

City of Hallandale Beach Public Works
Attn: Aqeel Abdool-Ghany, P.E.
Assistant City Engineer
City of Hallandale Beach
630 NW 2nd Street
Hallandale Beach, FL 33009
Ph: 954-457-1616

Arcadis U.S., Inc.
1000 NW 57th Ct.
Suite 770
Miami, FL 33126
Phone: 786 384 7012

www.arcadis.com

Subject:

WATER

**Scope of Services – Lift Station No. 6 Rehabilitation Engineering, Services
During Construction and Post Construction Services**

Dear Mr. Abdool-Ghany,

Date:

April 16, 2021

At the request of the City of Hallandale Beach ("City"), Arcadis U.S., Inc. ("Arcadis") is pleased to submit this letter proposal to provide engineering services to the City for Lift Station (LS) No. 6 Rehabilitation.

Contact:

Dan Garcia, PE

1. Overview

Phone:

786.332.9494

1.1 Background & Project Objectives

Wastewater is collected throughout the City and pumped by wastewater lift stations to the City of Hollywood's sanitary sewer system. The condition of the wastewater transmission and collection system was recently assessed to identify areas of deficiency and/or infrastructure that is approaching the end of its useful life. Field investigations of the condition of major accessible features of the 15 City-owned wastewater lift stations were conducted previously by Hazen & Sawyer, and condition assessment results and recommendations for improvements were published in March 2018 in the City's Wastewater Master Plan. LS No. 6 was identified as requiring significant maintenance or having minor defects and deficiencies that should be addressed.

Email:

daniel.i.garcia@arcadis.com

Florida License Numbers

Engineering

7917

Geology

GB564

Surveying

LB7062

The City has requested Arcadis to furnish design, permitting coordination, bidding support, and services during construction (SDC) for the rehabilitation of LS No. 6 (the "Project"). This lift station repumps all flow from LS No. 5 to the E-6 / Funston Street meter location via three submersible pumps. The lift station was last refurbished in 1999.

The City's Wastewater Master Plan recommends replacing equipment that has reached or is nearing the end of its useful life and required to meet future capacity needs. Specific repair recommendations can be referenced in the Appendix (Lift Station Condition Evaluation) of the Master Plan. Planned new development in the City's wastewater service area will require capacity upgrades at nine of the City's 15 lift stations, including LS No. 6. The recommended pump upgrades required for LS No. 6 are listed in the Master Plan Appendix.

With the existing lift station structure past the end of its service life, it is recommended that the station be rebuilt to meet current and future demand per client requirements. The proposed work will be authorized as a task order under Agreement for RFP # FY 2018-2019-012 CONSULTANT COMPETITIVE NEGOTIATION ACT (CCNA) CONTINUING PROFESSIONAL ARCHITECTURAL AND ENGINEERING SERVICES AND OTHER SERVICES ("Agreement"), executed between the City and Arcadis on September 25, 2020. The terms and conditions of the referenced Agreement apply.

1.2 Design Concept

The following presents a summary of the City's requested general design concept:

- Modifications will be included to comply with City Vulnerability and Adaptation Plan.
- Recommended structural reconstruction will consist of partially demolishing the existing lift station and constructing new walls and top slab inside the exterior shell of the existing lift station; new 16" walls to be constructed inside the existing lift station, thereby eliminating need for deep temporary shoring for demolition of the existing lift station and construction of a new lift station; this approach will also reduce construction impacts to neighborhood.
- Existing top slab will be demolished, and new top slab will be constructed which will be 6" above existing grade.
- Back-up generator will be replaced; elevated aluminum platform to support the new generator and other electrical equipment to be supported by the new top slab and a new slab-on-grade; the top of the platform to be set at an elevation that is above the 100-year flood elevation, per City direction.
- New pumps will be selected based on updated wastewater model and planning horizon to be provided by City; pump size/type identified in the City's Wastewater Master Plan are specified as constant speed, submersible and 85 hp and will be verified by Arcadis during design.
- Pumps will be provided with pump-out capabilities.
- Soft starters are preferred; however variable frequency drives (VFDs) or other arrangements may be recommended to design for the range of flows.
- City prefers pump motors to be driven by reduced voltage soft starters (RVSS); the use of VFDs will also be evaluated during the design phase.
- Control panel replacement and upgrades, cellular radio communication, and SCADA Integration will be conducted via Systems Integrator (SI); instrumentation and control (I&C) upgrades to follow concept of prior instrumentation and control work conducted previously at LS No. 8, as provided by the City.
- Noise mitigation equipment will be installed.
- Power distribution scheme will be provided, including 480V distribution panel, step-down transformer, and 120V distribution panel.
- New wet well dimensions will be sized to meet future capacity needs, as per City direction.
- Protective coating of interior surfaces of the wet well will be provided.

- Channel grinder will be provided for lift station.
- Additional site lighting for lift station will be included; the City prefers directed site lighting to reduce light pollution in neighborhood.
- New fencing will be included with a minimum height of 8 ft with same slat style as existing; additional screening to be determined during design.
- Bypassing operations will be necessary between decommissioning of existing lift station and commissioning of new lift station.

In addition, the City has requested the following modifications to assets “outside the fence” of the lift station:

- Identification and relocation of sewer handholes located in sidewalk and private property adjacent to LS No. 6.
- Furnish valve upstream of lift station to isolate station and provide ability to bypass/divert flow to meet future operations and maintenance needs.

2. Scope of Work

The Project scope is divided into the following four major tasks and the necessary project management activities:

- Design
- Permitting coordination
- Bidding support
- Services during construction (SDC)

2.1 Data Collection and Review of Standards

Upon receipt of a written notice-to-proceed, Arcadis shall proceed with activities that will allow for the completion of the preliminary design. Activities include the following:

- Kick-off meeting
- Site visit to observe existing conditions and gather available data
- Topographic and boundary survey
- Subsurface utility engineering (SUE) investigation

Assumptions

- Scope of work does not include geotechnical services; additional scope will be approved in advance by the City and budget will be covered from Owner’s Allowance (discussed further in Section 4, Budget) should a geotechnical investigation be required.
- Updated wastewater model will be provided by City for use in pump selection.

