



**MIAMI-DADE COUNTY DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT**

**MUNISPORT SITE
COMPREHENSIVE LANDFILL CLOSURE PLAN
AMENDED FORMALIZATION REPORT
FOR THE GROUNDWATER REMEDIATION
AMENDMENT 5**

PERA PHASED APPROACH



April 26, 2012

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- APPENDIX A: County Manager's Memorandum: Recommendation for Munisport and Other Landfill Closure Requirements
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APPENDIX C: Second Amended Grant Agreement between Miami-Dade County, Florida and City of North Miami, Florida
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AMENDMENT 5 EXHIBITS

- EXHIBIT A: Revised Amendment to Design/Build Groundwater Remediation Contract Implementation of Phased Approach proposal from CH2MHill to the City of North Miami; Approximate Locations of Proposed Extraction System

DOCUMENT HISTORY

This document is a revision by the Independent Engineer (A.D.A. Engineering, Inc.) of the original document produced by Brown & Caldwell, the original Public Works and Solid Waste Department (PWWM) formerly Department of Solid Waste Management (DSWM) Bond Engineer, and incorporated as the COMPREHENSIVE LANDFILL CLOSURE PLAN FORMALIZATION REPORT, dated March 2005. Sections or Tables that are revisions of those in the original document can be identified by the prefix “R” before the Section or Table number.

Only the Sections pertaining to groundwater remediation have been revised to reflect the Lump Sum proposal items; the other sections were not revised, with the exception of section 3.2.4 Stormwater Management System that has been historically updated as per the SFWMD permit records and Draw # 8A payment.

This document serves as a guide for the proposed groundwater remediation work to be performed at the Munisport site. The June 2010 Amendment 2, the January 2011 Amendment 3, the March 2011 Amendment 4 and this Amendment (Amendment 5, April 2012) do not alter the agreed upon Lump Sum proposal for the groundwater remediation that prompted Amendment 2, but rather clarifies the deliverables and payment methodology established in Amendments 2, 3 and 4 and incorporates the Phased Implementation approach required by PERA.

EXECUTIVE SUMMARY

This Executive Summary is historical language from the original document (Not Changed)¹

Please note that all capitalized terms used in this Executive Summary are defined in the body of this report.

The February 2004 Resolution R-244-04 adopted by the Miami-Dade County Board of County Commissioners stipulates that the Public Works and Waste Management Department (PWWM)¹ formerly the Department of Solid Waste (DSWM) Bond Engineer (the Bond Engineer) accomplish a formalization and Grant-Eligible budget validation of a number of landfill closure and remediation projects (including the Munisport Project) within the Comprehensive Landfill Closure Plan prior to commencement of construction of each project (the Pre-Construction Formalization.)As a result of the pre-construction formalization and validation effort documented in this report, Brown and Caldwell, as the Bond Engineer, have determined, and the Project Stakeholders have agreed, that:

- The grant amount provided by the County to the City of North Miami under the Grant Agreement is \$31,027,000 for Grant-Eligible expenses, as set forth in the Grant Agreement;
- As provided in the Grant Agreement, interest earned, if any, on grant funds in the escrow account can be used to fund Grant-Eligible expense; the Schedule of Values included in this report reflects a preliminary projection of interest earned in the amount of approximately\$2.0 million in addition to the base grant amount of \$31,027,000, for a total of approximately \$33.0 million; it should be noted that actual interest earned can vary widely as a function of the actual draw schedule that will occur, interest rate for earnings, and other variables;
- The County is not obligated in any way to fund Grant-Eligible expenses above the grant amount of \$31,027,000 plus any interest earned;
- The Bond Engineer has identified at least \$31,027,000 in Grant-Eligible expenses (as provided in the Grant Agreement) required by the Munisport Project budget;
- All Draw Requests against the Munisport Project budget shall be reviewed for authorization based on physical progress according to formulas (by individual budget item on the Schedule of Values) presented in this report;
- The Project Maximum unit costs for each item in the Schedule of Values shall be updated annually to reflect inflation according to a widely accepted construction cost index;
- The general intent of the Project Maximum Total in the Schedule of Values is that the sum of the draw requests for each item in the Schedule of Values will not exceed its associated Maximum Project Total amount; for a Project Maximum Total to be changed as the project progresses, other than a change required to reflect inflation, a change in the basis (such as units required, unit cost basis, or a change in the design basis) for calculation of the item in question must be authorized by the Bond Engineer.

¹ The Department of Solid Waste Management (DSWM) merged with the Public Works Department in October 2011 to form the Public Works and Waste Management Department (PWWM).

