monitoring Event	\$/event	\$20,000	2	\$40,000
Reporting	LS	\$10,000	1	\$10,000
Project Management	LS	\$6,000	1	\$6,000
			<i>Subtotal</i>	\$56,000
			<i>Contingency (20%)</i>	\$11,200
			<i>Annual Monitoring Costs (years 2-30)</i>	\$67,200
<b>Total Groundwater Monitoring Costs</b>				<b>\$2,066,000</b>
<b>Total Capital, O&amp;M and Groundwater Monitoring Costs</b>				
<b>Total Capital Costs</b>				<b>\$12,246,000</b>
<b>Total OM&amp;M Costs</b>				<b>\$2,630,000</b>
<b>TOTAL PROJECT COST</b>				<b>\$14,876,000</b>
Source (Year)	Inflation Index	Total Capital Cost	Total OM&M Cost	Total Project Cost
Arcadis Inflation Model (2016)	1.0308	\$12,623,177	\$2,711,004	\$15,334,970



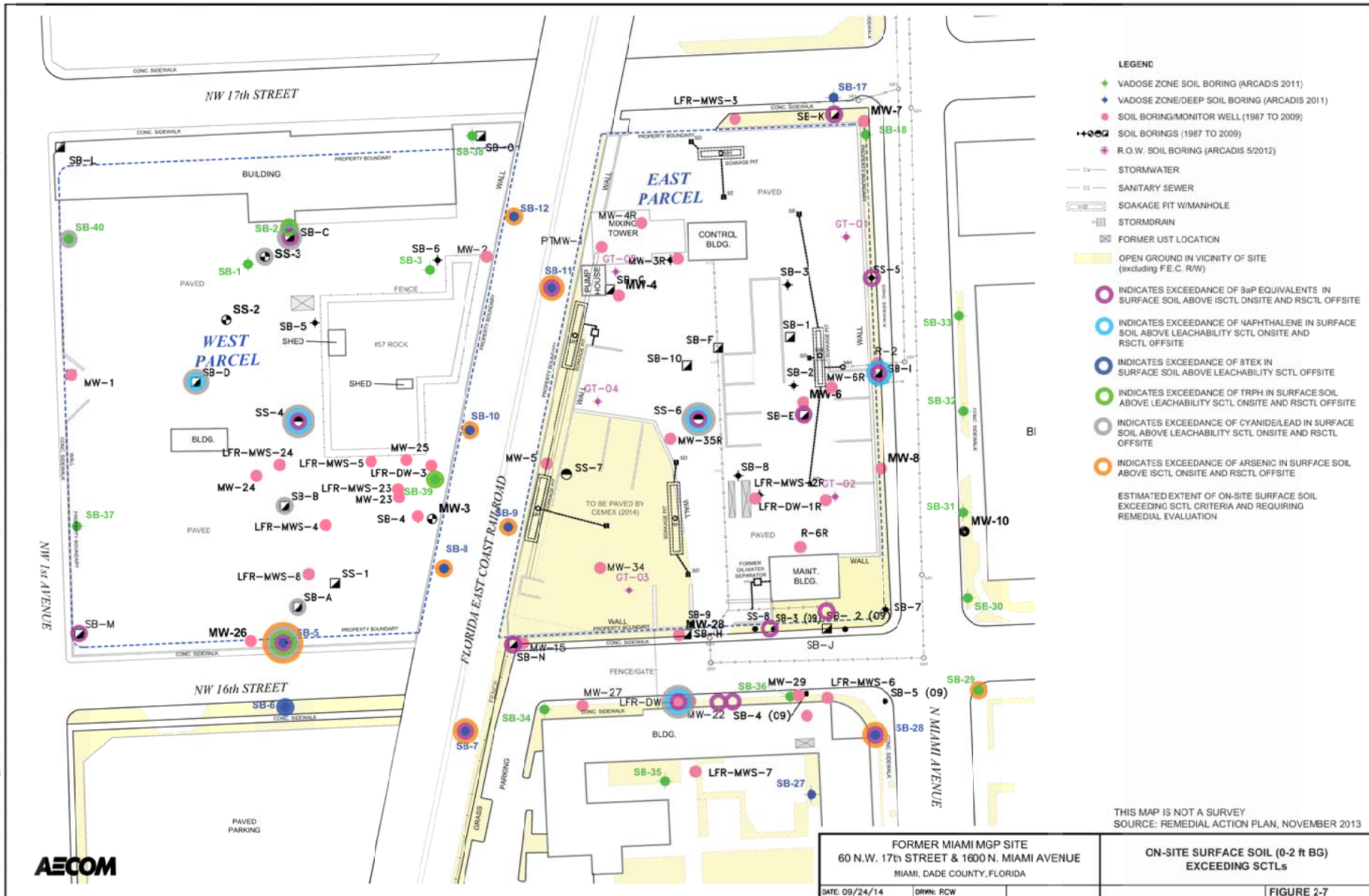
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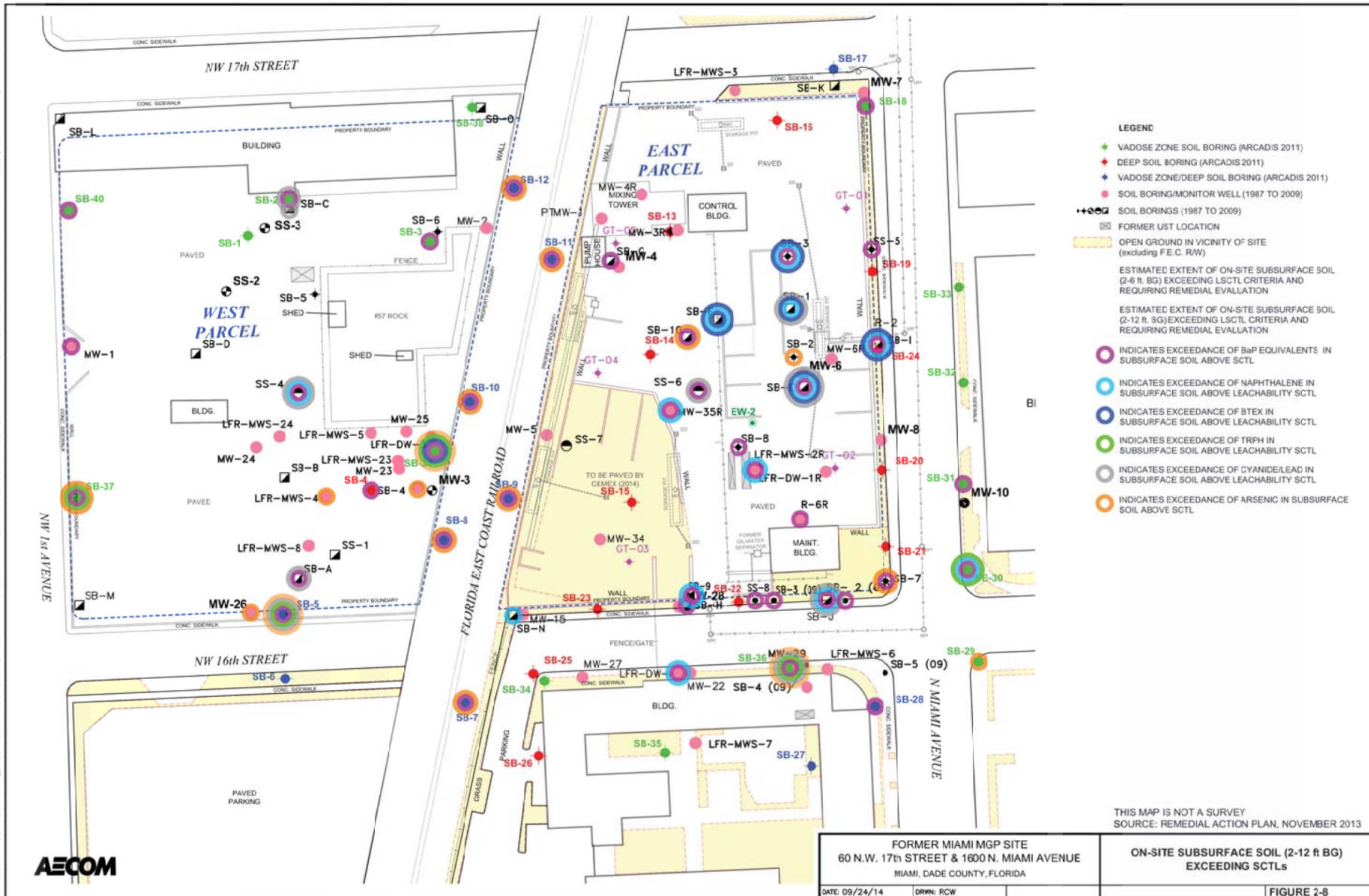
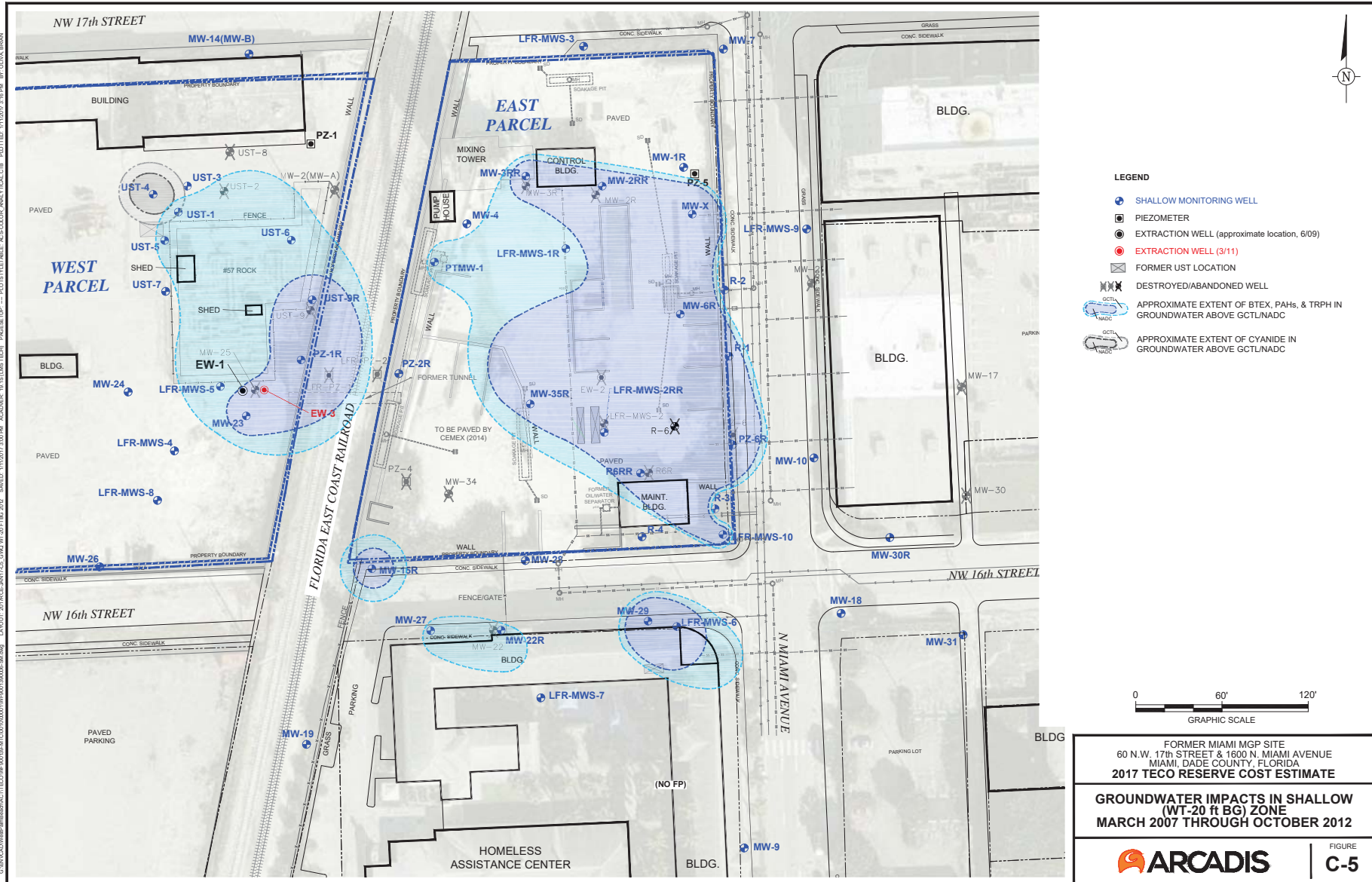
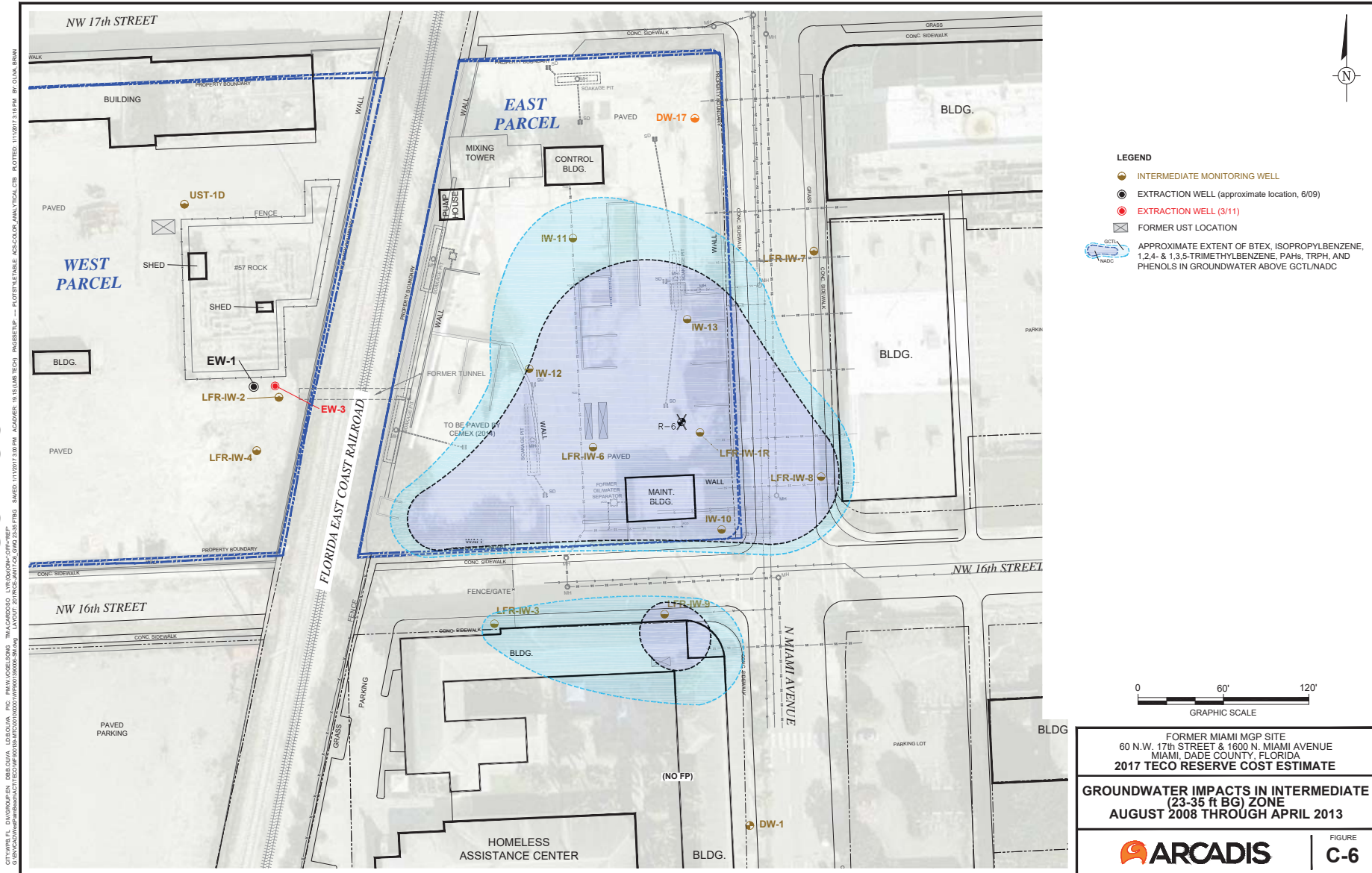