2.1.1 Kick-off Meeting/Site Visit

Arcadis shall facilitate a kick-off meeting with the City at the project site or at City offices to discuss project approach, schedule, and key milestones, and key contacts. In conjunction with the kick-off meeting, Arcadis shall

conduct a site visit to observe existing facilities and obtain information from operations staff relative to existing conditions and operational requirements.

Deliverables

- Kick-off Meeting summary and Project Schedule in PDF format
- Summary of observed field conditions

2.1.2 Topographic/Boundary Survey

Arcadis, through our designated specialty subconsultant Stoner & Associates, Inc., a Florida Registered Professional Land Surveyor, will work in accordance with Chapter 21 HH-6, Florida Administrative Code: Minimum Technical Standards for Land Surveying. A detailed scope of services can be referenced in Appendix 1. The services will include the following:

Coordinates and Benchmarks

Arcadis shall set and establish the coordinates and elevation of one (1) permanent reference monument to be located on the project site and from which design elevations and dimensions will be referenced and which will be used during the construction phase by the contractor for layout. Coordinates will be based on the State Plane Coordinate System (NAD 1983 Florida West (feet) with adjustments), and elevation will be referenced to NAVD 1988 datum. The location and reference tie for these reference monuments will be reviewed with the City prior to installation.

Horizontal and Vertical Information

Arcadis shall determine horizontal and vertical locations of the portions of the Project site. The survey will include the following:

- Power/utility poles and towers
- Edges of pavement and sidewalks
- Manholes and catch basins (including pipeline inverts and sizes), hydrants, valve boxes, and meter boxes
- Visible culverts and headwalls
- Fence corners
- Ditch tops of banks and toe of slopes
- Building corners
- Trees, shrubs, hedges, and other vegetation
- Spot elevations at grade within Project area

Deliverables

- Digital file of survey drawings in AutoCAD format
- Digital file of legal descriptions in Microsoft Word format

2.1.3 SUE Investigation

EM / GPR Utility designation (Horizontal Locates)

Arcadis, through our specialty subconsultant Blood Hound, shall horizontally locate detectable underground utilities within the Project area, including the ROW and roadway immediately adjacent and fronting LS No. 6 property. This work will be performed to Quality Level B standards in accordance with CI/ASCE 38-02. A detailed scope of services can be referenced in Appendix 2.

Deliverables

- Digital field sketch (NTS) of our utility discoveries for surveying purposes
- Photos of field observations
- Raw Ground Penetrating Radar (GPR) data

Vacuum Excavation (Vertical Locates)

Vacuum excavation will be utilized to provide the precise vertical position of the conflict or connection point of utilities within specific areas to be determined by City, based on horizontal discoveries, as described above. This work will be performed to Quality Level A standards in accordance with CI/ASCE38-02. A more detailed scope of services can be referenced in Appendix 2.

Deliverables

- Test hole data forms with pertinent information to include size, function, depth, material (of pipes if known) and provide the precise horizontal and vertical position of any discoveries
- Offsets will be provided to existing above ground features as well and all discoveries will be painted and flagged with all verification's staked with a semi-permanent marker for surveying purposes
- A digital field sketch will be provided along with pictures of the areas investigated

2.2 Design

Arcadis shall develop detailed design documents. These design documents will consist of Contract Drawings and Technical Specifications and will be incorporated by the City into a bid package for public procurement. Contract Drawings will be prepared in AutoCAD 2016 or later version in 2D format. Technical Specifications will follow the MasterFormat® 2016 from the Construction Specifications Institute (CSI).

The design will be delivered at stages of completion to allow for input by the City. At each stage, an engineer's opinion of probable construction cost (EOPCC) will be provided. Throughout the Design phase of the Project, Arcadis will engage senior technical staff who shall be responsible for conducting quality assurance and control (QA/QC) of the design at each key progress milestone.

2.2.1 Preliminary Engineering Report (PER)

Draft PER and EOPCC

Arcadis shall develop a Draft PER. The purpose of this PER is to identify the design criteria which will be used as the basis for subsequent final design documents. Arcadis shall provide the following sections of the PER:

- Mechanical Design Criteria
- Instrumentations and Control (I&C) Design Criteria
- Electrical Design Criteria
- Loads Summary
 - Power Supply Source
 - System Voltage Needs
- Site/Civil Design Criteria
- HVAC Design Criteria
- Structural Design Criteria
- Design Elevation Criteria from interpretation of City Vulnerability and Adaptation Plan
- Conceptual sequence of construction and bypass pumping arrangement

An EOPCC Class 4 (Accuracy -30% to +50%) will be included for the sections outlined above. No construction drawings or specifications will be issued with the PER, although preliminary equipment layout drawings and a proposed list of drawings and specifications for use in development of the Final Design will be included.

Draft PER Review Workshop

Following the review by City and two (2) weeks after the Draft PER is issued, Arcadis shall coordinate a workshop to discuss comments or questions from the reviewers.

Final PER and EOPCC

Following the review workshop with the City, Arcadis shall make the necessary updates to the Draft PER and issue a Final PER and EOPCC Class 4, documenting final design criteria elements agreed on to move forward into Final Design.

Deliverables

- Draft PER (electronic PDF Submittal)
- Final PER: Based on comments received from the City, Arcadis will revise and submit a Final Digitally Signed and Sealed PER (electronic PDF submittal)
- Workshop agenda and summary documenting decisions made during the workshop

Assumptions

- City will provide updated system hydraulic model for pump selection.

- City will provide copy of City's Vulnerability and Adaptation Plan and will provide consensus on design elevation selection. Storm surge design will at a minimum be evaluated for a 100-yr storm base flood elevation plus two (2) feet; final design elevation will be determined and established during the PER stage.

2.2.2 Draft (60%) Design

Arcadis shall prepare 60% design plans, which will incorporate comments from City and feedback obtained and defined during PER phase. This package will include the following:

1. Draft design plans (cover, general notes, key map, index, legends, plan, sections, and applicable details)
2. Draft Technical Specifications
3. 60% EOPCC Class 3 (Accuracy -20% to +30%)

Arcadis shall coordinate one (1) review workshop with City staff to discuss comments on the 60% submittal. Arcadis shall prepare a written summary of the comments and decisions made. This written summary will serve as the basis for proceeding with the Advanced Design.