CHAPTER 1.0

INTRODUCTION

As provided by Resolution R-244-04 passed by the Miami-Dade County Board of County Commissioners (BCC) in February 2004, Miami-Dade County (the County) resolved to:

- Develop the Comprehensive Landfill Closure Plan (CLCP) to address closure and remediation of the following inactive landfills:

- The Munisport Landfill Site (the Munisport Site) located in the City of North Miami;
- The Virginia Key Site located in the City of Miami;
- The Homestead Landfill located in the City of Homestead;

and other landfill closure or remediation projects of Countywide significance, including:

- North Miami-Dade Landfill Groundwater Remediation;
- South Miami-Dade Landfill Cell 3 Closure;
- North Miami-Dade East Cell Closure; and
- South Miami-Dade Landfill Cell 4 Closure; and to

- Enter into an amended grant agreement (the Grant Agreement) between the County and the City of North Miami (the City) to provide additional funding in the amount of \$31,027,000 (subject to this report's pre-construction validation (by PBS&J) of the estimate as part of the Brown & Caldwell CLCP) for closure and remediation (the Munisport Project) of the Munisport Site.

The February 2004 BCC resolution stipulates that the DSWM Bond Engineer, Brown & Caldwell², (the Bond Engineer) accomplish a formalization and Grant-Eligible budget validation of each project in the CLCP prior to commencement of construction of each project (the Pre-Construction Formalization.) In addition, the Grant Agreement requires that the Bond Engineer accomplish oversight of the Munisport Project construction activities in order to determine:

- a) Allowable use of grant funds as set forth in Section III of [the Grant Agreement], including those uses of grant funds set forth in paragraphs A, B, and C [of the Grant Agreement];
- b) Compliance with regulatory agency technical and permitting requirements, including referenced in paragraphs A, B, and C [of the Grant Agreement.]

The Grant Agreement (Section III B) also requires the Bond Engineer (the Independent Engineer as of August 2009) to approve individual Draw Requests from the City, based on specific physical progress as the Munisport Project is accomplished.

² Brown & Caldwell is no longer the Bond Engineer. The duties of the Bond Engineer in the Grant Agreement related to the groundwater remediation component are being carried out by A.D.A. Engineering, Inc., the Independent Engineer.

The original Brown & Caldwell report presented the results of the Pre-Construction Formalization for the Munisport Project. The two major chapters of the original report, Chapters 2.0 and 3.0, were modified to include language of the Schedule of Values (SOV) and payment methodology in Chapter 2.0 of the June 2010 and January 2011 revisions.

The revised Chapters 2.0 and 3.0 present the Schedule of Values (Revised Table R3-1) documenting the development of each item in the Schedule of Values, which presents two major groupings of information for each item:

- Project Maximum Total Calculation (the maximum Grant-Eligible amount for each item); and
- Draw Payment Basis (basis for approval of individual Draw Requests based on specific measures of physical progress.)

The revised Chapter 4.0 presents specific procedures that will be followed by the Independent Engineer to review and approve individual Draw Requests, in cooperation with Munisport Project Stakeholders:

- Miami-Dade County
- The City of North Miami
- The Developer or Receiver
- The Engineer of Record (SCS ES Consultant (SCS ES; formerly ES Consultants, Inc.) - Overall Project) and subcontractor to CH2M Hill
- CH2M Hill (Contractor, Groundwater Remediation System in its entirety as per Receiver-Vendor Contract)
- Other Munisport Project Stakeholders

Draw Requests submitted by the City (through the Developer/Receiver), once approved by the Independent Engineer and by the Miami-Dade County Department of Public Works and Waste Management (PWWM) formerly the Miami-Dade County Solid Waste Department (DSWM), will result in an amount corresponding to the approved Draw Request amount, to be paid from the Escrow Account created under the Grant Agreement.

The overall intent of the Schedule of Values and the Oversight Work Plan is to ensure that payment of Draw Requests tracks, as closely as reasonably possible, actual engineering and permitting, and physical construction progress as documented by the Vendor (CH2M Hill, referred to as Contractor in CLCP) and the Engineer of Record (SCS ES) and as physically verified by the Independent Engineer in the field.

While some items in the Schedule of Values will be tracked for physical progress (and therefore payment) through application of per acre pre-approved unit costs, a number of items will require verification of payment validity through review of documents (e.g. plans, calculations, models, etc; proof of submittals to the regulatory and permitting agencies; copies of regulatory permits obtained; stamped approved plans by the permitting agencies; and City of North Miami Building Department approvals).

CHAPTER 2.0

MUNISPORT SITE HISTORY AND CONCEPTUAL CLOSURE

R2.1 History

The Munisport Site includes an inactive municipal landfill located on a 291-acre parcel of land within the City limits of North Miami, Florida, along Biscayne Boulevard between NE 135th and NE 151st Streets. The Site is bordered to the east by Biscayne Bay, and wetlands; to the south by a mobile home community, to the west by commercial developments, and to the north by the Florida International University Biscayne Bay (North) Campus.