Figure C.7

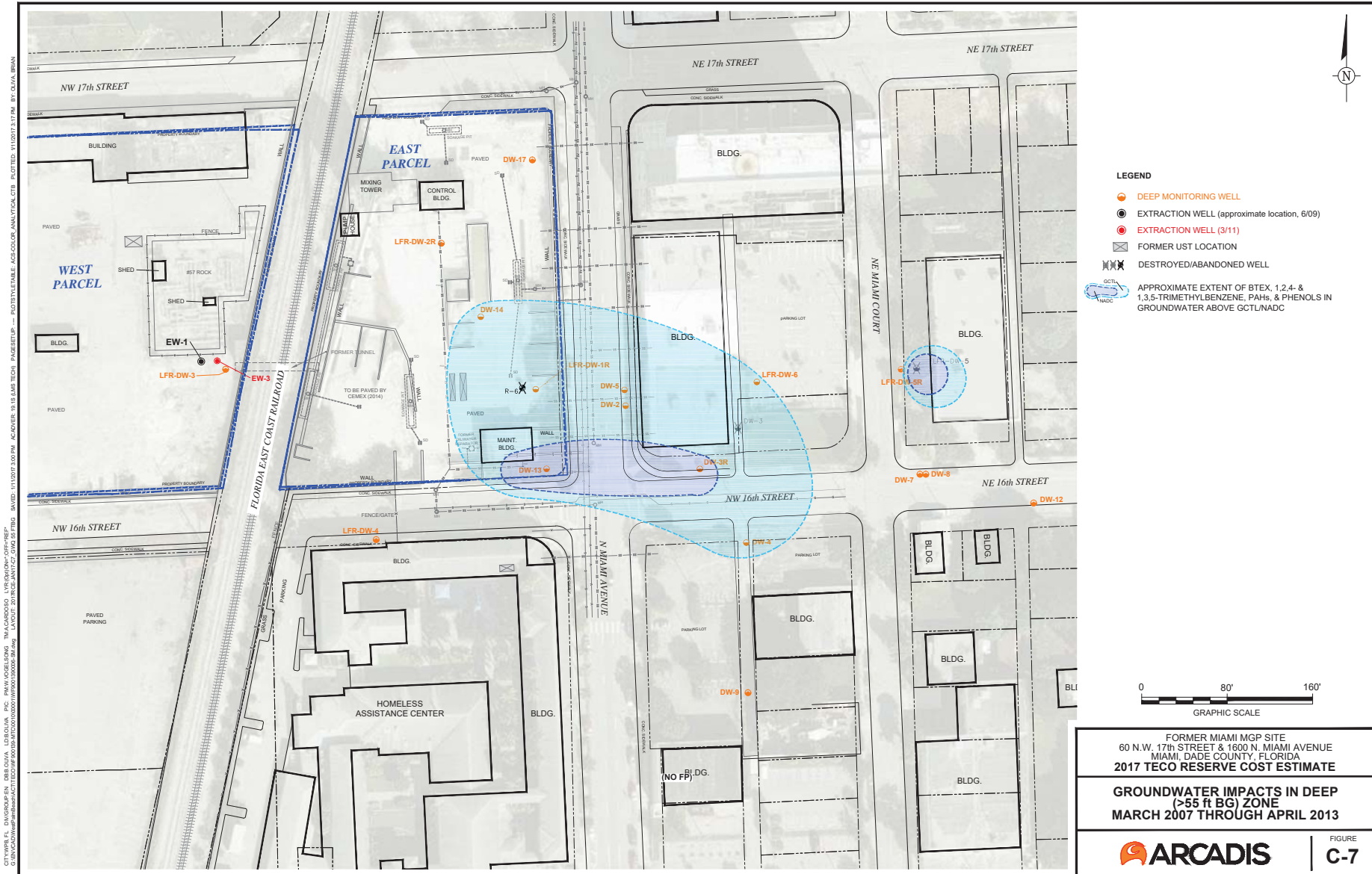




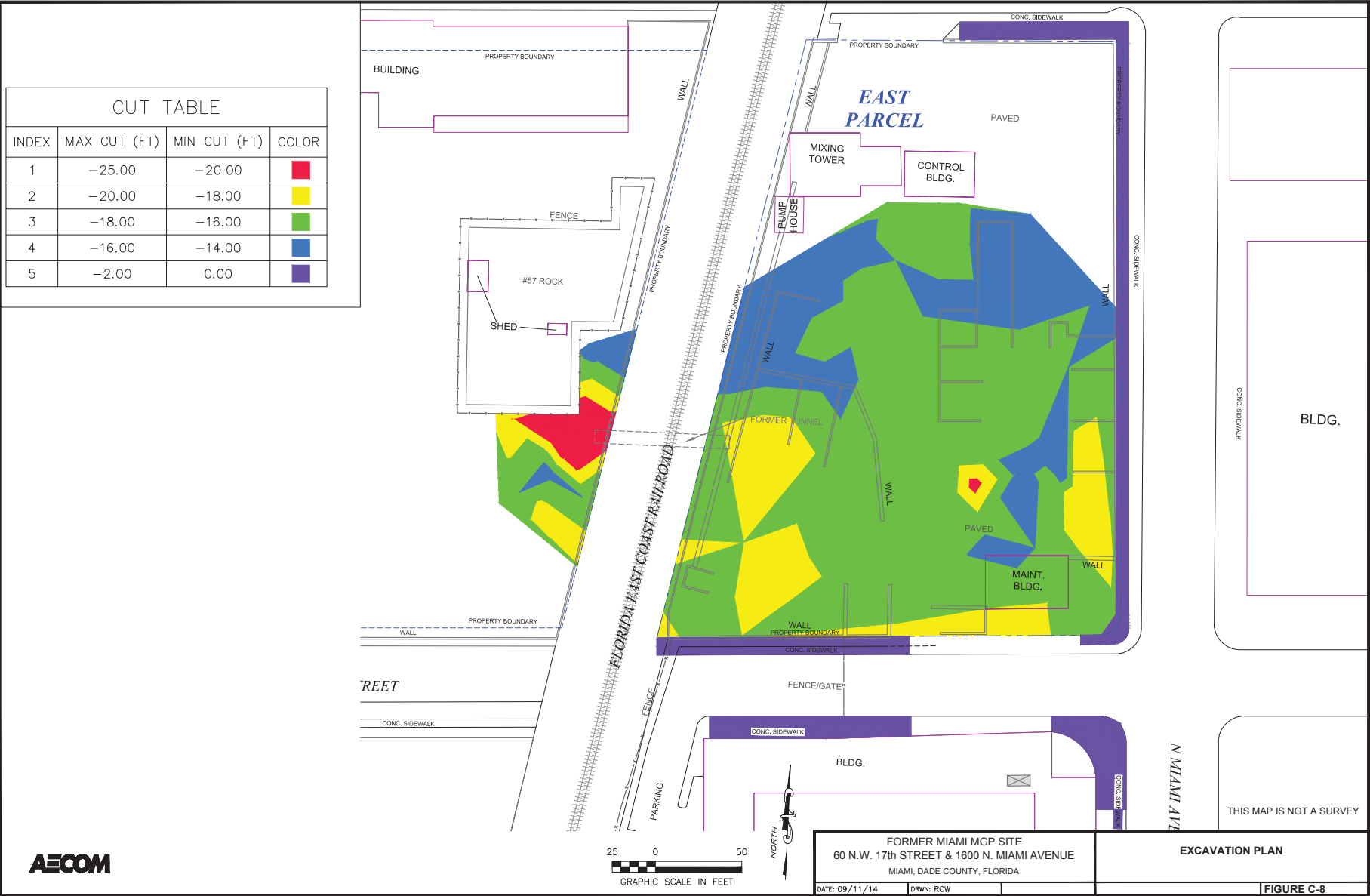




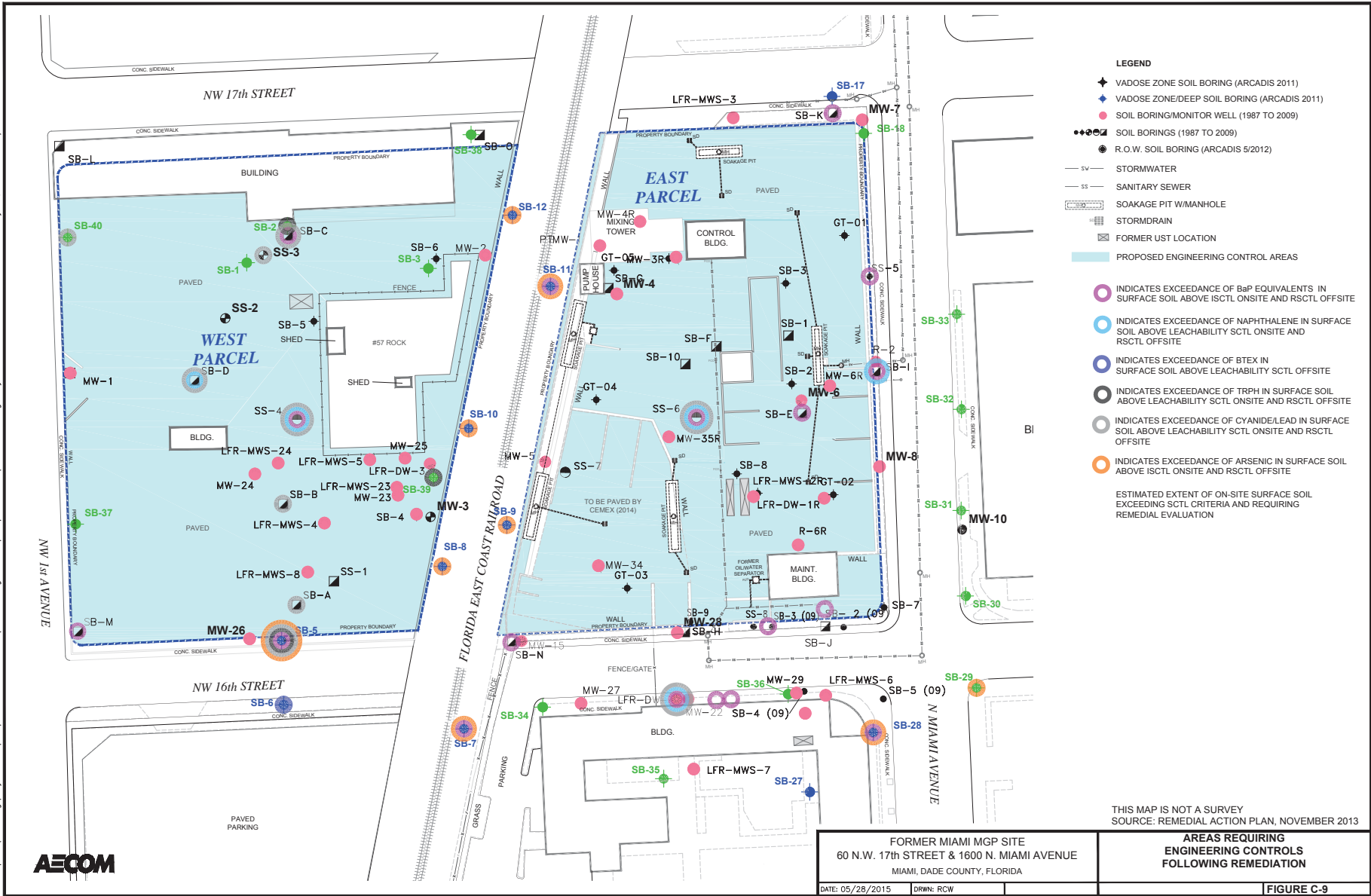














## APPENDIX D

Orlando



**Table D-1**  
Detailed Cost Estimate for Orlando Gasification Plant Site Operable Unit 1 (OU1)

Page 1 of 2

**REMEDIAL ALTERNATIVE 8 - OU1 ORLANDO MGP**

Date Created: 2/2/2013 Updated by: A. Cardoso  
Date Last Revised: 12/20/2016 Reviewed by:

**PROJECT SUMMARY**

OU1 is currently in the design phase.  
Pre-design investigation studies completed in 2016.  
Includes demolition of Building on Parcel 2.  
In-Situ Soil Stabilization (ISS) containment wall around groundwater source area and dissolved plume immediately to the west.  
Surface soil excavation within the ISS containment wall except beneath Parcel 3 building and West Robinson St.  
Excavation of tar well on Parcel 3.  
ISS of Light Non-Aqueous Phase Liquid (LNAPL) area on Parcel 2 to depth of 16 ft bls.  
Engineered cap for area within ISS containment wall.  
Hydraulic control system to collect infiltration through engineered cap for passive treatment prior to distribution outside of the ISS Containment Wall.  
Restoration of concrete/asphalt areas on Parcels 2, 3, 6 and 7.  
Long-term groundwater monitoring & United States Environmental Protection Agency (USEPA) 5-year reviews.  
Replacement of granular activated carbon (GAC) in hydraulic control system.  
Annual inspection and maintenance of engineered caps.

ITEMS	UNIT	UNIT PRICE	TOTAL UNITS	EXTENDED COST
<b>In-Situ Soil Stabilization (ISS) Containment Wall Costs</b>				
<i>Capital Costs for ISS Containment Wall</i>				
1 Institutional controls	LS	\$10,000	7	\$70,000
Access agreements and permitting	LS	\$70,000	1	\$70,000
Utility clearance/ GPR	LS	\$15,500	1	\$15,500
2 Mobilization/Demobilization and site preparation	LS	\$150,000	1	\$150,000
Utility Relocation	LS	\$1,811,850	1	\$1,811,850
Temporary Shoring for excavation in Tar Well and adjacent to buildings on Parcels 3 and 6	days	\$2,000	28	\$56,000
Asphalt and Concrete Removal (8 inches)	cy	\$151	3,575	\$539,825
3 Health and Safety and Site Security	weeks	\$15,000	41	\$615,000
Railroad Flagman	days	\$1,000	40	\$40,000
4 Surface soil excavation and offsite disposal	\$/ton	\$100	13,479	\$1,347,900.00
5 Subsurface soil excavation and offsite disposal (tar well & LNAPL)	\$/ton	\$100	2,873	\$287,300.00
6 ISS of LNAPL impacted soils	\$/CY	\$100	2,963	\$296,296.30
Engineered cap (HDPE liner w/ Geonet)	\$/ft <sup>2</sup>	\$1.75	47,185	\$82,574
Odor control using foam	\$/ft <sup>2</sup>	\$1	77,500	\$77,500
Building Demolition	\$/ft <sup>2</sup>	\$1	15,915	\$15,915.00
Disposal of C&D Waste	ton	\$60	8,065	\$483,900.00
Backfilling and compaction	\$/yd <sup>3</sup>	\$25	11,680	\$292,000.00
7 Restoration using permeable soil cover	\$/ft <sup>2</sup>	\$1	27,573	\$27,573.00
8 Upgrade existing cover	\$/ft <sup>2</sup>	\$6	21,400	\$128,400
9 Restoration using concrete/asphalt	\$/ft <sup>2</sup>	\$6	81,381	\$488,286
10 ISS Containment Wall to 56 ft	\$/ft <sup>2</sup>	\$30	76,608	\$2,259,936
11 Jet grouting - Utilities	LS	\$500,000	1	\$500,000
<i>Subtotal of ISS Containment Wall Capital Costs</i>				<u>\$9,656,000</u>
<b>Hydraulic Control System Inside ISS Containment Wall Costs</b>				
Hydraulic control system	LS	\$1,000,000	1	\$1,000,000
<i>Subtotal of GW Hydraulic Control Capital Costs</i>				<u>\$1,000,000</u>
As-built Report	LS	\$175,000	1	\$175,000
On-Site Construction Management	%	10%	1	\$1,066,000
Design and Technical Support (adjusted based on completed scope in 20	%	5%	1	\$533,000
Project Management	%	7%	1	\$746,000
<i>Subtotal of Capital Costs</i>				<u>\$13,176,000</u>
<i>Contingency 20%</i>				<u>\$2,635,000</u>
<b>Total Capital Cost for ISS Containment Wall, Engineered Caps, &amp; Hydraulic Control</b>				<u><b>\$15,811,000</b></u>



**Table D-1**  
Detailed Cost Estimate for Orlando Gasification Plant Site Operable Unit 1 (OU1)

Page 2 of 2

ITEMS	UNIT	UNIT PRICE	TOTAL UNITS	EXTENDED COST
<b>Operation and Maintenance (O&amp;M) Costs</b>				
12 Annual inspection costs	LS	\$2,500	1	\$2,500
13 Engineered Caps Maintenance Cost	LS	\$10,000	1	\$10,000
Change out of GAC	LS	\$20,000	1	\$20,000
<i>Subtotal for Engineering Controls</i>				\$32,500
Reporting				\$10,000