Deliverables (one paper set and one electronic "PDF" file)

- Draft (60%) Design Plans
- Draft (60%) Technical Specifications
- EOPCC Class 3
- Agenda and minutes of Draft (60%) Design workshop
- Permit status memorandum

Assumptions

- City will provide electronic copies of available City Standard Details.
- The City will provide electronic copies of the City's SCADA or Integration Standards currently under development.
- The City will provide an example Solicitation to establish format and requirements of Contract Documents.

2.2.3 Advanced (90%) Design

Arcadis shall prepare 90% Design plans, which will incorporate comments from City and feedback obtained during pre-application meetings with regulatory agencies (conducted as part of a separate task). This package will be used to submit to regulatory agencies for final comments before progressing to Final Design. This package will include the following:

1. Advanced (90%) Design plans (cover, general notes, key map, index, legends, plan sheet)
2. Advanced (90%) Technical Specifications
3. EOPCC Class 2 (Accuracy -15% to +20%)

Deliverables (one paper set and one electronic "PDF" file)

- Advanced (90%) Design Plans
- Advanced (90%) Technical Specifications
- EOPCC Class 2

- Technical memorandum summarizing City and permitting agency comments incorporated into Advanced (90%) Design
- Permit status memorandum

2.2.4 Final Design

Arcadis shall prepare a Final Design submittal based on final comments received from regulatory agencies and City. The package shall include the following:

1. Final Construction plans
2. Final Technical Specifications
3. EOPCC Class 1 (Expected accuracy ranges from -10% to +15%)

Deliverables (one paper set and one electronic "PDF" file)

- Final Construction plans
- Final Technical Specifications
- EOPCC Class 1

Assumptions

- City will be responsible for "front end" specification documents.

2.3 Permitting Coordination

Permit applications required for this project will be prepared and submitted by Arcadis to the responsible regulatory agency, including facilitation of and participation in one (1) pre-application meeting with each agency and response to up to two (2) requests for additional information from each regulatory agency. It is anticipated that permit fees will be paid for directly by the City to the corresponding regulatory authorities. Arcadis will provide notice for check requests to cover permitting fees two weeks in advance of permit application submittal. However, to prevent any delays in permit processing, with the City's advanced approval, permitting fees could be covered through the Owner's Allowance (discussed further in Section 4, Budget).

Anticipated permits include the following:

- Broward County Application to Construct a Wastewater Collection/Transmission System
- Broward County Uniform Building Permit Application
- Florida Department of Environmental Protection (FDEP) Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System

Deliverables

- Summaries of pre-application meetings with regulatory agencies; these summaries are to be used as the basis for advancement of the design plans

Assumptions

- It is anticipated that an FDEP Environmental Resource Permit (ERP) will not be required.
- The City will pay all permit fees and will sign as Utility Owner on the permit applications.
- City will coordinate with City of Hollywood for bypass pumping requirements and setup.
- All public right-of-way (ROW) adjacent within project area is owned by City of Hallandale Beach.
- It is anticipated that a City of Hallandale Building Department Permit will not be required.

2.4 Bidding Support

The City will procure services from a qualified General Contractor (Contractor) through a public procurement process. Arcadis shall provide the following services in support of this public procurement:

1. Attend a pre-bid meeting and site visit.
2. Respond to requests for information (RFI) from prospective bidders. Prepare responses for addenda to interpret, clarify or expand the contract documents.
3. Provide bid evaluation and recommendation; Arcadis will contact up to two references of the apparent low bid contractor to assess qualifications.
4. Prepare a conformed set of drawings and specifications incorporating revisions from addenda during the bidding phase.

Deliverables

- Written responses to questions received during bidding process via email
- Bid evaluation letter
- Conformed documents (Final PDF digitally signed and sealed)

Assumptions

- Ten (10) RFI responses will be addressed.
- City will finalize addenda based on Arcadis input and publish all addenda and clarifications.
- City will confirm bids are compliant with procurement requirements.
- City will provide compiled Microsoft Excel file with each bidder's cost information.
- Alternative equipment proposed by potential bidders will not be evaluated by Arcadis during the bidding process.

2.5 Services During Construction (SDC) and Post Construction Services

Arcadis shall provide the following services during and after the completion of the construction:

1. Request for Information Support
2. Shop Drawings/Submittals Review
3. Meetings Participation
4. Site Visits
5. Post-Construction Services

2.5.1 Requests for Information Support

Arcadis shall respond to up to ten (10) Contractor RFIs for clarification.

2.5.2 Shop Drawings/Submittals Review

Arcadis shall initially review shop drawings for completeness. Incomplete shop drawings shall be returned to the Contractor for their action. Arcadis shall review complete shop drawings/submittals submitted by Contractor. Arcadis' review shall be for conformance with the design concept and contract requirements. Arcadis shall review or take other appropriate action with respect to material and equipment submittals, shop drawings, samples, and other data that the Contractor is required to submit. Such reviews or other action shall not extend to means, methods, techniques, sequences, or procedures of construction or safety program of the Contractor. If during the shop drawing process, the Contractor requests of substitute material and/or equipment are made, Arcadis shall provide a recommendation on the submittal to the City.

Assumptions

- Arcadis has assumed thirty (30) shop drawings/submittals and two (2) review events for each submittal.

2.5.3 Meetings

Arcadis shall attend one (1) pre-construction meeting and up to twelve (12) construction progress meetings.

Assumptions

- City will coordinate construction progress meetings, including preparation of agenda and summaries.
- A construction duration of 180 days (6 months) has been assumed.

2.5.4 Project Site Visits

Arcadis shall conduct on-site observations. Based on information obtained during these site visits, Arcadis will determine in general if the work is proceeding in accordance with the Contract Documents.

During these site visits, Arcadis shall:

1. Observe pre-installation inspection.
2. Confirm installed equipment follows Contract Documents and Submittals.
3. Independently observe installation of equipment and materials.

Issues or deficiencies observed during these site visits shall be immediately communicate to the City or its Project representative for immediate attention. For budgeting purposes, Arcadis has included one (1) weekly site visit for up to hours (4) hours for one (1) Arcadis representative for 180 calendar days during active construction duration.