Activity associated with the Site began in the mid-1960's as part of the construction of a trade and cultural center to be known as "Munisport". Operations in the 1970's initially included the placement of construction debris to raise the elevation of wetland areas to provide a subgrade for construction. Due to financial constraints and opportunities for increased revenues from landfill tipping fees, the developers began accepting solid waste for fill material. The owner of the property, the City of North Miami, pursued a modification of the dredge and fill permit to allow for the use of solid waste as fill material. However, the modification was denied by the United States Environmental Protection Agency (EPA) through a veto of the United States Army Corps of Engineers dredge and fill permit. Before the use of solid waste could be halted through veto of the dredge and fill permit, an estimated six million cubic yards of solid waste had been placed in the landfill. Because the solid waste was disposed of without the use of a liner or leachate control mechanisms, rainfall percolating through the solid waste is believed to have caused elevated levels of ammonia in the underlying groundwater and associated discharge into adjacent surface water.

A remedial investigation completed by EPA in 1988 and a water quality and toxicity assessment completed in 1989 found that the landfill posed no threat to human health, but that it did pose a significant threat to aquatic organisms in the adjacent wetlands. Based on these findings, EPA issued a Record of Decision (ROD) in 1990 that included the implementation of a hydraulic barrier to intercept the discharge of contaminated groundwater from the landfill to the adjacent mangrove preserve. EPA and the City of North Miami entered into a Consent Decree for the cleanup in 1992. Contaminated groundwater collected as part of the implementation was to be treated through air stripping with the water discharged to the underlying aquifer. Associated actions included the tidal restoration of a State of Florida mangrove preserve and a hydraulically altered wetland area.

Due to the varying degrees of complexity in scope of the different components of the remedy, EPA decided to segment the design and construction process into the four following phases: Tidal Restoration of a wetland area included in the Biscayne Bay Aquatic Preserve; Access and Service Road; Hydraulic Barrier Recovery Wells; and Treatment and Disposal System. Tidal restoration of the wetlands was completed in September 1995. Construction of the service road and recovery wells for the hydraulic barrier were substantially completed in 1996. A draft design for the groundwater treatment and disposal system was submitted to EPA in December 1996.

However, based on results from the monitoring of the changes in water quality and toxicity conditions in the mangrove preserve in 1996, and as a result of the dike breach for tidal restoration of the preserve, EPA concluded that the increased tidal circulation was adequate to mitigate the adverse impact to the environment and that further response pursuant to CERCLA was not warranted. As a result, the ROD was amended to "No Further Action" in 1997. The Site was removed from EPA's National Priorities List in September 1999. The State and County are expected to oversee the closure of the landfill.

The City published a solicitation for letters of interest in April 2001, pertaining to the potential development of approximately 190 acres of the former landfill. The Swerdlow Group submitted a letter of interest to the City of North Miami in July 2001. On April 23, 2002, authorization was received to negotiate a development agreement for the Munisport Site between the Swerdlow Group and the City. A development agreement was executed by the City and Swerdlow Group on November, 2002.

The original Developer intended to develop the Site as a mixed-use residential, hotel, and commercial community. After of the sale of the project to another developer and its subsequent foreclosure, the project was assumed by a court appoint Receiver and ultimately reverted to the City. A new Developer or the City may have other uses for the land. The City will continue to retain ownership of the Site and in the event a Developer expresses interest and contracts with the City, the Developer may be given a long-term lease for the development of the project.

As described in Chapter 1.0-Introduction of this report, the County has provided the City \$31,027,000 under the Grant Agreement to close the landfill and accomplish groundwater remediation.

On August 2003, the former Engineer of Record for the project, PBS&J, submitted its "Conceptual Closure and End Use Plan" for the Site on behalf of the City. After being amended in November 2003, January 2004, and twice during March 2004, the Conceptual Closure and End Use Plan were approved by FDEP on June 2004. FDEP also approved the Alternate Procedures and Requirements, which stated that part of the Site could be closed using a permeable cover.

The aforementioned plan approval was introduced as the Munisport Site CLCP Pre-construction Formalization Report by Brown and Caldwell dated March 2005. Following Brown and Caldwell, Malcolm Pirnie, Inc. became the Bond Engineer; however, Malcolm Pirnie, Inc. merged with ARCADIS, an engineering firm providing direct services to the City's Developer at the Munisport Site. The PWWM requested and obtained an opinion from the Ethics and the Public Trust that prohibited Malcolm Pirnie, Inc. from providing bond engineering services related to this project. On August 25, 2009 the Solid Waste Department proposed to the City of North Miami that an Independent Engineer, A.D.A. Engineering, Inc., provide the services required of the Bond Engineer. SEE EXHIBITS R-1, R-2 and R-3.

The former Developer actively pursued the approval of an in-situ groundwater treatment system, an a funnel and gate/ex-situ treatment system. Neither of these systems were implemented and the Groundwater Remediation Budget saw a percentage reduction due to monies spent on local agency fees, requested studies, models, incomplete designs and impasses regarding permits.

The Receiver through his engineers (CH2M Hill prime and SCS ES subcontractor) is proposed a conventional groundwater extraction system with the extracted effluent disposal through a Class I Industrial injection well. See this Chapter Section 2.3.01 (Project Overview) and Section 2.3.02 (Basis of Estimate).