Design and Technical Support (20%)				\$6,500
Program Management (20%)				\$6,500
				\$55,500
			<i>Contingency</i>	20%
<b>Total Annual O&amp;M Cost for Engineering Controls</b>				\$66,500
<b>Total 30-year O&amp;M Cost</b>				<b>\$1,995,000</b>
<b>Groundwater Monitoring Costs</b>				
<b>Years 1 &amp; 3</b>				
14 Groundwater Monitoring Event	\$/event	\$15,000	4	\$60,000
Reporting	LS	\$10,000	1	\$10,000
Project Management	LS	\$10,000	1	\$10,000
<i>Subtotal</i>				\$80,000
<i>Contingency (20%)</i>				\$16,000
<i>Annual Monitoring Costs (years 1 &amp; 3)</i>				\$96,000
<b>Years 4-30</b>				
14 Groundwater Monitoring Event	\$/event	\$15,000	2	\$30,000
Reporting	LS	\$8,000	1	\$8,000
Project Management	LS	\$5,000	1	\$5,000
<i>Subtotal</i>				\$43,000
<i>Contingency (20%)</i>				\$8,600
<i>Annual Monitoring Costs (years 4-30)</i>				\$51,600
<b>Total Groundwater Monitoring Costs (years 0-30)</b>				<b>\$1,681,000</b>
Five year project reviews	LS	\$40,000	6	\$240,000
<b>Total Capital Cost</b>				<b>\$15,811,000</b>
<b>Total Operation, Maintenance &amp; Monitoring Costs</b>				<b>\$3,916,000</b>
<b>Total Project Cost</b>				<b>\$19,727,000</b>

Source (Year)	Inflation Index	Total Capital Cost	Total OM&M Cost	Total Project Cost
Arcadis Inflation Model (2013)	1.0159	\$16,062,395	\$3,978,264	\$20,040,659
Arcadis Inflation Model (2014)	1.0209	\$16,398,099	\$4,061,410	\$20,459,509
Arcadis Inflation Model (2015)	1.0181	\$16,694,905	\$4,134,922	\$20,829,826
Arcadis Inflation Model (2016)	1.0308	\$17,209,108	\$4,262,277	\$21,471,385

**Assumptions**

- 1 Institutional controls on all properties restricting commercial use, maintenance of engineering controls and site management plan.
- 2 Site preparation includes removal of fences, preparation of equipment/ soil/ backfill staging areas, utility management, temporary fences,
- 3 Health and Safety supervisor, perimeter air monitoring, dust/ odor control, traffic control, PPE equipment.
- 4 Assumes non-hazardous disposal of excavated soil.
- 5 Includes removal of tar well on Parcel 3 and portion of soils to 6 ft bls on Parcel 2 that overly LNAPL.
- 6 LNAPL will be immobilized using ISS to a depth of 16 ft bls.
- 7 Excavated non-hardscape areas will be restored with a vegetative cover above the engineered cap.
- 8 West Robinson street will be milled and replaced with lower permeability asphalt/ sealer.
- 9 Excavated hardscape areas will be restored using a low-permeability cover such as asphalt or concrete above the engineered cap.
- 10 ISS containment wall installed using bentonite and other additives, as needed.
- 11 Grouting around and beneath utilities including the PGS/FGT gas lines, sanitary sewer and storm sewer
- 12 Annual inspection of engineering controls by a licensed P.E.
- 13 Necessary repairs engineering controls as determined during annual inspections.
- 14 Eight monitor wells will be monitored on a quarterly basis for two years and semi-annually thereafter for 20 years.



**Table D-2**  
Detailed Cost Estimate for Orlando Gasification Plant Site Operable Unit 2 (OU2)

Page 1 of 6

OU2 REMEDIAL ALTERNATIVE 3 - Scenario 3B  
600 W. Robinson St., Orlando, Florida

Date Created: 3/24/2015  
Date Last Revised: 4/1/2016

**PROJECT SUMMARY**

***Institutional Controls + Extended Pump and Treat (P&T) System + Monitored Natural Attenuation (MNA), which includes:***

Institutional controls restricting the use of Upper Florida Aquifer groundwater and installation of water wells.  
Six 6-inch recovery wells installed to 230 feet below land surface (ft bls) using 30 feet of stainless steel well screens.  
Six submersible pumps, each capable of producing 25 gallons per minute (gpm) flow. Total system flow: 150 gpm.  
Influent treatment system consists of air stripper and granular activated carbon (GAC).  
Treated system effluent will be discharged using deep injection well under Underground Injection Control (UIC) permit.  
Injection well installed to 450 ft bls constructed of 6-inch casing utilizing approximately 50 ft of open borehole.  
Based on groundwater modeling performed to date, extraction system will operate for 12 years to provide significant mass removal.  
MNA for dissolved Upper Floridan Aquifer groundwater plume, long-term program for 30 years.