Substantial Completion

Before the City issues a Certificate of Substantial Completion, Arcadis shall conduct a Project walkthrough inspection in concert with City and Contractor. Arcadis shall submit to the City and Contractor a list of observed punch list items for work which is either incomplete or not in conformance with the Contract Documents and that require completion or correction. Arcadis shall coordinate with the City for making the decision on whether the work should be considered Substantially Complete.

Observation and Review of Final Tests and Inspections

Arcadis shall participate with the City and Contractor to conduct a final inspection of the work and review of the punch-list of work required for Final Completion. Arcadis shall give an opinion regarding the status and adequacy of the work as it relates to conformance with the Contract Documents. Resolution of punch list items with the Contractor between Substantial Completion and Project close-out will be coordinated by the City with limited support from Arcadis.

Assumptions

- Arcadis has assumed a Project duration to Substantial Completion of 180 calendar days. Schedule changes (additional time) approved for Contractor will also result in equivalent additional days required for Arcadis to provide SDCs until Project close out.
- Onsite observation of construction or resident project representative (RPR) services are not included in this scope. City will provide or contract with an inspector or representative for daily oversight of Contractor's work.
- Review of Contractor Pay Applications is not included in this scope of services.

2.5.5 Post-Construction Services

It is assumed Arcadis shall provide part-time services for the duration after Final Completion which will include Start-up and Commissioning Assistance and Record Drawing Review. For budgeting purposes, Arcadis has estimated Start-Up assistance activities will be conducted within 30 days after Substantial Completion.

Start-up Assistance

Arcadis shall assist the City during systems startup and commissioning, which will include the following:

- Review of Arcadis' proposed method and schedule for start-up of the equipment and facilities
- Technical guidance during operational confirmation and acceptance testing
- Review of test data
- Troubleshooting as may be required

Record Drawings

Arcadis shall review final record drawings based on Contractor-supplied information and provide shapefiles based on installed conditions.

Deliverables

- Arcadis shall submit record drawings to the appropriate regulatory agencies and provide City with one (1) PDF set
- Shapefiles of installed conditions in ArcGIS format

Assumptions

- Arcadis has assumed two (2) review events for record drawings.
- As-built survey to be performed by surveyor contracted by the City or Contractor.
- Startup and Acceptance testing will be conducted over a seven (7) day period.

2.6 Project Management

Project management activities specific to this Project include the following:

1. Provision, monitoring and updating of schedule of services being provided. The initial project schedule will be provided in MS Project format at Project Kickoff and updated as necessary throughout the Project.
2. Management of subcontractors, as applicable.
3. Monthly design progress reporting and invoicing.

Assumptions

- Except for the Project Kickoff and Site Visit, all project meetings are anticipated to be held virtually subject to updates on COVID-19 guidance by the City, Arcadis and all other relevant permitting agencies.

3. Project Schedule

The table below includes the proposed Project design schedule. This schedule assumes no significant delays in design or permitting review periods, which will be established in coordination with the City at the Kick-off Meeting.

Milestone	Completion
Notice to Proceed (NTP)	July 2021
Data Collection and Review of Standards	August 2021
Preliminary Engineering Report	October 2021
Draft 60% Design	February 2022
Advanced 90% Design	March 2022
Final Design	April 2022

A proposed construction schedule will be determined during the Final design stage and confirmed upon selection by City of a Contractor. For purposes of establishing SDCs, it has been estimated that the time between Construction Notice to Proceed and Substantial Completion is approximately six months with one additional month to achieve Final Completion for a total of seven months.

4. Project Budget

The table below includes a breakdown of the proposed lump-sum compensation for the Project, distributed by task. An Owner's allowance has been included for additional or optional services including collection of geotechnical data and permitting application fees. Use of the Owner's Allowance is subject to City approval and subject to written authorization prior to initiation of any work.

Task No	Task Description	Subtotal
2.1	Data Collection and Review of Standards	\$22,200
2.2	Design	
2.2.1	Preliminary Engineering Design	\$34,200
2.2.2	Draft 60% Design	\$75,400
2.2.3	Advanced 90% Design	\$50,000
2.2.4	Final Design	\$24,900
2.3	Permitting Coordination	\$21,800
2.4	Bidding Support	\$13,800
2.5	Services During Construction	\$110,900
2.6	Project Management	\$21,400
	Subtotal	\$374,600
	Owner's Allowance	\$10,000
	Grand Total	\$384,600

Arcadis proposes to invoice for the Scope of Services monthly based upon percentage complete by task as established in the Scope of Work section and listed in the table above.

Aqeel Abdool-Ghany, P.E.
City of Hallandale Beach Public Works
April 16, 2021

We thank you for the providing us the opportunity to assist the City on this Project. We look forward to working with the City. Please contact me if you have any questions or require further information.

Sincerely,

Arcadis U.S., Inc.

Daniel Garcia, P.E.
Project Manager

Email: daniel.i.garcia@arcadis.com
Telephone: 786-332-9494

CC: Leah Richter, Arcadis

This proposal and its contents shall not be duplicated, used or disclosed — in whole or in part — for any purpose other than to evaluate the proposal. This proposal is not intended to be binding or form the terms of a contract. The scope and price of this proposal will be superseded by the contract. If this proposal is accepted and a contract is awarded to Arcadis as a result of — or in connection with — the submission of this proposal, Arcadis and/or the client shall have the right to make appropriate revisions of its terms, including scope and price, for purposes of the contract. Further, client shall have the right to duplicate, use or disclose the data contained in this proposal only to the extent provided in the resulting contract.

Appendix 1

March 31, 2021

Mr. Daniel Garcia, PE
Arcadis US, Inc.
1000 NW 57th Court
Suite 770
Miami, FL 33126

**RE: Proposal for Professional Surveying Services
Lift Station No. 6
Hallandale Beach, FL**

Dear Mr. Garcia,

I am pleased to provide you with this proposal for surveying services at the above-referenced site. Based on the information that you provided, I have developed the scope of services shown below.