2.2 Closure

2.2.1 Site Preparation (Not Changed) Original language from Brown & Caldwell March 2005. PBS&J Engineer of Record, Brown & Caldwell Bond Engineer

The “Conceptual Closure and End Use Plan” published by the Engineer of Record in August 2003 states that Site preparation for closure and re-development will require rough grading, clear and grub/cutting & chipping, removal/disposal of unsuitable materials, and slope and fill. The Engineer of Record estimates that the landfill footprint is approximately 164 acres. It is assumed that about half of the 164-acre Site will require 1.5 feet of cut or fill. High points averaging 1.5 feet will be graded into low points for a smooth surface that generally follows the original grade of the landfill.

Clearing the Site, which includes grubbing, cutting, and chipping, will be done in conjunction with the rough grading. The entire Site is overgrown with heavy vegetation that needs to be removed in order to accomplish the proposed closure and redevelopment plan.

The Engineer of Record expects that during the clearing and rough grading phase, bulky waste materials will be churned to the surface. If these materials cannot be relocated within the Site, then they will be collected and disposed off-site, in an approved landfill or, if these are ferrous, they will be recycled. It is expected that these unsuitable materials will consist of general trash, tires, metal, white goods and other bulky items.

The 164-acre Site will then be covered with 0.5 feet of sandy material that is intended to provide a bedding layer for the final cover system that will be placed on top of it. Final Cover specifications will be discussed in the following section.

2.2.2 Landfill Final Cover System (Not Changed) Original language from Brown & Caldwell March 2005. PBS&J Engineer of Record, Brown & Caldwell Bond Engineer

Under current State of Florida landfill closure requirements established in Chapter 62-701, F.A.C., the final cover system for the Munisport Landfill would consist of an impermeable barrier (permeability of 1×10^{-7} cm/sec or less) layer in order to minimize infiltration and erosion. Chapter 62-701.310 F.A.C. allows for the request of an approval of alternate procedures or requirements as long as the petitioner demonstrates that the alternate procedure or requirement provides an equal degree of protection for the public and the environment.

During August 2003, the Engineer of Record, on behalf of the City, requested an Alternate Procedure for the Landfill Closure of the Munisport Landfill. This request consisted of placing a permeable 24-inch thick sand layer instead of the impermeable layer normally required. The Engineer of Record estimates that the permeable layer will cover approximately 50% of the Site. The future structures and paving would provide an impermeable layer on the remaining 50% of the Site. This permeable layer is consistent with the design requirements of the proposed groundwater

remediation system, which relies on the continued infiltration and groundwater movement throughout the landfill area.

The current FDEP closure permit includes authorization of the Alternate Procedures and Requirements, SWAP 94-1, which approves the use of both impermeable and permeable areas. The 24 inch permeable layer, as designed by the Engineer of Record, will be divided into two distinct layers. The bottom layer will consist of 12 inches of a sandy material (Type M, or similar). The upper layer will consist of 12 inches of clean and relatively free-draining topsoil with a well-established vegetative cover of grass or sod.

2.2.3 Gas Management System (Not Changed) Original language from Brown & Caldwell March 2005. PBS&J Engineer of Record, Brown & Caldwell Bond Engineer

Historical documents suggest that landfilling activities at the Site might date as far back as the 1940's. Even though there are no accurate records of landfilling operations prior to the early 1970's, aerial photographs identify active landfilling operations since the mid 1960's. Taking the mid 1960's as the baseline of mayor landfill activities at the Site, the age of the waste varies from approximately 20 to 40 years. Typically, landfills continue to produce gas for many years after their closure. Recent studies performed by H.J. Ross Associates and HSA have shown that landfill gas is still being produced at the Munisport Site but in very small quantities.

The Engineer of Record reviewed the landfill gas generation potential of the Munisport Site using EPA's Landfill Gas Emissions Model (LandGEM), which estimates air pollutant emissions from municipal solid waste landfills. Two scenarios were developed to run the model. The first considered the entire waste as biodegradable and the second assumed that only half (50%) of the total waste mass was biodegradable. The results from the model indicated that in the worst case scenario (100% biodegradable) the methane production increased to a maximum value of 3,768 megagrams per year (Mg/yr) reached in year 1980. From 1981 to present, the methane production has been decreasing. The methane production for year 2003 was calculated at 1,502 Mg/yr.

Under Title V Regulations, the allowable surface emission rate for landfill gas is 500 ppm at 10 cm above the landfill surface. In order to exceed that surface emissions rate, the landfill would have to be producing a minimum of 2,000 Mg/yr. This value is lower than the value calculated for 2003, as mentioned in the previous paragraph. Also, the lower explosive limit for methane is 5% of 50,000 ppm, which is equal to 100 times the allowable surface emission rate specified in the Title V Regulations.