ITEMS	UNIT	UNIT PRICE	TOTAL UNITS	EXTENDED COST
<b>Capital Costs for Installation of Groundwater P&amp;T System</b>				
1 Institutional Controls	LS	\$500,000	1	\$500,000
2 Access and Permitting	LS	\$100,000	1	\$100,000
<i>Institutional Controls and Permits Subtotal</i>				\$600,000
<b>Replacement Monitoring Wells</b>				
Monitoring wells				
Well installation 2" - 230 feet deep	each	\$35,000	4	\$140,000
Cuttings disposal	/well	\$1,500	4	\$6,000
Well completion and development	LS	\$2,000	4	\$8,000
Surveying	LS	\$1,500	1	\$1,500
<b>Recovery/Injection System</b>				
Recovery wells				
Well installation 6" - 230 feet deep	each	\$55,000	6	\$330,000
Cuttings disposal	/well	\$1,500	6	\$9,000
Well vaults	LS	\$7,500	6	\$45,000
Well development	LS	\$1,500	6	\$9,000
Injection well				
Well installation 6" - 450 feet deep	each	\$105,000	1	\$105,000
Cuttings disposal	/well	\$3,000	1	\$3,000
Well vaults	LS	\$10,000	1	\$10,000
Well development	LS	\$3,000	1	\$3,000
Recovery pumps - electrical submersible with VFDs	each	\$4,000	6	\$24,000
In-well pressure transducers	each	\$1,000	7	\$7,000
Recovery wellhead piping, valving, and flow meter	each	\$3,000	6	\$18,000
Recovery piping from wells to treatment system				
2-inch recovery pipe (trench, backfill, restoration)	/LF	\$30	1,470	\$44,100
2-inch recovery pipe (pipe)	/LF	\$7	1,470	\$10,290
3-inch recovery pipe (trench, backfill, restoration)	/LF	\$30	310	\$9,300
3-inch recovery pipe (pipe)	/LF	\$10	310	\$3,100
Treated water re-injection piping to injection well				
4-inch discharge pipe (trench, backfill, restoration)	/LF	\$30	100	\$3,000
4-inch discharge pipe (pipe)	/LF	\$12	100	\$1,200
Directional drill road crossing	each	\$20,000	2	\$40,000
Electrical conduit	/LF	\$15	1,780	\$26,700
Electrical wiring	/LF	\$10	2,900	\$29,000
Control conduit extraction wells	/LF	\$15	1,780	\$26,700
Control wiring extraction wells	/LF	\$10	2,900	\$29,000
Control conduit injection well	/LF	\$15	100	\$1,500
Control wiring injection well	/LF	\$10	100	\$1,000
Electrical pump j-boxes and terminations	each	\$600	6	\$3,600
Electrical pull boxes	each	\$1,000	15	\$15,000
Railroad crossing jack-and-bore	LS	\$50,000	2	\$100,000
Road repairs	LS	\$50,000	1	\$50,000
Maintenance of traffic	LS	\$15,000	1	\$15,000

*Recovery/Injection System Subtotal* \$1,127,000  
*Taxes (7%) (on select items)* \$9,400  
*Shipping (10%) (on select items)* \$13,400  
*Mark-up (5%)* \$56,400  
***Recovery System Total*** **\$1,207,000**



**PEOPLES GAS SYSTEM**  
**DOCKET NO. 160159-GU**  
**STAFF'S FOURTH DATA REQUEST**  
**FILED: JANUARY 13, 2017**  
**SUPPLEMENTED: JANUARY 19, 2017**

**Table D-2**  
Detailed Cost Estimate for Orlando Gasification Plant Site Operable Unit 2 (OU2)

Page 2 of 6

ITEMS	UNIT	UNIT PRICE	TOTAL UNITS	EXTENDED COST
<u>Water Treatment Equipment</u>				
Transfer pumps with motor and VFD	LS	\$8,500	2	\$17,000
Air stripper	LS	\$90,000	1	\$90,000
Chemical Injection System	LS	\$25,000	1	\$25,000
Liquid Granular activated carbon vessels (includes carbon, 5,000 lb units)	LS	\$55,000	3	\$165,000
3 Vapor Granular activated carbon vessels (10,000 lb units)	/month	\$3,000	12	\$36,000
Instrumentation	LS	\$40,000	1	\$40,000
Control panel	LS	\$70,000	1	\$70,000
Distribution panel	LS	\$30,000	1	\$30,000
VFD panel	LS	\$75,000	1	\$75,000
PLC and data communications	LS	\$15,000	1	\$15,000
Data collection software and hardware	LS	\$6,000	1	\$6,000
Dial-out/internet communications package	LS	\$5,000	1	\$5,000
<i>Process Equipment Subtotal</i>				\$574,000
<i>Taxes (7%)</i>				\$40,200
<i>Shipping (10%)</i>				\$57,400
<i>Mark-up (5%)</i>				\$33,600
<i>Equipment Total</i>				<u>\$706,000</u>
<u>Plant Subcontractors (Building and Equipment Pad)</u>				
Mobilization	LS	\$3,000	1	\$3,000
Permitting - local building/plumbing	LS	\$5,000	1	\$5,000
Building (30 x 60)	square feet	\$70	1,800	\$126,000
Equipment concrete pad (50 x 80)	square feet	\$20	4,000	\$80,000
Parking area and fencing	LS	\$14,000	1	\$14,000
Landscaping and finishing	LS	\$10,000	1	\$10,000
<i>Building Subcontractor Subtotal</i>				\$238,000
<u>Plant Subcontractors (Mechanical)</u>				
Permitting - local building/plumbing	LS	\$5,000	1	\$5,000
Mobilization	LS	\$4,000	1	\$4,000
Equipment receiving and laydown	LS	\$10,000	1	\$10,000
Plant piping assembly - labor	LS	\$60,000	1	\$60,000
Plant piping assembly - parts	LS	\$50,000	1	\$50,000
<i>Mechanical Subcontractor Subtotal</i>				\$129,000
<u>Plant Subcontractors (Electrical)</u>				
Permitting - local electrical	LS	\$5,000	1	\$5,000
Mobilization	LS	\$4,000	1	\$4,000
Panel receiving and installation	LS	\$5,000	1	\$5,000
Conduit and wiring - materials	LS	\$30,000	1	\$30,000
Conduit and wiring - installation	LS	\$35,000	1	\$35,000
Panel terminations	LS	\$8,000	1	\$8,000
Conduit racks	LS	\$6,000	1	\$6,000
Area lighting	LS	\$30,000	1	\$30,000
Lightning/surge protection/grounding	LS	\$10,000	1	\$10,000
<i>Electrical Subcontractor Subtotal</i>				\$133,000
<u>Other Items</u>				
PLC Programming	each	\$30,000	1	\$30,000
Office Furnishings	each	\$5,000	1	\$5,000
Surveying	LS	\$10,000	1	\$10,000
Health & Safety equipment	each	\$5,000	1	\$5,000
Misc construction costs (expenses)	each	\$3,000	1	\$3,000
<i>Other Subtotal</i>				\$53,000
<b>Subtotal Construction</b>				<b>\$3,066,000</b>



**PEOPLES GAS SYSTEM**  
**DOCKET NO. 160159-GU**  
**STAFF'S FOURTH DATA REQUEST**  
**FILED: JANUARY 13, 2017**  
**SUPPLEMENTED: JANUARY 19, 2017**

**Table D-2**  
**Detailed Cost Estimate for Orlando Gasification Plant Site Operable Unit 2 (OU2)**

Page 3 of 6

ITEMS	UNIT	UNIT PRICE	TOTAL UNITS	EXTENDED COST
Reporting - As-built drawings				\$80,000
4 Design and technical support (20%)				\$613,200
Construction oversight and technical support (15%)				\$459,900
Project Management (20%)				\$613,200
			Subtotal	\$4,833,000
		Contingency	20%	\$967,000
<b>Total Capital Cost for Installation of Groundwater P&amp;T System</b>				<b>\$5,800,000</b>
<b>Groundwater P&amp;T System Operation and Maintenance (O&amp;M) Costs</b>				
<u>Annual O&amp;M Costs (Year 1)</u>				
Operations Labor				
Operator (20 hours per week)	\$/hour	\$79	1,040	\$82,200
Operator (20 hours, four times a year for GAC changeout)	\$/hour	\$79	80	\$6,300
Operator (10 hours per month, troubleshooting)	\$/hour	\$79	120	\$9,500
Subcontractor support	month	\$1,000	12	\$12,000
General expenses and site maintenance	month	\$1,000	12	\$12,000
Utilities - plant electric (55 HP total, \$0.12/kw-hr)	\$/HP/year	\$1,000	55	\$55,000
Liquid Granular activated carbon (change out 2-5,000 lb units every 6 months)	\$/change-out	\$25,000	2	\$50,000
Vapor Granular activated carbon (change out 2-10,000 lb units every 3 months)	\$/change-out	\$40,000	4	\$160,000
Injection discharge monitoring	/ samples	\$500	12	\$6,000
Air stripper cleaning (every 6 months)	LS	\$10,000	2	\$20,000
Injection well cleaning / rehabilitation / re-development (every year)	LS	\$20,000	1	\$20,000
Utilities - water	/1,000 gal	\$6	60	\$400
Internet and communication fees	month	\$200	12	\$2,400
Plant process monitoring	/ samples	\$250	120	\$30,000
Equipment repairs/replacement (10% of selected equipment capital cost)	LS	\$13,100	1	\$13,100
Anti-Scaling chemical	\$/drum	\$1,300	24	\$31,200
Instrumentation maintenance	month	\$500	12	\$6,000
Health and safety equipment	month	\$300	12	\$3,600
			Subtotal	\$520,000
Reporting (Monthly Status, Annual O&M Report)	LS	\$100,000	1	\$100,000
Engineering and Technical Support (10%)				\$52,000
Project Management (25%)				\$130,000
			Subtotal O&M Cost for Year 1 of Operation	\$802,000
		Contingency	20%	\$160,000
			Annual O&M Costs (year 1)	\$962,000
			Subtotal O&M Costs (year 1)	<b>\$962,000</b>
<u>Annual O&amp;M Costs (Years 2 - 6)</u>				
Operations Labor				
Operator (10 hours per week)	\$/hour	\$79	520	\$41,100
Operator (20 hours, twice a year for GAC changeout)	\$/hour	\$79	40	\$3,200
Operator (10 hours per month, troubleshooting)	\$/hour	\$79	120	\$9,500
Subcontractor support	month	\$1,000	12	\$12,000
General expenses	month	\$1,000	12	\$12,000
Utilities - plant electric (55 HP total, \$0.12/kw-hr)	\$/HP/year	\$1,000	55	\$55,000
Liquid Granular activated carbon (change out 2-5,000 lb units every 6 months)	\$/change-out	\$25,000	2	\$50,000
Injection discharge monitoring	/ samples	\$350	12	\$4,200
Air stripper cleaning (every 6 months)	LS	\$10,000	2	\$20,000
Recovery well cleaning / rehabilitation / re-development (every 2 years)	LS	\$12,000	3	\$36,000
Injection well cleaning / rehabilitation / re-development (every year)	LS	\$20,000	1	\$20,000
Utilities - water	/1,000 gal	\$6	60	\$400
Internet and communication fees	month	\$200	12	\$2,400
Plant process monitoring	/ samples	\$250	120	\$30,000
Equipment repairs/replacement (10% of selected equipment capital cost)	LS	\$13,100	1	\$13,100
Anti-Scaling chemical	\$/drum	\$1,300	24	\$31,200
Instrumentation maintenance	month	\$500	12	\$6,000
Health and safety equipment	month	\$300	12	\$3,600
			Subtotal	\$350,000



**PEOPLES GAS SYSTEM**  
**DOCKET NO. 160159-GU**  
**STAFF'S FOURTH DATA REQUEST**  
**FILED: JANUARY 13, 2017**  
**SUPPLEMENTED: JANUARY 19, 2017**