Site Limits:

Lift Station No. 06, located at 450 NE 12th Avenue, Hallandale, Beach, FL



SCOPE OF SERVICES:

Lift Station Surveying services:

- Establish horizontal and vertical control points to support the survey efforts. Horizontal coordinates will be based on the Florida State Plane Coordinates System, East Zone, North American Datum of 83/11, and elevations will be based on National American Vertical Datum of 1988.
- Locate surface features as follows: lift station structure, fences, pavement, driveways, paved swales, sidewalks, slabs, curbs, walls, fences, and signage.
- Locate visible surface evidence of utilities as follows: utility poles, guy wires, street lighting, storm sewer structures, sanitary sewer structures, wire pull boxes, cable enclosures, utility cabinets, valves, valve boxes, meter boxes, backflow preventers, fire hydrants, and overhead utilities.
- Measure spot elevations approximately every 25 feet, at centerline and edges of pavement.
- Measure the rim and invert elevation of sanitary structures adjacent to the lift station, determine pipe types, size, and flow direction, when possible.
- Measure the rim and invert elevation of storm sewer structures within the limits of the survey, determine pipe types, size, and flow direction, when possible.
- Plot property lines, right-of-way lines and easements based on plats of record and information gathered from the Broward County Property Appraisers Web Site.
- Prepare a survey drawing on 24"x36" sheets, utilizing AutoCAD.

Project Fee(s):	Amount
Survey Fee	\$2,800.00
Total :	\$2,800.00

Schedule:

S&A anticipates the start of the project to commence within one (1) week of receiving Notice to Proceed from the client. We anticipate completion of the project two (2) weeks thereafter, weather permitting.

Deliverables:

The survey drawings will be prepared utilizing AutoCAD. Legal Descriptions will be prepared utilizing MS Word. The drawings and Word documents will be delivered digitally via e-mail. Certified hard copies of the drawings will be provided upon request and will be billed at the rates shown below for copies. Hard copies will be delivered by United States Postal Service Standard Mail. Other delivery methods will be invoiced at our cost for the service, plus 15% of the cost.

Black-Line Prints

18" x 24" = \$2.50 Per Sheet
24" x 36" = \$5.00 Per Sheet
30" x 42" = \$7.50 Per Sheet

Outside Printing

Cost + 15%

Courier Services

Cost + 15%

The above scope of services and associated fee(s) are based on the following:

- Arcadis US, Inc. to coordinate access into lift station enclosure.
- This survey does not include the location of pipes and structures within the interior of the lift station structure.
- Information concerning ownership, right-of-way, easements, and other matters of record, will be limited to data obtained from an on-line a search of the local County Property Appraisers website. Data obtained in this manner (on-line search) is not considered an official search of public records and may not include vital information that could affect the property being surveyed. Unless otherwise specified, a search of the public records for information affecting this property is not included in this "SCOPE OF SERVICES."
- Matters of zoning, land use, height, density, access, setbacks, will not be shown on the survey drawings unless specified otherwise in "SCOPE OF SERVICES."
- Environmental and soil conditions will not be shown on the survey drawings unless specified otherwise in "SCOPE OF SERVICES."
- Subsurface features will not be located or shown on the survey unless specified otherwise in "SCOPE OF SERVICES."
- As-built measurements collected in active facilities (storm, sanitary and other structures), are limited in accuracy and reliability. Before the final design of improvements or beginning construction, critical measurements should be verified with the facilities pumped down and cleaned of effluent and derbies to ensure the integrity of the data being presented in the survey drawings. Subsurface features will not be located or shown on the survey unless specified otherwise in "SCOPE OF SERVICES."
- Trees, shrubs, hedges, and other vegetation will not be located or shown on the survey unless specified otherwise in "SCOPE OF SERVICES."
- Coordination with attorneys, title companies, outside consultants is not included and will be hourly at the rates shown below.
- Express delivery fees, copies of public records and printing fees are not included and will be billed at our cost.

Service, outside of the above scope of services, will be billed on an hourly basis per the rate schedule shown below:

Employee Classification	Hourly Rate
Principal	\$150.00
Senior Professional Land Surveyor	\$125.00
Professional Land Surveyor	\$110.00
Field Crew Supervisor	\$75.00
Survey/CAD Technician	\$75.00
Survey Crew	\$150.00
Administrative	\$70.00

Standard General Conditions:

- **Payment of Invoices** – Invoices are due and payable upon receipt. Delinquent accounts more than 30 days from the date of invoice will constitute a breach of this agreement, and all remaining services may be terminated at the option of Stoner & Associates, Inc. (from now on referred to as S&A). Should it become necessary to collect any unpaid invoices through an attorney or legal proceedings, the client agrees to pay all costs of collections, including attorneys' fees.
- **Hours & Rates** - Rates are based on a forty (40) hour week, excluding holidays. Time more than forty (40) hours per week will be invoiced at one and one-half times the rates quoted herein (overtime time-and-a-half).
- **Termination** – The obligation to provide further services under this agreement may be terminated by either party upon seven (7) day' written notice in the event of substantial failure by the other party to perform by the terms hereof through no fault of the terminating party.
- **Client-Furnished Information** – S&A will consider all information supplied by the client as accurate and correct. Extra work or work was done over because of inaccurate or incorrect information supplied by the client will be paid for as additional services.
- **Ownership of Documents** – All documents prepared under this Agreement are instruments of service and are the property of S&A. The use of said documents on other projects or extensions of this project must be approved in writing by S&A.
- **Additional Services** – If authorized by the client, S&A will furnish additional services, which are not considered normal or customary basic services. The cost for additional services provided by S&A personnel will be billed on a time and materials basis. Additional services provided by others (i.e., soil testing, aerial photography, etc.) will be billed directly to the client by the provider.
- **Reimbursable Expenses** – The client will pay S&A for the actual expenses incurred in connection with the project for commercial travel and subsistence, shipping charges (i.e. Federal Express, mail, etc.), courier/delivery charges, printing, and reproduction costs.
- **Controlling Law** – This Agreement will be governed by the laws of the State of Florida and is deemed to have been entered into in Broward County, Florida.
- **Oral Agreements** – No oral agreement guaranty, promise, representation or warranty will be binding.
- **Limitation of Liability** – The client agrees to limit any and all liability or claim for damages, cost of defense, or expenses to be levied against S&A by the client or third parties to a sum not to exceed \$20,000.00 or the amount of our fee, whichever is greater, on account of any design defect, error, omission, or professional negligence.

Mr. Daniel Garcia, PE
March 31, 2021
Page 5 of 6

Sincerely,

STONER & ASSOCIATES, INC.