Based on the field studies performed and the gas production estimates derived from the LandGEM model, the Engineer of Record determined that under a conventional landfill closure, the landfill area would require a total of 82 passive gas wells over the entire 164 acres. This is the equivalent of one passive well every two acres. In addition, the Engineer of Record requested an alternate closure procedure to replace the required impermeable cover system with a permeable cover system due to groundwater remediation requirements. The permeable cover would allow gas produced at the landfill to escape to the atmosphere and reduce the potential for gas buildup under the landfill cover.

Since the ultimate goal is to redevelop the Site into a series of housing, commercial, and hotel developments, the gas management system will be considerably different from the one that would be installed for a usual non-redevelopment closure. Buildings and structures to be constructed on-site will require a series of barrier and venting systems to prevent any gas infiltration and buildup that could lead to hazardous conditions if methane concentrations exceed safe levels. Utility lines

will also require a barrier system, as they could provide a path for the gas to enter into the buildings. The actual gas management system will be designed in conjunction with the design of the proposed buildings and structure. The redevelopment of the site has been divided into various phases which will be submitted to FDEP, as completed, for final approval of the gas management system involved.

2.2.4 Stormwater Management System (Not Changed) Original language from Brown & Caldwell March 2005. PBS&J Engineer of Record, Brown & Caldwell Bond Engineer

The Site's stormwater management system has yet to be fully designed and permitted. Instead, the Engineer of Record developed a "Proposed Method for Stormwater Control" that follows the requirements of Florida Department of Environmental Protection (FDEP), South Florida Water Management District (SFWMD), and the Miami-Dade County Department of Planning, Environment and Regulatory Affairs (PERA), formerly the Miami-Dade County Department of Environmental Resources Management (DERM). These state that the system should limit the post-development peak rate of discharge for the 25-year, 72-hour storm design event to that of the pre-development condition for basins with a positive discharge. Closed basins, in the post-development condition, retain the 100- year, 72-hour storm event. For the use of the drainwells as on-site retentions, storage equal to 0.5 inch over the basin area will be provided prior to discharge into the drain well as a water quality volume.

Design criteria of the proposed method included attenuation of the peak flow from post-development conditions basins through stormwater detention basins so as to not exceed predevelopment peak rates of discharge. Water quality retention time volume will be provided for in either stormwater ponds or environmental swales (sodded swales that allow for sediment treatment before discharging to stormwater basins). The post-development stormwater system consists of a system of treatment and attenuation basins that will discharge off-site via environmental swales, drain to on-Site lakes, or discharge to new drain wells.

The design by the Engineer of Record allows for 10,500 linear feet of swales and drainage channels, weirs to control discharge, 10 outfall structures, and approximately 7,500 linear feet of piping, 15 drain wells, and 16 basins.

As part of the proposed stormwater management system the various lake shores in the Site will have to be regraded. The proposed plan consists of removing waste from the shore line and regarding the lake shores to achieve 1:4 grade. It was estimated that 150 sf/lf of the lake bank will need to be peeled back, 24 sf/lf of over-excavation will be needed to remove waste, 24 sf/lf of backfill with final cover over waste, and 54 sf/lf of shore line will have to be excavated under water.

2.2.5 Site Access Control (Not Changed) Original language from Brown & Caldwell March 2005. PBS&J Engineer of Record, Brown & Caldwell Bond Engineer

Access control to the Site will be restricted by 16,500 linear feet of fencing and gate. The fence is a 6.0 foot high fence, 9 gauge, no barbed wire, 2 inch line post, 10 inch O.C., 1-5/8 inch top rail, aluminized steel.

R2.3 Groundwater Remediation

R2.3.01 Project Overview

R2.3.01.01 BACKGROUND

The City of North Miami – Miami-Dade County grant for the closure and remediation of the former Munisport Landfill contains two major sections: landfill closure and groundwater remediation. This revision to the schedule of values (SOV) of the grant is only for the groundwater remediation portion of the project. Currently, including unallocated accrued interest, there is approximately \$14.5 to \$15 million available in the grant to complete the groundwater remediation portion of the project, which includes up to five years of pre-closure O&M.

To date, several groundwater remediation approaches have been considered for the Former Munisport Landfill site. The main approaches that were considered consisted of:

1. Conventional groundwater extraction methods followed by ex-situ biological treatment and re-injection of the treated water into select portions of the surficial aquifer. This approach was approved for pilot testing by PERA (formerly DERM), but was later abandoned by the developer (Biscayne Landing, LLC). This system would be expected to produce 3 to 5 million gallons per day (mgd) of groundwater for treatment, resulting in a relatively large treatment facility. Capital costs for such a system would likely be \$15 to \$20 million and based on a similar system operating in Miami-Dade County (County's Old South Dade Landfill), O&M costs would be well over \$1 million annually.
2. An in-situ system was pilot tested at the site for approximately two years. While the in-situ system would likely have been less costly than options that include groundwater extraction and treatment, it was disapproved by PERA (formerly DERM). The current funding allocated for groundwater remediation in the grant is based on the projected cost of the in-situ system.
3. A funnel and gate (F&G) extraction system followed by ex-situ biological treatment and re-injection of the treated water into the salt water portion of the aquifer, below the contaminant plume was approved for pilot testing by PERA (formerly DERM). This extraction approach has not been used in Miami-Dade County. The F&G system was proposed to minimize the groundwater extraction flow rate, thereby minimizing the required capacity (and cost) of the treatment facility. The extraction system would consist of sheet pile or slurry walls installed to approximately 35 feet below grade and recovery wells would be located within the open slots of the wall (spaced every 300 feet or so). Estimates for the cost of the F&G extraction system with ex-situ treatment range from approximately \$15 to \$20 million, excluding O&M, depending on the flow capacity. Based on the aforementioned similar system in Miami-Dade, O&M costs would be approximately \$1 million annually. Additionally, the F&G extraction system required a \$2.6 million pilot test. When this approach was considered, the developer at the time requested an increase to the grant of \$19 million.