**Table D-2**  
Detailed Cost Estimate for Orlando Gasification Plant Site Operable Unit 2 (OU2)

Page 4 of 6

ITEMS	UNIT	UNIT PRICE	TOTAL UNITS	EXTENDED COST
Reporting (Monthly Status, Annual O&M Report)	LS	\$80,000	1	\$80,000
Engineering and Technical Support (10%)				\$35,000
Project Management (25%)				\$87,500
<i>Subtotal Annual O&amp;M Cost (years 2 - 6)</i>				\$552,500
<i>Contingency 20%</i>				\$111,000
<i>Annual O&amp;M Costs (year 2 - 6)</i>				\$664,000
<b>Subtotal O&amp;M Costs (years 2 - 6)</b>				<b>\$3,320,000</b>
<b>Annual O&amp;M Costs (Years 7 - 12)</b>				
<b>Operations Labor</b>				
Operator (10 hours per week)	\$/hour	\$79	520	\$41,100
Operator (20 hours, once a year for GAC changeout)	\$/hour	\$79	20	\$1,600
Operator (10 hours per month, troubleshooting)	\$/hour	\$79	120	\$9,500
Subcontractor support	month	\$1,000	12	\$12,000
General expenses	month	\$1,000	12	\$12,000
Utilities - plant electric (55 HP total, \$0.12/kw-hr)	\$/HP/year	\$1,000	55	\$55,000
Liquid Granular activated carbon (annual change out, 2-5,000 lb units)	\$/change-out	\$25,000	1	\$25,000
Injection discharge monitoring	/ samples	\$350	12	\$4,200
Air stripper cleaning (every 6 months)	LS	\$10,000	2	\$20,000
Recovery well cleaning / rehabilitation / re-development (every 2 years)	LS	\$12,000	3	\$36,000
Injection well cleaning / rehabilitation / re-development (every year)	LS	\$20,000	1	\$20,000
Utilities - water	/1,000 gal	\$6	60	\$400
Internet and communication fees	month	\$200	12	\$2,400
Plant process monitoring	/ samples	\$250	120	\$30,000
Equipment repairs/replacement (10% of selected equipment capital cost)	LS	\$13,100	1	\$13,100
Anti-Scaling chemical	\$/drum	\$1,300	24	\$31,200
Instrumentation maintenance	month	\$500	12	\$6,000
Health and safety equipment	month	\$300	12	\$3,600
<i>Subtotal</i>				\$323,000
Reporting (Monthly Status, Annual O&M Report)	LS	\$80,000	1	\$80,000
Engineering and Technical Support (10%)				\$32,300
Project Management (25%)				\$80,800
<i>Subtotal Annual O&amp;M Cost (years 7 - 12)</i>				\$516,100
<i>Contingency 20%</i>				\$103,000
<i>Annual O&amp;M Costs (year 7 - 12)</i>				\$619,000
<b>Subtotal O&amp;M Costs (years 7 - 12)</b>				<b>\$3,714,000</b>
<b>Total P&amp;T 12-year O&amp;M Cost</b>				<b>\$7,996,000</b>
<b>Groundwater Monitoring Costs</b>				
<b>Year 1</b>				
<b>5 Groundwater Monitoring (Quarterly)</b>				
Analytical (28 wells, 4 QA/QC per event)	well	\$300	32	\$9,600
Sampling expenses (28 wells)	well	\$100	28	\$2,800
Hydraulic monitoring (33 wells)	well	\$30	33	\$1,000
Field expenses	LS	\$3,000	1	\$3,000
Labor (2 men, 50 hours each man, per event)	\$/hour	\$90	100	\$9,000
<i>Subtotal (per event)</i>				\$25,400
<i>Events per year</i>				4
<i>Subtotal (annual)</i>				\$101,600
Quarterly Data Submittal	LS	\$2,500	3	\$7,500
Annual Report and Technical Support	LS	\$40,000	1	\$40,000
Project Management	LS	\$50,000	1	\$50,000
<i>Subtotal</i>				\$199,100
<i>Contingency 20%</i>				\$39,820
<i>Annual Monitoring Costs (years 1)</i>				\$239,000
<b>Subtotal Groundwater Monitoring Costs (years 1)</b>				<b>\$239,000</b>



**Table D-2**  
Detailed Cost Estimate for Orlando Gasification Plant Site Operable Unit 2 (OU2)

ITEMS	UNIT	UNIT PRICE	TOTAL UNITS	EXTENDED COST
<b>Years 2 - 14</b>				
5 Groundwater Monitoring (Semiannual)				
Analytical (28 wells, 4 QA/QC per event)	well	\$300	32	\$9,600
Sampling expenses (28 wells)	well	\$100	28	\$2,800
Hydraulic monitoring (33 wells)	well	\$30	33	\$1,000
Field expenses	LS	\$3,000	1	\$3,000
Labor (2 men, 50 hours each man, per event)	\$/hour	\$90	100	\$9,000
		<i>Subtotal (per event)</i>		<u>\$25,400</u>
	<i>Events per year</i>		2	
	<i>Subtotal (annual)</i>			<u>\$50,800</u>
Monitoring well replacement (1 well every 2 years)	LS	\$40,000	0.5	\$20,000
Semi-Annual Data Submittal	LS	\$2,500	1	\$2,500
Annual Report and Technical Support	LS	\$30,000	1	\$30,000
Project Management	LS	\$50,000	1	\$50,000
		<i>Subtotal</i>		<u>\$153,300</u>
		<i>Contingency</i>	20%	\$30,660
		<i>Annual Monitoring Costs (years 2 - 14)</i>		<u>\$184,000</u>
		<i>Subtotal Groundwater Monitoring Costs (years 2 - 14)</i>		<u>\$2,392,000</u>
<b>Years 15 - 30</b>				
5 Groundwater Monitoring (Annual)				
Analytical (20 wells, 3 QA/QC per event)	well	\$300	23	\$6,900
Sampling expenses (20 wells)	well	\$100	20	\$2,000
Hydraulic monitoring (20 wells)	well	\$30	20	\$600
Field expenses	LS	\$3,000	1	\$3,000
Labor (2 men, 40 hours each man, per event)	\$/hour	\$90	80	\$7,200
		<i>Subtotal (per event)</i>		<u>\$19,700</u>
	<i>Events per year</i>		1	
	<i>Subtotal (annual)</i>			<u>\$19,700</u>
Monitoring well replacement (1 well every 2 years)	LS	\$40,000	0.5	\$20,000
Annual Report and Technical Support	LS	\$30,000	1	\$30,000
Project Management	LS	\$40,000	1	\$40,000
		<i>Subtotal</i>		<u>\$109,700</u>
		<i>Contingency</i>	20%	\$21,940
		<i>Annual Monitoring Costs (years 15 - 30)</i>		<u>\$132,000</u>
		<i>Subtotal Groundwater Monitoring Costs (years 15 - 30)</i>		<u>\$2,112,000</u>
		<i>Total OU2 Groundwater Monitoring Costs (Years 0 - 30)</i>		<u>\$4,743,000</u>
<b>System Decommissioning Cost</b>				
Recovery/injection well abandonment	\$/ft	\$30	1,830	\$55,000
P&T equipment dismantling and disposal	LS	\$60,000	1	\$60,000
Monitor well abandonment	\$/ft	\$15	6,185	\$93,000
		<i>Subtotal</i>		<u>\$208,000</u>
		<i>Contingency</i>	20%	\$41,600
		<i>Total Decommissioning Cost</i>		<u>\$250,000</u>
<b>Five Year Review Costs</b>				
Five Year Project Reviews	LS	\$60,000	6	\$360,000
		<i>Total OU2 Five Year Review Costs (Years 0 - 30)</i>		<u>\$360,000</u>



**Table D-2**  
Detailed Cost Estimate for Orlando Gasification Plant Site Operable Unit 2 (OU2)

ITEMS	UNIT	UNIT PRICE	TOTAL UNITS	EXTENDED COST
Total Capital Cost				\$5,800,000
Total O&M Cost				\$13,349,000
Total Project Cost				\$19,149,000
<b>Assumptions</b>				
1 Institutional controls restricting installation of groundwater wells.				
2 Includes access agreements, right of way permits, construction permits, maintenance of traffic planning, and UIC permit.				
3 Assumes monthly rental of three vapor-phase GAC vessel (\$1000/month/vessel).				
4 Includes design and reports required for CERCLA (RD Work Plan, 80% RD Report, 90% RD Report, 100% RD Report, and associated Remedial Action Work Plans.				
5 IDW from groundwater sampling will be discharged to OU2 groundwater treatment plant.				

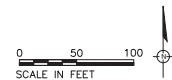




1. SURFACE SOIL SAMPLES WITH "SSI" PREFIX WERE COLLECTED IN 1990 AND NOT SURVEYED INTO THE EXISTING SITE CIVIL BASE MAP. THE 1990 SURFACE SOIL SAMPLE LOCATIONS ARE APPROXIMATE BASED ON HISTORICAL REPORT MAPS.

2. DASHED LINE ON EAST SIDE OF S4 INDICATES THAT THE EASTERN LIMIT OF THE SURFACE SOIL AREA WILL BE DETERMINED DURING PRE-DESIGN WORK.

<u>AREA (sq. ft.)</u>	<u>DEPTH</u>	<u>CU. YDS.</u>	<u>TONS</u>
S1 = 74,576	2 ft.	5,524	7,734
S2 = 90,734	2 ft.	6,721	9,409
S3 = 16,914	2 ft.	1,253	1,754
S4 = 621	1.5 ft.	34.5	48.3

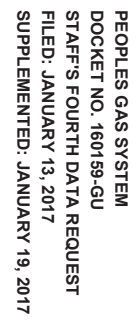


ORLANDO GASIFICATION SITE  
600 W. ROBINSON ST., ORLANDO FLORIDA  
**2017 TECO RESERVES COST ESTIMATE**

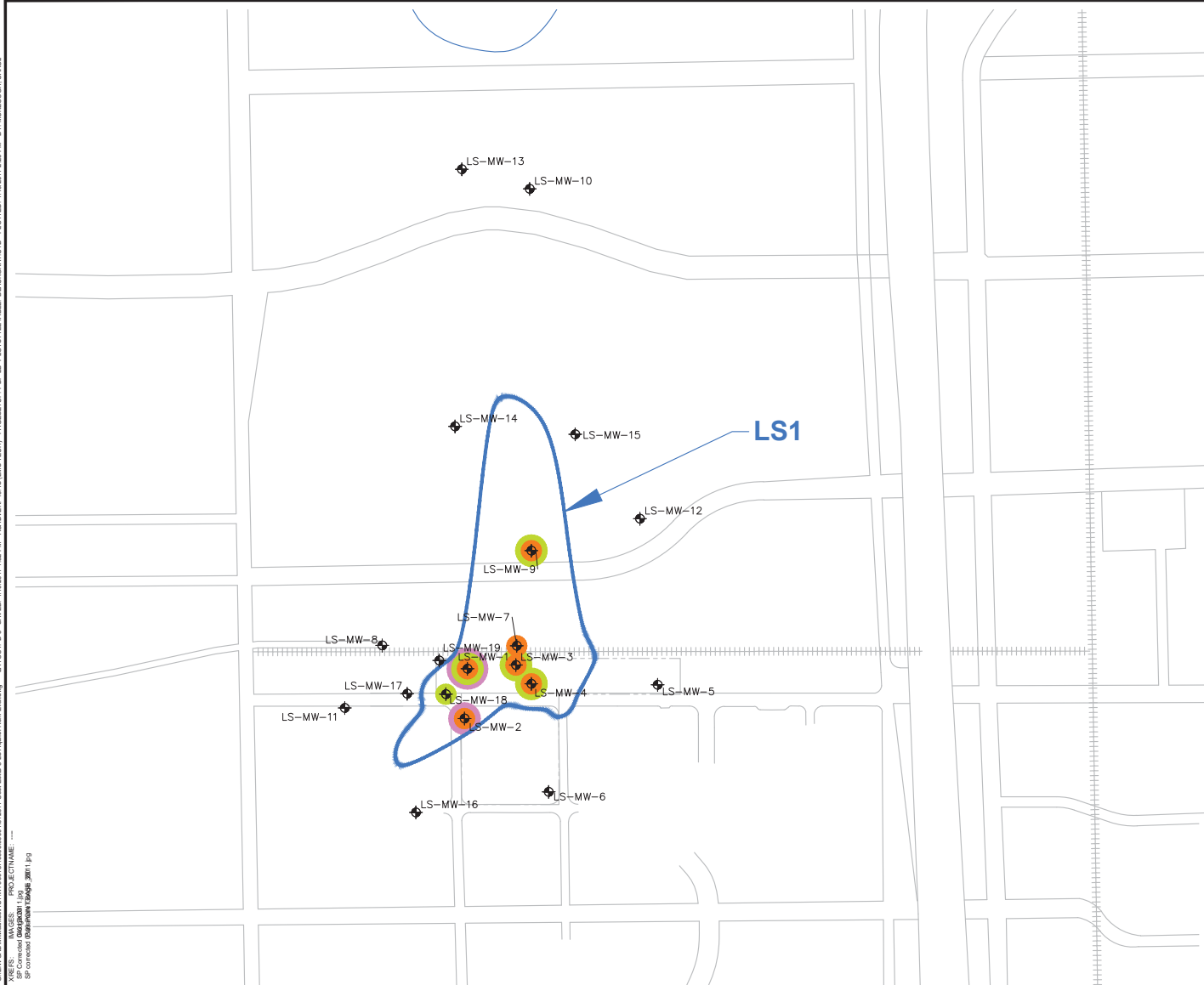
## SURFACE SOIL REQUIRING REMEDIAL EVALUATION

FIGURE  
D-1









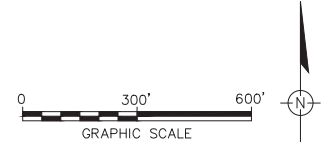
# LEGEND

- MONITORING WELL
- INDICATES EXCEEDANCE OF GROUNDWATER PRG FOR AT LEAST ONE VOC
- INDICATES EXCEEDANCE OF GROUNDWATER PRG FOR AT LEAST ONE PAH
- INDICATES EXCEEDANCE OF GROUNDWATER PRG FOR AT LEAST ONE METAL
- AREA OF LOWER SURFICIAL AQUIFER GROUNDWATER REQUIRING REMEDIAL EVALUATION

AREA (sq. ft.)  
 LS1 = 324,848

## NOTES

1. BENZENE CONCENTRATION DETECTED IN WELL LS-MW-16 IS ATTRIBUTED TO OTHER BENZENE SOURCES LOCATED SOUTH OF THE FORMER MGP SITE, AND IS THEREFORE NOT INCLUDED IN THE AREA FOR REMEDIAL EVALUATION.
2. LS = LOWER SURFICIAL.
3. LOCATION OF LS1 IS BASED ON PERMANENT MONITORING WELL DATA AND TEMPORARY GROUNDWATER SCREENING RESULTS; COMPLETE SET OF DATA PROVIDED IN APPENDIX E.