James D. Stoner, P.S.M.
President

JDS: las

Authorization to Proceed – The person signing below authorizes the work herein described to be performed and does so on behalf of the owner of the property in question and warrants that he/she has authority to sign this agreement on behalf of the owner and will accept all charges incurred on behalf of the owner.

Read and approved this _____ day of _____, 2021.

SIGNATURE:

TYPED NAME AND TITLE:

FIRM:



**Please complete the information requested below to
ensure that we have accurate information for this project.**

PROJECT CONTACT / BILLING INFORMATION

Business Name: _____

Business Address: _____

Business Phone Number: _____

Business Fax Number: _____

Project Manager's Name: _____

Contact Phone Number: _____

E-mail Address: _____

Billing Contact's Name: _____

Contact Phone Number: _____

E-mail Address: _____

Billing Address:
(if different than above) _____

Preferred Method of Receiving Invoices: **Mail** _____ **E-Mail** _____

Appendix 2



ESTIMATE

Created Date 4/5/2021

Estimate Number 60557

Customer	Arcadis US, Inc.	Name	Mr. Daniel Garcia
Billing Phone	786-384-7012	Phone	786-384-7012
Billing Address	1000 NW 57th Ct., Suite 770 Miami, FL 33126 US	Email	daniel.i.garcia@arcadis.com
Job Site Location	City of Hallandale Beach LS, 450 NE 12th Ave., Hallandale Beach, Florida, 33009		

Product	Invoice Description	Quantity	Sales Price	Total Price
Advantage Locate (hourly)	EM / GPR Utility designation	8.00	\$200.00	\$1,600.00
MOT Plans-Vac	MOT Plans for Vacuum Excavation project	2.00	\$195.00	\$390.00
Permit	ROW permit	1.00	\$350.00	\$350.00
SUE Maint of Traff 4 (unit)	SUE Maintenance of Traffic Level 4 (unit rate)	2.00	\$1,300.00	\$2,600.00
Vacuum Excavation (Hourly)	Vacuum Excavation (Hourly rate)	16.00	\$250.00	\$4,000.00

Grand Total \$8,940.00

Scope of Work

Customer SOW Design engineering

BHUG SOW

Client has requested an estimate for the following Scope of Work:

- The following work is being performed to Quality Level B standards in accordance with CI/ASCE 38-02.
- Client has requested an estimate to horizontally locate detectable underground utilities within the limits of the referenced lift station to include the ROW and roadway immediately adjacent and fronting the property.
- EM and Real-Time GPR Locating equipment will both be utilized to locate and mark the utility lines. A not to scale digital field sketch will be provided of our discoveries for surveying purposes. We will also provide pictures and the raw GPR data for review.
- Customer is advised the horizontal portion of this estimate is based on a 2-hour minimum, with a not to exceed limit. Any additional time required on site to complete the task beyond the 2-hour minimum will be invoiced in 15-minute increments @ \$50 per increment, not to exceed 8 hours.
- Customer is advised that Blood Hound utilizes water-based paint and flags to identify any discoveries onsite. If this is an issue, Blood Hound must be made aware of this when scheduling. All discoveries will be painted and flagged for surveying purposes.
- All findings will be marked according to APWA standard.
- Any available as-builts, engineered or other record drawings, if available, should be supplied to BHUG prior to commencement of field work.



ESTIMATE

Created Date 4/5/2021

Estimate Number 60557

- Estimate does not include any camera or surveying services.
- BHUG is not responsible for, moved, altered, obliterated or maintaining marks. BHUG will impose an additional fee to relocate/remark facilities.
- The performance of BHUG's services is limited to full and unobstructed access to include but not limited to: mechanical rooms, manholes, hand holes, vaults, meter rooms, telecom rooms, fixtures (plumbing, electrical, communication), dispensers, fenced compounds, tanks and structures. Full cooperation from the on site personnel is necessary to perform a complete survey.
- Results are dependent upon field conditions at the time of locating services. It may be necessary to have parked vehicles or machinery moved to allow for a full scan and to access structures.
- Estimate DOES NOT include the use of Robotic or Push/Pull Cameras for assistance in locating Sewer Lines or Laterals. These lines would attempt to be marked by EM / Rodder if possible or GPR. If lines are not able to be completely located, Blood Hound will arrow the direction of each line leaving a manhole.
- CUSTOMER IS ADVISED THAT LIMITATIONS EXIST IN LOCATING PLASTIC MATERIALS WITHOUT TRACEABLE WIRES ATTACHED.
-
- **The following work is being performed to Quality Level A standards in accordance with CI/ASCE 38-02.**
- **Vacuum Excavation will be utilized to provide the precise vertical position of the conflict or connection point utilities within specific areas to be determined by the engineer of record (EOR), based on our horizontal discoveries. Based on a site walk and existing records it is anticipated to take 2 days to complete.**
- **Customer is advised the vertical portion of this estimate is based on a 4-hour minimum, with a not to exceed limit. Any additional time required on site to complete the task beyond the 4-hour minimum will be invoiced in 15-minute increments @ \$62.50 per increment, not to exceed 16 hours.**
- Test hole data forms will be provided with pertinent information to include size, function, depth, material (of pipes if known) and provide the precise horizontal and vertical position of any discoveries. Offsets will be provided to existing above ground features as well and all discoveries will be painted and flagged with all verification's staked with a semi-permanent marker for surveying purposes. A digital field sketch will be provided along with pictures of the areas in question.
- Cavities will be refilled with dry, native spoils (compacted in 6" lifts).
- Estimate does not include any final restoration such as hot mix asphalt, milling / resurfacing or special back fill requirements (flowable fill.) If final restoration is required by end client, city, state, or any other entity, that restoration will be the responsibility of the client. Blood Hound does not perform final concrete or asphalt surfacing. BHUG will not perform any excavations thru sidewalk without prior permission. *Test holes performed under the roadway will be repaired with an asphalt cold patch and any concrete surfaces will be repaired with a Quikrete type product.*
- **Customer understands any fees required for permits, traffic control and MOT plans are provided and included in this estimate, based also on 2 days of VAC field work.**



ESTIMATE

Created Date 4/5/2021
Estimate Number 60557

- All Survey work will be completed by others.