R2.3.01.02 SOV REVISION Amendment 4

The alternative remediation system that is proposed by the team of CH2M Hill prime and SCS ES subcontractor (collectively the Contractor) for the project site consists of a conventional groundwater extraction system utilizing vertical groundwater recovery wells and a Class I injection well to dispose of the groundwater into the boulder zone (approximately 3,300 feet below ground).

This approach provides the level of protection required; uses technology that has been proven and approved in the past by PERA (formerly DERM) throughout Miami-Dade County; can be implemented more timely than other proposed systems; drastically reduces capital and O&M costs; has less uncertainty; and provides much greater flexibility than other systems.

To move forward with the project, a revision to the SOV of the grant is needed to allocate funding for this beneficial approach. The proposed SOV revision provided herein is based on the concepts detailed below. Although the detailed design of this new remediation approach has not commenced, based on experience with the technology proposed and similar local sites, the Contractor has agreed to complete the project for a lump sum (Guaranteed Maximum Price) in an amount less than what is available in the grant for groundwater remediation, plus the accrued interest to date. The Contractor will provide a performance and payment bond to provide assurance that the project will be completed satisfactorily. This approach will result in a minimum savings on the order of \$10 million to project stakeholders.

Along with this “Project Overview”, the revised Schedule of Values (Table R3.1) and a “Basis of Estimate” comprise the documents the Contractor has developed in support of the SOV revision. To develop the SOV revision, the Contractor utilized reasonable estimates of equipment requirements and material quantities based on project requirements and experience on similar sites in South Florida. Because this project will be completed for a lump sum amount and the Contractor is assuming considerable risk, the costs provided in the SOV are only intended to provide a basis for payment to ensure that grant funds are disbursed commensurate with the work progress.

R2.3.01.03 SOV REVISION Amendment 5 PERA Phased Approach Project Overview

R2.3.01.03.01 BACKGROUND

The Miami-Dade County Department of Planning, Environment and Regulatory Affairs (PERA; formerly DERM) issued a letter dated November 23, 2011 requiring the groundwater extraction portion of the remediation project for the referenced site be completed in phases. In general, the phased approach requested by PERA in the letter and in several meetings will consist of installing the groundwater extraction system in two phases and implementing a testing program for a period of time while the first phase is operated. The results of the testing program will then be used to further refine the groundwater model and complete the design and layout of the second phase of the extraction system.

The sensitivity of the mangroves that lie east of the landfill is dictating this phased approach. There is concern by PERA that extracting the fresh groundwater lens at the property boundary, which is required to capture the ammonia contamination, may change the hydro-period and/or salinity and may impact the wetland ecosystem. Because the northern altered mangroves generally exhibit better water quality and are less saline than the southern altered mangroves, at PERA’s request, the first phase of the extraction system will include about 3,700 linear feet along the southern and southeastern property boundary of the total 8,000 linear feet proposed. See **Figure 1** for the proposed phasing layout.

R2.3.01.03.02 OVERVIEW

On a macro-level, the PERA phased project includes the following additional activities and considerations:

- Initial (prior to system start-up) water elevation and quality monitoring in the mangroves and select groundwater wells to establish baseline conditions in the wet and dry seasons in order to be able to make informed decisions after start-up of the groundwater withdrawals. Also conduct one to two tidal-impact studies for one week will be conducted. If two are conducted, one will be during the dry season and one during the wet season. This work must begin as soon as possible in order to have sufficient data collected in both dry and wet seasons before Phase 1 system start-up, which is expected between September and November 2012.
- The first phase of the extraction system will be installed and ready for operation when the injection well and pump station are completed. Extracted groundwater in Phase 1 will be conveyed to the pump station and then to the Class 1 injection well for disposal. The operations and maintenance (O&M) of the system will commence after system start-up and balancing. During the first three months of O&M, we will conduct a pilot test. The Phase 2 portion is expected to come on-line approximately one year after the Phase 1 start-up.
- The existing groundwater model will be revised based on the baseline sampling and Phase 1 monitoring data. The model will then be run to simulate the full extraction system and provide the basis and further demonstration for the design and operation of the Phase 2 extraction system.
- A RAP Addendum (RAPA) will be prepared and submitted to PERA with the design and layout of the Phase 2 system. Upon RAPA approval, the construction plans will be completed to obtain the necessary permit modifications and construction permits and mobilize for construction of Phase 2.
- Because the Phase 2 system is adjacent to the freshwater wetlands (northern altered mangrove preserve (AMP)), PERA has suggested that the Phase 2 system may move westward instead of along the eastern property boundary to avoid potential impacts on the northern AMP (see Exhibit A).