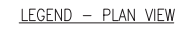
ORLANDO GASIFICATION SITE  
 600 W. ROBINSON ST., ORLANDO FLORIDA  
 2017 TCO RESERVES COST ESTIMATE









## LOWER SURFICIAL AQUIFER GROUNDWATER REQUIRING REMEDIAL EVALUATION



FIGURE  
 D-3





- |   |   |
|---|---|
|  | PARCEL BOUNDARY   |
|  | COMBINATION OF ENGINEERING / INSTITUTIONAL CONTROLS AND EXCAVATION / DISPOSAL OF SURFACE SOILS (0-2 FEET BELOW LAND SURFACE)                |
|  | COMBINATION OF EXCAVATION/DISPOSAL OF SURFACE SOILS TO 2 FEET BELOW LAND SURFACE AND INSTALLATION OF LOW PERMEABILITY COVER, WHERE REQUIRED |
|  | EXCAVATION AND OFF-SITE DISPOSAL OF TAR WELL AND SOILS TO 6 FEET BELOW LAND SURFACE   |
|  | ISS CONTAINMENT WALL APPROXIMATE LOCATION   |
|  | EXCAVATION OR ISS OF MOBILE NAPL TO 16 FEET BELOW LAND SURFACE  |
|  | NO SOIL EXCAVATION TO BE PERFORMED, EXCEPT AS NECESSARY TO ACCOMMODATE UTILITY RELOCATION AND ISS CONTAINMENT WALL INSTALLATION             |
|  | EXCAVATION OF SURFACE SOILS TO 1.5 FEET BELOW LAND SURFACE WITH BACKFILL AND RESTORATION TO GRADE   |

## REMEDIAL ALTERNATIVE 8 ACTIVITIES

- INSTITUTIONAL AND ENGINEERING CONTROLS.
- EXCAVATION AND OFF-SITE DISPOSAL OF SURFACE SOILS WITHIN ISS CONTAINMENT WALL EXTENTS LOCATED NORTH OF WEST ROBINSON STREET.
- PARCELS 3, 4, AND 5 – EXCAVATE EXPOSED SURFACE NON-HARDSCAPE SOILS.
- PARCEL 6 – EXCAVATE EXPOSED SURFACE NON-HARDSCAPE SOILS.
- INSTALLATION OF ISS CONTAINMENT WALL TO WITHIN TOP OF HAWTHORN GROUP TO ENCAPSULATE THE GROUNDWATER "SOURCE AREA" AND ELAVATED DISSOLVED IMPACTS TO THE WEST OF THE "SOURCE AREA."
- IN-SITU ENHANCED BIODEGRADATION (ISB) AND/OR MONITORED NATURAL ATTENUATION FOR DISSOLVED GROUNDWATER PLUME NORTH OF THE ISS CONTAINMENT WALL, BASED ON APPROXIMATELY 3 YEARS OF POST-CONSTRUCTION GROUNDWATER MONITORING.
- PARCEL 3 BUILDING AREA TO BE EVALUATED DURING REMEDIAL DESIGN INVESTIGATION AND TO BE INCLUDED WITHIN AREA FOR EXCAVATION AND/OR ISS OF MOBILE NAPL, IF MOBILE NAPL IS FOUND TO BE PRESENT.



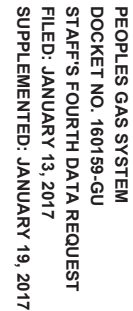
ORLANDO GASIFICATION SITE  
600 W. ROBINSON ST., ORLANDO FLORIDA  
**2017 TECO RESERVES COST ESTIMATE**

## REMEDIAL ALTERNATIVE 8 CONCEPTUAL LAYOUT

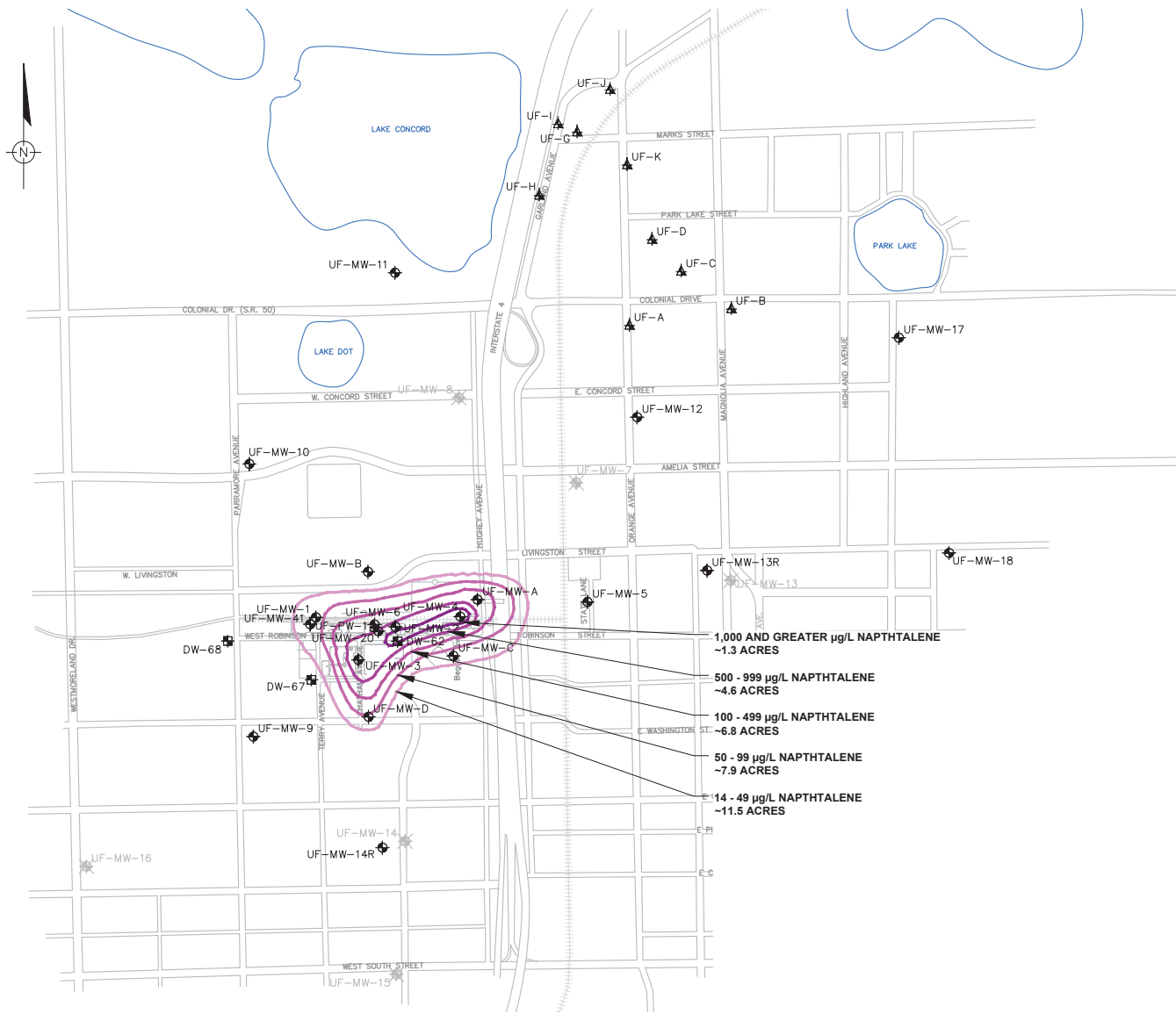


FIGURE  
**D-4**







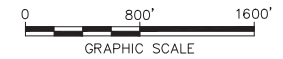


#### LEGEND

- SITE MONITORING WELL
- ABANDONED MONITORING WELL
- DRAINAGE WELL
- NDOS MONITORING WELL
- SOIL BORING
- NAPHTHALENE 14 - 49 µg/L
- NAPHTHALENE 50 - 99 µg/L
- NAPHTHALENE 100 - 499 µg/L
- NAPHTHALENE 500 - 999 µg/L
- NAPHTHALENE <1,000 µg/L

#### NOTES

1. NAPHTHALENE ISOPLETHS ARE BASED ON GROUNDWATER RESULTS FROM UPPER FLORIDAN AQUIFER MONITORING WELLS SCREENED BETWEEN 200 AND 250 FEET BELOW LAND SURFACE.
2. WELL UF-MW-13 WAS ABANDONED IN 2012 DUE TO CONSTRUCTION.
3. NDOS - NORTHERN DOWNTOWN ORLANDO SITE.



ORLANDO GASIFICATION SITE 600 W. ROBINSON ST., ORLANDO FLORIDA 2017 TCO RESERVES COST ESTIMATE	
<b>NAPHTHALENE ISOPLETH-BASED AREAS          (NOVEMBER 2013)</b>	
	FIGURE <b>D-6</b>



## APPENDIX E

Ocala



**Table E-1**  
Detailed Cost Estimate for West Florida Natural Gas Company Site (Ocala Former MGP)

Page 1 of 4

**Alternative Summary: Institutional Controls, Extending & Maintaining Existing Concrete Cover for 30 years, Enhanced Aerobic Bioremediation via Sock Wells, and Natural Attenuation Monitoring**

Date Created 12/2009 Updated by: A. Cardoso  
Date Last Revised 12/20/2016 Reviewed by:

**Project Summary**

Pre-Feasibility studies have been completed from 2012 through 2015. Revised Feasibility Study to be submitted in 2017

Institutional controls. Maintaining existing fence, gate, and signs for 30 years

Extending existing concrete cover by approximately 25,000 s.f. and maintaining the concrete cover for 30 years

Baseline monitoring event will include sampling of seven onsite monitor wells for BTEX, PAHs, and arsenic

Two, 6-inch diameter oxygen delivery wells will be installed to 80 ft bls, with 40 ft of 0.010-inch slotted PVC well screens

Three, 6-inch diameter oxygen delivery wells will be installed to 160 ft bls, with 100 ft of 0.010-inch slotted PVC screens

Sock canisters containing ORC® or equivalent slow release oxygen source will be installed in each monitor well

Each sock will be 4-inches in diameter and approximately 12-inches long

The socks will be installed in 4-inch diameter, 10-foot long canisters stacked on top of each other

The canisters will be pulled out of the wells and the socks will be replaced on a semi-annual basis for five years

Sock remediation monitoring includes sampling of four monitoring well locations on a quarterly basis during the first year and

semi-annually thereafter for six additional years

NAM includes sampling of 10 onsite monitor wells on a quarterly basis for one year (Year 1), semi-annual basis for four years

(Years 4-5), and annually thereafter for 25 years (Years 6-30)

Items	Unit	Unit Cost	Quantity	Cost
<b>ADMINISTRATIVE COSTS</b>				
<b>CAPITAL COSTS</b>				
1 Finalize Feasibility Study Report /Agency Negotiations	LS	\$75,000	1	\$75,000
Proposed Plan & ROD	LS	\$25,000	1	\$25,000
USEPA Oversight	LS	\$180,000	1	\$180,000
Subtotal Capital Costs				280,000
Contingency (20%)				56,000
<b>Total Capital Costs</b>				<b>336,000</b>
<b>REMEDY IMPLEMENTATION</b>				
<b>CAPITAL COSTS</b>				
2 Institutional Controls	LS	\$10,000	1	\$10,000
3 Baseline Groundwater Sampling	\$/well/event	\$1,000	12	12,000
4 Installation of Oxygen Delivery Wells	\$/LF	\$200	640	\$128,000
5 Disposal of IDW	\$/drum	\$150	128	\$19,200
6 Fabrication of PVC Canisters	\$/LF	\$20	380	\$7,600
7 ORC® (or equivalent) Cost	\$/lb	\$15	1,455	\$21,827.07
Subtotal Capital Costs				\$198,627
USEPA Oversight	LS	\$100,000	2	\$200,000
8 Reporting	LS	\$100,000	1	\$100,000
Onsite Construction Management (15%)				\$29,794
Engineering and Technical Support (15%)				\$29,794
Project Management (15%)				\$29,794
Total Capital Cost				\$588,009
Contingency (20%)				\$117,602
<b>Total Capital Costs</b>				<b>\$705,611</b>