If the Scope of Work should change, or is different than listed on the estimate, please call our office for a revised estimate.

Quoted rates are exclusive to this estimate only. Rates quoted by Call Center Representatives are in effect unless otherwise stipulated within a formal estimate.

Please note estimate is valid for 90 days from the quote created date.

Blood Hound will use electromagnetic (EM) and ground-penetrating-radar (GPR) equipment to locate private underground utilities at site indicated by client. All findings will be marked according to APWA standard. Customer is responsible for calling 811 for locates of any public utilities. If the scope of work should change or is different than that listed on estimate, please call our office for a revised estimate. Unless expressly noted, Vacuum Excavation estimates do not include any of the following services: Permitting, Traffic Control, Restoration, Special Restoration, Special Backfill or Waste Disposal. If you need any of those services please call our office for a revised estimate. Blood Hound is not responsible for the condition of the pipes or structures before or after jetting/clearing service is performed. Unsatisfactory conditions could be present within the structure and any services may bring those deficiencies to light. In the event of inclement weather, if the client still requests for crew to arrive on site, then the client will be responsible for minimum charges even if no work is performed.

Payment is due at the time of service, unless you already have an account with us. If you do have an account with us, payment terms are Net 30 days, unless otherwise stated in a pre-approved contract. To learn more, please call the office at 888-858-9830.

PRICE MAY VARY BASED ON ACTUAL TIME ON SITE. The above pricing is based only on the information supplied by the customer. If a site walk through has not been conducted, this may affect the price.

If this is a prevailing wage job, please contact our office for a revised quote as this pricing does not reflect prevailing wage rates. If at some later date a project is determined to be a prevailing wage job, then any extra expense incurred by Blood Hound will be billed to the client.

The project estimate outlined in this specific proposal is valid for 90 days from the date of the proposal. Blood Hound reserves the right to review and adjust this estimate if client does not approve of the proposal within 90 days.

We look forward to working with you.

By signing this Estimate the client acknowledges that they accept the scope of work listed on the estimate, as well as the service rates provided and are providing Blood Hound with a Notice To Proceed (NTP) for the listed Project. If the scope of work should change while the work is in progress, any changes will be documented on the technician's field notes and signed off on by the client. Signing this estimate also acknowledges that the client agrees to the terms and conditions as they relate to payment for services rendered.

Signature: _____

Printed Name: _____

Date Signed: _____



Equipment Report

Equipment Operations and Limitations

Corporate Location:

750 Patrick's Place
Brownsburg, IN 46112

Office # 888-858-9830

Fax # 888-858-9829

<http://www.BHUG.com>

Equipment Description –

Blood Hound uses a variety of equipment to identify and locate subsurface structures, such as direct connect and inductive utility location transmitters and receivers with multi-frequency broadcasts and reception capabilities, ground penetrating radar, sewer cameras (both robotic and fiber optic push/pull), and other equipment, to locate the lateral position of buried structures, as well as to provide estimates on the depths of subsurface structures.

Traditional EM equipment is used as the primary tool to determine the location of all conductive subsurface structures, as well as any utilities that have locating wires (i.e. gas lines) buried with the non-conductive utility to facilitate location. This equipment operates using frequencies ranging from 512 Hz up to and including 480 kHz. The frequency that is selected is dependent on the type of utility to be located, operator preference, estimated depth of the target utility, and distance for which the target utility must be marked. Frequencies are often changed during operations to improve the quality of the signal, decrease interference, and/or increase the range for the transmitted signal.

EM locating operates by conducting an AC electric current through the target utility at a specific frequency. This causes the target utility to radiate a radio signal at the desired frequency. This radiated radio signal is then detected using the receiver, which is tuned to detect radio fields at the desired frequency. By measuring peak or null signal measurements, the lateral line location can be determined.

Blood Hound uses a variety of Ground Penetrating Radar (GPR) units from multiple manufacturers. Blood Hound employs antenna frequencies ranging from 250 MHz up to 1.6 GHz, depending on the specific needs of the survey. Data can be analyzed in real-time, or collected for post-processing analysis, including the development of subsurface response maps.

The most commonly used antennae operate in a frequency range of 250 to 350 MHz., which provides the greatest balance of resolution and effective depth penetration. Frequency ranges higher than this provide greater resolution and better penetration through more conductive or signal absorbing materials (i.e. clay soils, concrete, etc). However, this increased resolution comes at the cost of significantly reduced depth penetration.

GPR operates by radiating a radio band frequency into the soil from the transmitter contained within the antenna assembly. This signal is reflected to the receiver contained in the antenna unit, and this received signal is then converted into visual patterns based on the intensity of the reflected signal.

The depth of the target reflection pattern is determined based on the time elapsed from the transmission until the reception of the reflected signal, and is then projected by making assumptions regarding the transmission rate of the signal through the medium. If the signal velocity assumptions are not accurate, then the depth estimates will not be accurate.

Blood Hound also performs Electromagnetic soil conductivity analysis (EM Induction Survey). This method uses a Fisher TW-6 "Split Box" locator mounted on an inductive sweep bar. The bar places the transmitter and receiver four feet apart, with the inductive transmitted field oriented in an opposing orientation from the receiving antenna. This opposing orientation allows for the receiver to not register the presence of the transmitting field. When the transmitting field encounters a conductive object (metal), the field is bent, which results in the detection of the field by the receiving antenna. This equipment allows for the detection of conductive objects, and is not limited to the detection of ferrous metals as is the case with many magnetometers.