TECHNICAL OVERVIEW

Extraction System – Vertical Recovery Wells (PERA Phased Approach Revised)

Vertical recovery wells will be installed along the eastern and southern property boundaries (approximately total 8,000 feet) to create a hydraulic barrier to off-site migration of the ammonia contaminated fresh water lens below the landfill. Based upon established PERA (formerly DERM) requirements, the lens of groundwater that requires treatment is approximately 20 to 25 feet thick at the eastern property boundary and deepens along the southern boundary as one moves westward. This lens has been defined as Zones 1 and 2 in prior reports.

It is likely that 20 to 40 recovery wells will be required to establish and maintain the hydraulic barrier. Extensive groundwater modeling will be conducted to simulate the extraction system and determine appropriate well spacing and flow rates. Once those criteria are established, wells, pumps, controls, etc. will be sized and selected accordingly. The expected maximum total flow rate for the extraction system is 5 mgd. The extracted groundwater will be conveyed to the injection system pump station (see below) through a common header pipe.

The concept of the extraction system remains the same with the exception that it will be installed as two separate Phases to satisfy PERA's request for monitoring and evaluation of the extraction system and use the collected data to further refine the groundwater model and finalize the layout of the northern portion of the system referred to as Phase 2.

Disposal System

The extracted groundwater is non-hazardous and can be directly injected into the Boulder Zone via Class I Industrial injection well. With this approach, groundwater treatment will not be required, thus eliminating the challenges of other remedies that would require operating a biological treatment system, maintaining effluent quality and preventing system upsets. In addition a biological system would not be able to provide the flexibility in flow control that is inherent in this new proposed remedy.

Class I Industrial Injection Well

The injection well will have a design capacity of 5 MGD (3,500 gpm at 12.5 ft/s) and will be constructed using multiple casings to isolate and protect the aquifers penetrated during drilling and testing. The injection zone will be completed as a nominal 16-inch diameter open-hole from approximately 2,800 feet to 3,300 feet in depth. The exact casing depths will be determined pending evaluation of drilling and testing data throughout well construction and subject to the approval of the FDEP. The injection well steel casings will be installed and fully cemented to ground surface. A monitoring annulus for leak detection will be provided by installing an 11.75-inch Fiberglass Reinforced Plastic (FRP) pipe with packer inside of the final 16-inch diameter seamless steel casing.

As the well is constructed, various data will be collected and submitted to the FDEP in support of the casing setting depths. Additional features of the injection well include continuous measurement and recording of injection flow and pressure. An annular leak detection system will be installed that is comprised of a hydropneumatic tank connected to the fluid-filled annulus between the 16-inch and 11.75-inch well casings. The tank and monitoring annulus will be maintained at an approximate pressure of 125 psi. Pressure and water level monitoring within the hydropneumatic tank will be provided; loss of pressure or the decline in water level within the tank will be used to evaluate the potential development of leaks in the 16-inch and/or 11.75-inch casing during operation.

Dual-Zone Floridan Aquifer Monitor Well

A dual-zone monitor well will be constructed to permit the continuous measurement of the potentiometric surface and for obtaining water samples from two zones within the Floridan aquifer. Drilling and testing will be comparable to that described for the injection well, but will focus on identification of two specific monitoring zones; the selection of the two monitor zones are subject to the approval of the FDEP. Since the Biscayne Landing site is adjacent to Miami-Dade County's North District Wastewater Treatment Plant, there is historical data that indicates the base of the

USDW is located at approximately 1,310 feet below land surface (bls). Current guidance from the FDEP requires the completion of an Upper Monitor Zone (UMZ) at or immediately below the USDW; the location is selected and approved based on site specific testing. A Lower Monitor Zone (LMZ) will be constructed approximately 200 feet below the UMZ. The expected length of the open-hole sections for each monitor zone will be between 50 feet and 100 feet.

Upon completion of the dual-zone monitor well, both monitor zones will be equipped with water sampling and transfer pumps; pressure transducers will be installed to measure and record the elevation of the water surface in the two monitor zones. Purge water produced during periodic sampling of the two monitor zones will be disposed of in the injection well.

Injection Well Pump Station

Groundwater from the extraction trench will be conveyed to the injection well pump station for disposal in the injection well. To the maximum extent possible, “off the shelf” components will be used in the construction of the facility to ensure components can be quickly replaced or repaired should there be a failure. The pump station will be located within close proximity of the injection well to minimize the footprint of the disposal system.