**Table E-1**  
Detailed Cost Estimate for West Florida Natural Gas Company Site (Ocala Former MGP)

Page 2 of 4

Items	Unit	Unit Cost	Quantity	Cost
<b>OMM COSTS (Site Maintenance)</b>				
Maintaining fence, gate and signs	\$/year	\$2,500	1	\$2,500
9 Annual concrete cover inspection and maintenance	\$/year	\$5,000	1	\$5,000
USEPA oversight costs	\$/year	\$8,000	1	\$8,000
			Subtotal	\$15,500
Reporting (25%)				\$3,875
Project Management (25%)				\$3,875
			Annual O&M Cost	\$23,250
			Contingency (20%)	\$4,650
<b>Total Annual Site O&amp;M Cost</b>				<b>\$27,900</b>
<b>Total 30-Year Site O&amp;M Cost</b>				<b>\$837,000</b>
<b>OMM COSTS (Sock Well Maintenance)</b>				
Semi-Annual Oxygen Sock Replacement				
10 Labor	\$/hr	\$85	48	\$4,080
11 Field Expenses	\$/event	\$2,500	1	\$2,500
12 ORC® (or equivalent) Costs	\$/lb	\$15	1,455	\$21,827.07
			Subtotal Cost	\$28,407
Engineering and Technical Support (25%)				\$7,102
Project Management (25%)				\$7,102
			Semi-Annual Sock O&M Cost	\$42,611
			Contingency (20%)	\$8,522
<b>Total Semi-Annual Oxygen Sock O&amp;M Cost</b>				<b>\$51,133</b>
<b>Total Annual Oxygen Sock O&amp;M Cost</b>				<b>\$102,265.45</b>
<b>Total Five Year Oxygen Sock O&amp;M Cost</b>				<b>\$511,327</b>
<b>OMM COSTS (Sock Well Monitoring)</b>				
Labor (13)	\$/hr	\$85	20	\$1,700
Expenses (14)	\$/event	\$1,000	1	\$1,000
Analytical Costs (15)	\$/sample	\$500	4	\$2,000
			Subtotal Cost	\$4,700
Reporting	LS	\$2,500	1	\$2,500
Engineering and Technical Support (15%)				\$705
Project Management (25%)				\$1,175
			Subtotal Cost per Monitoring Event	\$9,080
			Contingency (20%)	\$1,816
OMM costs Per Event				\$10,896
OMM costs for Year 1 (4 events total)				\$43,584
OMM costs for Years 2 through 7 (12 events total)				\$130,752
<b>Total Seven Year Sock Remediation Monitoring Costs</b>				<b>\$174,336</b>



**Table E-1**  
Detailed Cost Estimate for West Florida Natural Gas Company Site (Ocala Former MGP)

Page 3 of 4

Items	Unit	Unit Cost	Quantity	Cost
<b>OMM COSTS (NAM)</b>				
13 Labor	\$/hr	\$85	30	\$2,550
14 Expenses	\$/event	\$1,000	1	\$1,000
15 Analytical Costs	\$/sample	\$500	10	\$5,000
			Subtotal Cost	\$8,550
USEPA Oversight	LS	\$5,000	1	\$5,000
Reporting	LS	\$2,500	1	\$2,500
Engineering and Technical Support (15%)				\$1,283
Project Management (25%)				\$2,138
			Subtotal Cost per Monitoring Event	\$19,470
			Contingency (20%)	\$3,894
NAM costs Per Event				\$23,364
NAM costs for Year 1 (4 events total)				\$93,456
NAM costs for Years 2 through 5 (8 events total)				\$186,912
NAM costs for Years 6 through 30 (25 events total)				\$584,100
<b>Total 30-Year NAM Costs</b>				<b>\$864,468</b>
Five Year Project Review	\$/each	\$10,000	6	\$60,000
<b>Total Project OMM Costs</b>				<b>\$2,447,131</b>
<b>Total Capital Cost</b>				<b>\$1,042,000</b>
<b>Total O&amp;M Cost</b>				<b>\$2,447,000</b>
<b>Total Project Cost</b>				<b>\$3,489,000</b>

Source	Year	Inflation Index	Total Capital Cost	Total O&M Cost	Total Project Cost
Arcadis Inflation Model	2010	1.0127	\$1,055,233	\$2,478,077	\$3,533,310
Arcadis Inflation Model	2011	1.0207	\$1,077,077	\$2,529,373	\$3,606,450
Arcadis Inflation Model	2012	1.0186	\$1,097,110	\$2,576,419	\$3,673,530
Arcadis Inflation Model	2013	1.0159	\$1,114,554	\$2,617,385	\$3,731,939
Arcadis Inflation Model	2014	1.0209	\$1,137,849	\$2,672,088	\$3,809,936
Arcadis Inflation Model	2015	1.0181	\$1,158,444	\$2,720,453	\$3,878,896
Arcadis Inflation Model	2016	1.0308	<b>\$1,194,124</b>	<b>\$2,804,243</b>	<b>\$3,998,366</b>



**Table E-1**  
Detailed Cost Estimate for West Florida Natural Gas Company Site (Ocala Former MGP)

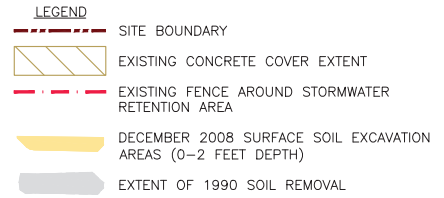
Page 4 of 4

Items	Unit	Unit Cost	Quantity	Cost
<b>Footnotes</b>				
1	Pre-Feasibility study includes costs for contractors, University of Waterloo, and outside consultants			
2	Institutional controls restricting the use to commercial/industrial purposes, maintenance of engineering controls, adherence to soil management plan, and prohibiting use of onsite groundwater			
3	Event includes groundwater sampling for BTEX, PAHs, arsenic.			
4	Two, 6-inch diameter oxygen delivery wells will be installed to 80 ft bls, with 40 ft of 0.010-inch slotted PVC well screens. Three, 6-inch diameter monitor wells will be installed to 160 ft bls, with 100 ft of 0.010-inch slotted PVC well screens			
5	Assumes off-site disposal of investigation derived waste (IDW) as non-hazardous material			
6	PVC canisters will be fabricated using 10 feet of 4-inch diameter schedule 40 PVC, 0.010-inch slotted well screen			
7	ORC® (or equivalent ) in the form of foot long socks. Approximately 3.85 lbs of ORC® (or equivalent ) per linear feet of well screen.			
8	Includes Remedial Design (RD) Work plan, Sampling/ Analysis Plan, Remedial Design			
9	Annual inspection by a Florida PE and repairs to the concrete cover as necessary			
10	Includes 2 personnel X 12 hrs per day X 2 days for field prep/mobilization/demobilization. Work includes removal of spent ORC® socks, cleaning of PVC canisters and installation of fresh ORC® socks in five Sock wells			
11	Includes field vehicle, meals, lodging, PPE, lifting winch/tripod and expendables			
12	Approximately 1,455lb of ORC® (or equivalent ) will be consumed during a 6-month period			
13	Event includes groundwater sampling from four monitor wells for BTEX, PAHs and Arsenic. Includes 1-person X 12 hrs per day X 2 days for field prep, mobilization/ demobilization and sampling of four wells			
14	Includes field vehicle, cell phone, lodging, meals, PPE and groundwater sampling equipment			
15	Analysis includes BTEX by USEPA Method 8260, PAHs by Method 8270 and Arsenic by Method 200.7			

**List of Acronyms**

ICs - Institutional controls  
ORC® - Oxygen Release Compound manufactured by FMC Corporation  
IDW - Investigation derived waste  
PVC - poly vinyl chloride  
BTEX - benzene, toluene, ethyl benzene and total xylenes  
PAH - polycyclic aromatic hydrocarbons  
USEPA - United States Environmental Protection Agency  
s.f - square feet  
PE - Professional Engineer  
ARM - active remediation monitoring  
NAM - natural attenuation monitoring  
O&M - operation and maintenance  
OMM - operation maintenance and monitoring costs





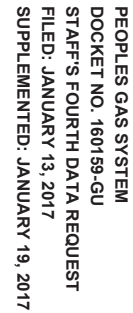
1. SOURCE: BASE MAP '2002 SAMPLE LOCATIONS AND CROSS-SECTION LOCATIONS' (2002 C-SECT LOC.DWG) PROVIDED BY 'JACQUES WHITFORD COMPANY, INC.' MAP DATE 11/01/02, SCALE 1"=40'.



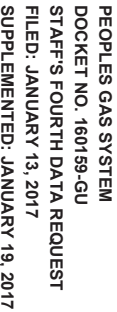
**ARCADIS** | Engineering & Technology  
Environment & Infrastructure  
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FIGURE  
**E-1**

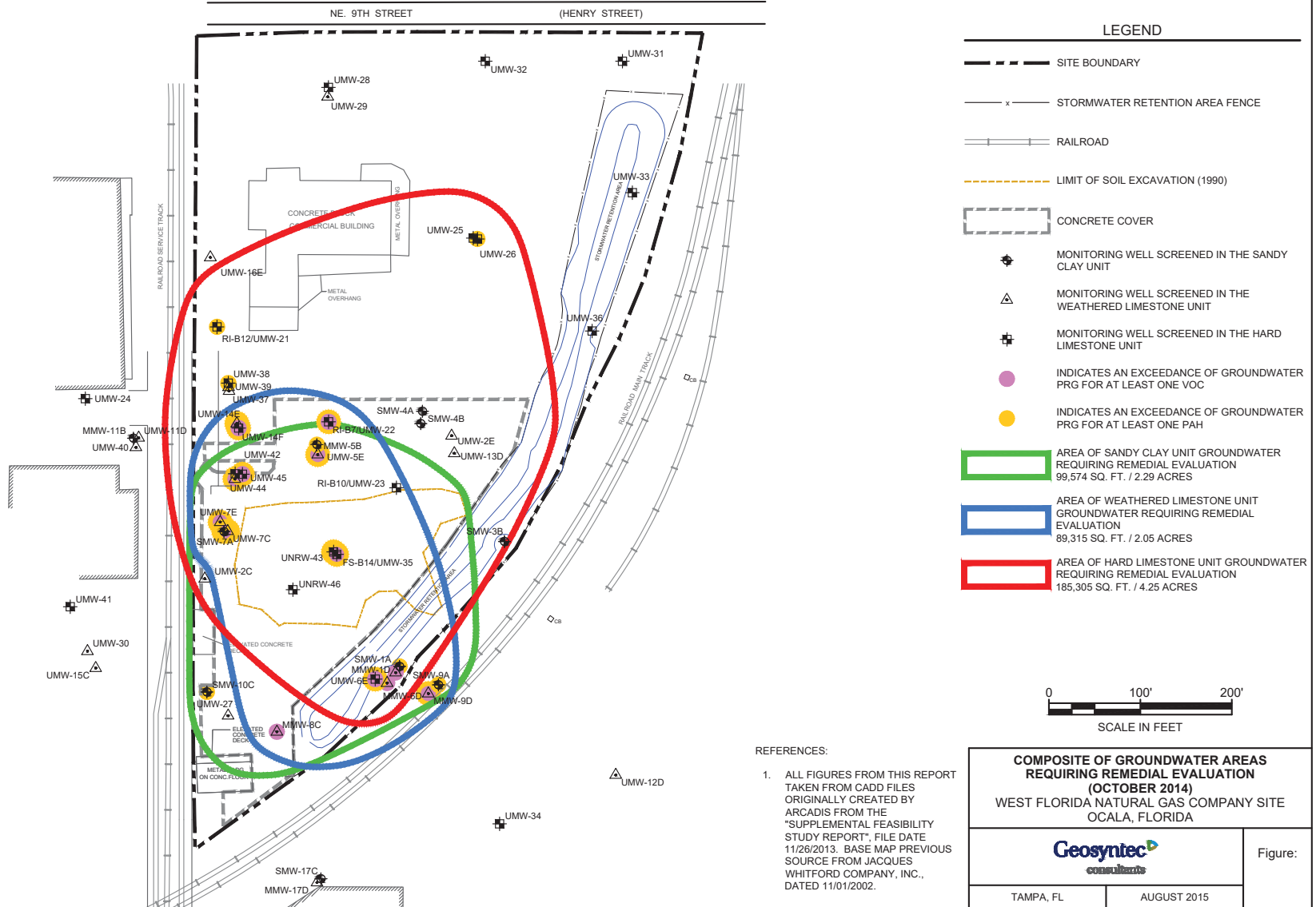














# APPENDIX F

Jacksonville





**Table F-1**  
Detailed Cost Estimate for Former Jacksonville MGP Site

Page 1 of 2

**Former Jacksonville MGP Site**

Date Created: 12/14/2015 Updated by: A. Cardoso  
Date Last Revised: 12/21/2016 Reviewed by:

**Project Summary**

Soil excavation of surface soil exceeding commercial/industrial criteria.