Factors Effecting Performance of Equipment –

There are several factors that can impact the effectiveness of the EM Locating equipment:

- **Target Utility Composition** – EM locating is only effective if the target utility is composed of continuous conductive material. Plastic, concrete, clay, or other non-conductive materials cannot be located using EM locating techniques. In addition, some metals are not highly conductive, which makes locating using EM techniques difficult. For example, cast iron is a poor conductor and cast iron lines can often be difficult to locate using standard EM techniques. Additionally, many pipes are composed of individual sections which may be gasketed. This can impede the current at each pipe joint.
- **Shielding of Target Utility** – Since EM locating uses an electronic signal, unshielded lines that are directly buried in the soil (i.e. water lines) can be difficult to locate for significant distances. This is due to the continuous loss of transmitted signal directly to the ground. As the signal travels along the utility, a significant portion of the signal is lost to ground, resulting in decreased signal quality. The greater the distance between the transmitter and the location point on an unshielded line, the more degraded the signal will be.
- **Conductive Pathway to Ground** – Locating is accomplished by creating a complete circuit, and the transmitted signal must be able to return to the ground in some form. An open circuit is generally much more difficult to locate since the circuit is not complete, and the emitted signal cannot return to ground. Thus, the signal may not travel along the desired pathway. Additionally, soil conditions can affect the pathway to ground. For example, in highly conductive soils, a signal can inductively find a pathway to ground even in an open circuit.
- **Depth** – The signal induced onto the target path must have sufficient strength to be detectable at the surface. Utility lines deeper than 15 feet are often difficult to locate due to the inability of the radio frequency being radiated from the target line to effectively radiate through the soil to the receiver at the surface. Similarly, shielding between the target utility and the receiver can affect the signal reception and create a loss of signal.



Equipment Report

Equipment Operations and Limitations

Corporate Location:

**750 Patrick's Place
Brownsburg, IN 46112**

Office # 888-858-9830

Fax # 888-858-9829

<http://www.BHUG.com>

Similarly there are several factors that can impact the effectiveness of GPR surveys:

- **Subsurface Material / Soil Composition** – Soil composition and subsurface material is the most important factor impacting the effectiveness of GPR. The more conductive the subsurface material, the less effective the GPR survey will be. GPR works best in sandy soils, and is least effective in heavy clay soils or where the subsurface material contains a large volume of highly conductive backfilled debris or material (i.e. metal scraps or slag sand). Midwestern soils generally have a high clay content and create significant challenges to completing an effective GPR survey. As a general rule, the smaller the particulate matter that the subsurface material is composed of, the greater the inhibiting effect on the GPR signal.
- **Composition of the Subsurface Target** – The inherent electrostatic reflectivity of a target will impact the effective identification of the target. Lightweight subsurface material, such as PVC, are generally more transparent to radio waves and will reflect a substantially smaller percentage of the radiated signal. This will result in a smaller and more minor reflection signature, making effective interpretation more difficult. Some materials are completely transparent to radio waves and can only be identified if a reflective material (i.e. water) is contained within the target pipe.
- **Moisture Content of the Subsurface Material** – Water, when combined with dissolved ions (salt) has an inhibiting effect on GPR signals, and signals can often not effectively penetrate saturated soil material, when the soil is slightly conductive. The addition of more water increases the conductivity of the soil and more significantly inhibits the effective signal penetration.
- **Depth** – The GPR signals have a finite effective penetration depth. The deeper the target, the less likely it will be effectively identified. As the signal penetrates the subsurface material it loses strength as the depth increases. Effective signal penetration can be defined as the depth at which the reflected signal no longer has sufficient power to reach the receiver antenna of the GPR. In other words, the effective survey depth is the depth at which the penetrating signal reaches a maximum of 50% of its emitted strength, although it should be noted that at this range only a 100% reflective target (i.e. metal) would have the potential to be detectable.
- **Target Size** – The smaller the diameter of the target structure, the lower the probability of successful identification of the target during a GPR survey. The smaller the target, the less of a signal that will be reflected, decreasing the probability of a positive identification of the subsurface target. As a general (but not absolute) rule of thumb, for every 1 foot of depth you must have 1 inch in diameter in order to be observable. For example, a 3" diameter pipe must be less than 3 feet below grade in order to be observable during a GPR survey.

EM Inductive Surveys can also be impacted by environmental factors.

- **Surface and Subsurface Material / Soil Composition** – Highly conductive soils can prevent the identification of other conductive structures with this methodology. The presence of surface metal, including vehicles, fences, and debris, can swamp other readings and prevent the identification of subsurface targets. In addition, the presence of rebar reinforcement within concrete can have a similar effect and prevent identification of other structures.
- **Target Size** – Small metallic targets may not be detected, since the mass of the target object must be large enough to impact the shape of the transmission field. Small objects may not have sufficient mass to cause a field distortion significant enough to be detected.
- **Target Depth** – Deeper targets may not sufficiently distort the transmitted signal to allow for detection by the receiver. However, large high-mass targets are more likely to be detectable at significantly deeper depths, than lower mass targets.

Summary of Equipment and Survey Effectiveness –

EM locating is generally very effective in locating most subsurface utility lines. Electric, Telephone, and Cable TV can almost always be located using standard EM locating techniques. Also, many water lines can also be located. However, due to the continuous contact with the soil, and the common use of cast and ductile iron in water line construction, water lines can often prove difficult to locate. Additionally, water lines constructed of plastic are becoming more common and cannot be located using standard locating methodologies. Sewer lines (storm and sanitary) are very rarely locatable with standard techniques, unless a conductive tool can be introduced into the line (i.e. locating a sanitary lateral by running a rod containing metal through the line from a clean-out access point). All Blood Hound technicians carry a Jameson rodder for this specific purpose.

GPR surveys are an effective way of locating and identifying subsurface obstructions prior to drilling or excavating activity. However, these surveys cannot and will not identify all subsurface utilities or other obstructions, in all circumstances. Midwestern soils in particular, present significant challenges to an effective GPR survey, and should not be relied upon as the only means of protecting underground utilities. EM Induction surveys provide another level of investigation, which when combined with traditional EM locating and GPR provide the most complete non-destructive process available for the protection of subsurface utilities and other structures. When Vacuum Excavation is employed, the possibility of a damaged utility is further minimized.

In general, private utility locating surveys conducted by Blood Hound technicians are highly accurate and effective. However, there are numerous factors that can result in a line being mis-marked or left unmarked by our technicians, that are beyond the control of Blood Hound or its technicians. This includes, but is not limited to, a lack of adequate prints or available site knowledge, a lack of access to utilities (i.e. cleanouts, interior communications rooms, vaults, etc), a lack of visual indications of the utility's presence, a disruption of a conductive pathway (i.e. repair in a metal water line made with plastic), and commonly bonded lines creating undesired signal conduction pathways. While Blood Hound provides its employees with extensive training on ways to mitigate these and other issues, there are unfortunately occasions where these factors cannot be effectively eliminated.