Long-term MNA will be used to treat residual groundwater impacts

Assumes institutional controls to restrict land use to commercial/industrial and prohibit installation of water supply wells

Items	Unit	Unit Price	No. of Units	Extended Cost
<b>Capital Cost - Common Components</b>				
Remedial Action Plan	LS	\$60,000	1	\$60,000
Institutional controls	LS	\$50,000	1	\$50,000
			<i>Subtotal</i>	\$110,000
		<i>Contingency</i>	20%	\$22,000
<b>Total Capital Cost for Common Components</b>				<b>\$132,000</b>
<b>Operation and Maintenance (O&amp;M) Costs</b>				
Annual inspection costs	LS	\$3,000	1	\$3,000
Reporting	LS	\$5,000	1	\$5,000
Program management	LS	\$2,000	1	\$2,000
			<i>Subtotal for Engineering Controls</i>	\$10,000
		<i>Contingency</i>	20%	\$2,000
<b>Total Annual O&amp;M Cost for Institutional Controls</b>				<b>\$12,000</b>
<b>Total 30-year O&amp;M Cost</b>				<b>\$360,000</b>
<b>Capital Cost - Excavation</b>				
Mobilization/Demobilization	LS	\$65,000	1	\$65,000
Site surveying and utility locate	LS	\$30,000	1	\$30,000
Permitting	LS	\$25,000	1	\$25,000
Decontamination pad	LS	\$20,000	1	\$20,000
Air monitoring, odor control, dust control	Month	\$55,000	1.5	\$82,500
Excavation of surface unsaturated soils (~3 ft bls)	CY	\$26	145	\$3,770
Material Handling & Logistics	CY	\$8	145	\$1,160
T&D of Non-Hazardous Soil (Assumes 100% of Total Volume)	Tons	\$55	218	\$11,962.50
Furnish and place non-woven geotextile	SY	\$4	1,220	\$4,880
Surface Restoration	SY	\$28	1,220	\$34,160
Waste characterization sampling and analysis	LS	\$6,000	3	\$18,000
			<i>Subtotal</i>	\$296,000
As-built Report	LS	\$60,000	1	\$60,000
On-Site Construction Management	%	10%	1	\$30,000
Design and Technical Support	%	10%	1	\$30,000
Project Management	%	8%	1	\$24,000
			<i>Subtotal of Capital Costs</i>	\$440,000
		<i>Contingency</i>	20%	\$88,000
<b>Total Capital Cost for Excavation</b>				<b>\$528,000</b>

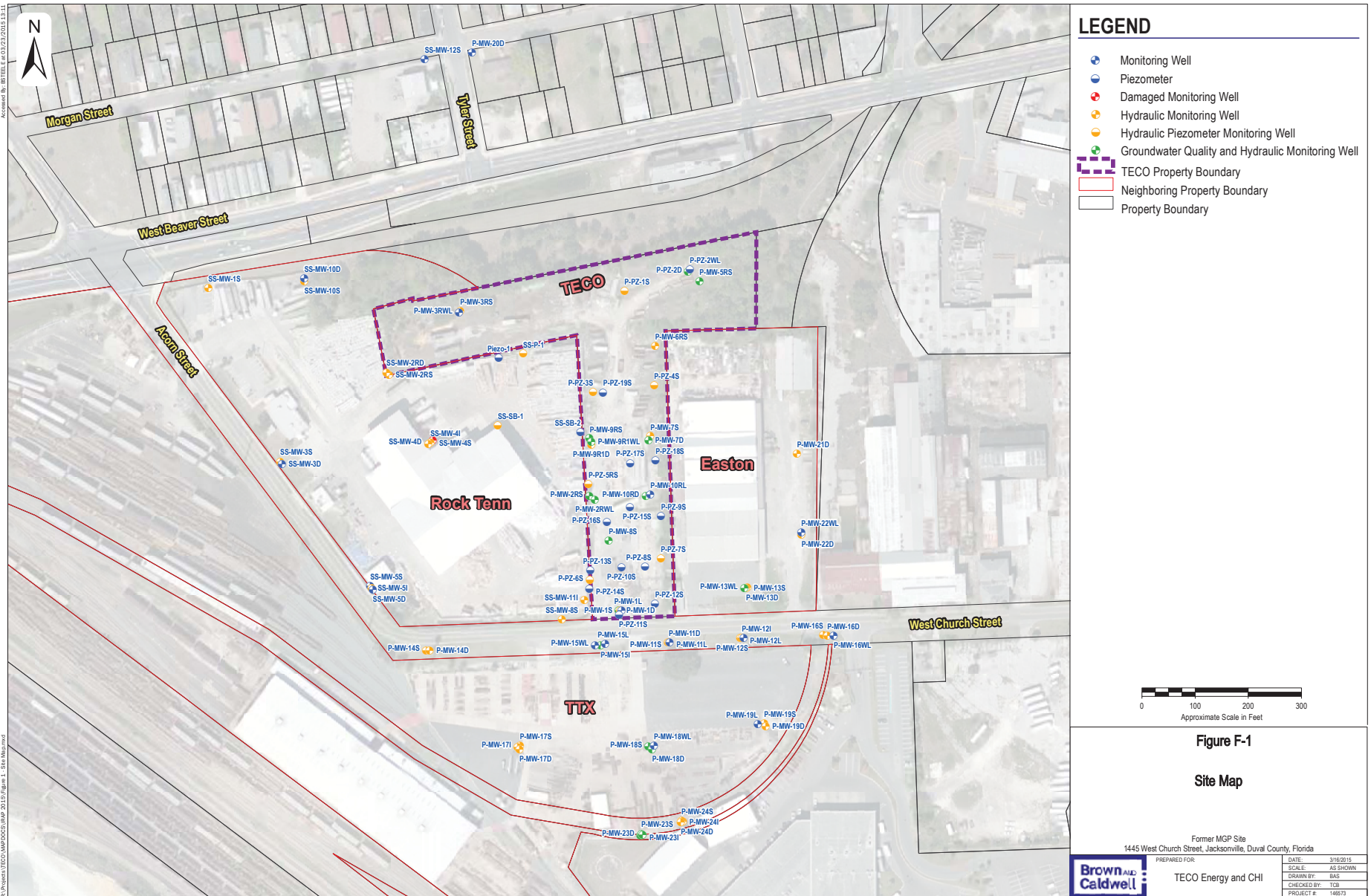


**Table F-1**  
Detailed Cost Estimate for Former Jacksonville MGP Site

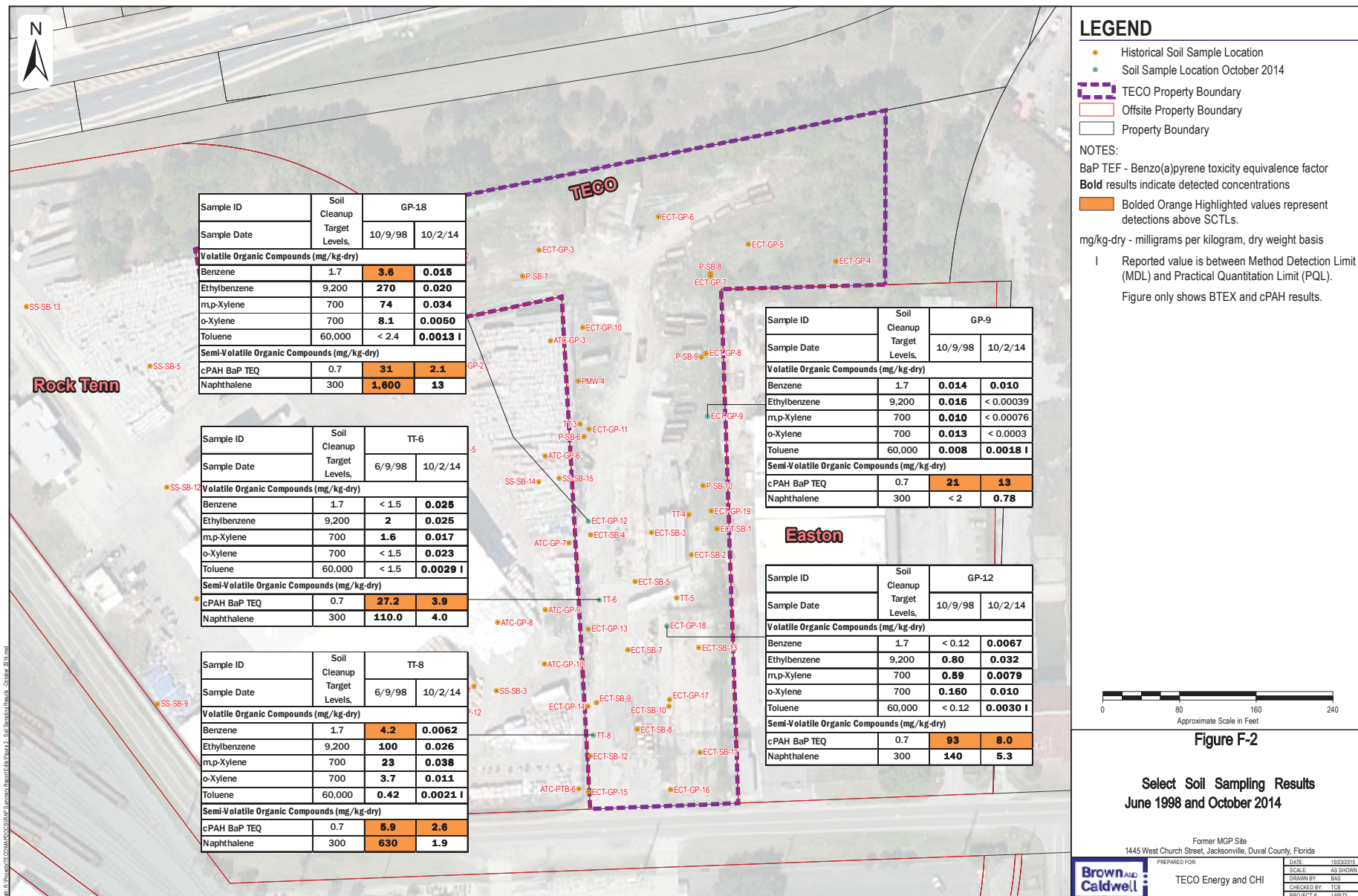
Page 2 of 2

Items	Unit	Unit Price	No. of Units	Extended Cost
<b>Groundwater Monitoring Costs</b>				
<i>Year 1</i>				
Groundwater Monitoring Event (Quarterly)	\$/event	\$18,000	4	\$72,000
Reporting	LS	\$10,000	1	\$10,000
Project Management	LS	\$10,000	1	\$10,000
			<i>Subtotal</i>	\$92,000
			<i>Contingency (20%)</i>	\$18,400
			<i>Annual Monitoring Costs (year 1)</i>	\$110,400
<i>Years 2 -30</i>				
Groundwater Monitoring Event (Semiannual)	\$/event	\$18,000	2	\$36,000
Reporting	LS	\$8,000	1	\$8,000
Project Management	LS	\$6,000	1	\$6,000
			<i>Subtotal</i>	\$50,000
			<i>Contingency (20%)</i>	\$10,000
			<i>Annual Monitoring Costs (years 2-30)</i>	\$60,000
<b>Total Groundwater Monitoring Costs</b>				<b>\$1,850,000</b>
<b>Total Capital, O&amp;M and Groundwater Monitoring Costs</b>				
<b>Total Capital Costs</b>				<b>\$660,000</b>
<b>Total OM&amp;M Costs</b>				<b>\$2,210,000</b>
<b>TOTAL PROJECT COST</b>				<b>\$2,870,000</b>
Source (Year)	Inflation Index	Total Capital Cost	Total OM&M Cost	Total Project Cost
Arcadis Inflation Model (2016)	1.0308	\$680,328	\$2,278,068	\$2,958,396














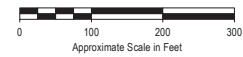








-  Monitoring Well  
 Piezometer  
 Groundwater Quality and Hydraulic Monitoring Well  
 TECO Property Boundary  
 Neighboring Property Boundary  
 Property Boundary  
 \* Duplicate sample collected from P-MW-2RWL  
 micrograms per liter  
 Value is estimated  
 Concentration exceeds Groundwater Cleanup Target Level (GCTL)
- Bolded values represent a detection or a non-detect whose MDL is above the GCTLs  
 1 Listed as "Primary Standard" corresponding to the numerical standards listed in Chapter 62-550, F.A.C.  
 2 Listed as "Secondary Standard" corresponding to the numerical standards listed in Chapter 62-550, F.A.C.  
 3 Listed as "Minimum Criteria" in 62-777, F.A.C.



**Figure F-3**

Groundwater Concentration Map  
August 2015

Former MGP Site  
1445 West Church Street, Jacksonville, Duval County, Florida



PREPARED FOR:  <div style="text-align: center; font-size: 24pt;">TECO Energy and CHI</div>	DATE:	10/23/2015
	SCALE:	AS SHOWN
	DRAWN BY:	BAS
	CHECKED BY:	TCB
	PROJECT #:	148573