R2.3.02 Basis of Estimate

This basis of estimate has been prepared to support the revised Schedule of Values (SOV) for the City of North Miami – Miami-Dade County grant that incorporates the conventional groundwater extraction and injection system as the method of groundwater remediation at the Former Munisport Landfill site proposed by CH2M Hill prime and SCS ES subcontractor (together the “Contractor”). This basis of estimate and the SOV have been developed by the Contractor based on their prior remediation design, permitting and construction experience nationally and in particular in South Florida, including Miami-Dade County. At the time of developing the SOV, the remediation system is at the conceptual level; however, regulatory agencies having jurisdiction over the project have expressed their support of the concept. The work will include design, permitting, construction and an operations and maintenance period. The Contractor will provide a performance and payment bond to the City of North Miami prior to commencing construction. The bond will provide the City and other stakeholders the assurance that the project will be completed satisfactorily for the amount indicated herein.

1. Performance and Payment Bond

A performance and payment bond will be provided for the construction portion of the project. The bond will be obtained upon completion of design and permitting and will be provided to the City prior to commencing construction. The cost of the bond will be reimbursed at cost and is estimated at 1.1 to 1.3% of the total construction cost.

2. Allowance (PERA Phased Approach Revised)

Permit and agency review fees will be required for the various approvals and permits needed from PERA (formerly DERM), FDEP, SFWMD, building department, etc. Permit and review fees will be reimbursed at cost; \$100,000 has been allocated for these fees. This line item can also be used to reimburse other grant eligible costs.

All permit fees will be issued or reimbursed in the form of a check upon presenting an original receipt or upon submittal of a letter from the Contractor stating the amount of the fee, purpose and agency letter or copy of the requesting agency’s fee table.

The permit fees associated with the Phased Approach are for the SFWMD Water Use Permit Modification and for Construction Permitting. These fees are shown under the Phased Approach item extension of Table R3.1 and on Table1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

3. Engineering and Permitting (PERA Phased Approach Revised)

It is anticipated that the engineering and permitting for the groundwater remediation system will include the following:

- Review, evaluation and acceptance of prior onsite work that will be used in the development of the remediation design, including prior pump tests, geologic investigations, groundwater quality trends, etc.
- Groundwater modeling to demonstrate the effectiveness of the proposed extraction system and predict future groundwater conditions
- Address issues related to potential wetland impacts due to the extraction system
- Stormwater modeling to evaluate the impact to the extraction system capture
- Preparation of a Remedial Action Plan, or modification of prior plans
- Preparation of construction drawings of the full-scale groundwater extraction system
- Preparation of construction drawings of the injection well system including pump station and other appurtenances
- Participation in meetings with regulatory agencies throughout their review process
- Participating in public meetings as necessary

Additionally, this item includes the preparation of applications and services to obtain the following permits/approvals:

- Approval of the RAP by PERA (formerly DERM) Pollution Remediation Section
- Approval of the RAP by PERA (formerly DERM) Coastal Section
- Underground Injection Control (UIC) Permit for well construction from FDEP
- Water Use Permit from SFWMD
- Environmental Resource Permit (ERP) Modification from SFWMD
- Landfill Closure Permit Modification from FDEP
- Permitting of the construction plans through the County and City of North Miami

Ten percent of the construction cost is provided in the SOV for the engineering and permitting services. The fee is based on past experience with projects of this complexity, size, and involving the number of stakeholders, and is commensurate with similar projects. Permit fees are not included in the cost for this item (see item 2).

In order to provide a basis for payment to ensure that grant funds are disbursed commensurate with the work progress, the milestones listed below will be used as a guideline for payment. These are only anticipated activities and others may arise that will require agreement between the Contractor and Independent Engineer on a payment basis. Note that the total compensation for this item is the amount indicated herein (or SOV), and is not dependent on the number of RAIs issued or the specific activities listed below. The percentages within each activity listed below tied to deliverables are the maximum percentage of the fees for that activity that may be drawn upon achieving the milestone.

Activity	% of line item
Initial concept presentation and meetings with agencies, City, County; Contractor will provide meeting materials or other relevant information with the draw	3
Groundwater modeling; Contractor will provide a certified status of work completed for modeling with each draw at 30%, 60% and 90% completion; Final 10% payment upon RAP submittal	15
Address wetland issues; Contractor will provide a certified status report of work completed with each draw at 30%, 60% and 90% completion; Final 10% payment upon RAP submittal	5
Prepare RAP; 30%, 60% and 90% progress payments. Final 10% payment upon RAP submittal	18
Respond to RAP RAI #1; Final payment upon submittal	3
Respond to RAP RAI #2; Final payment upon RAP approval	2
Construction drawings for full-scale extraction system; 60% payment at RAP submittal; 30% payment at submittal for construction permits; Final 10% payment once all permits are obtained	12.5
Water Use Permitting; up to 60% progress payments, 30% upon submittal of application; Final 10% payment upon receipt of permit	2
ERP Permitting; up to 60% progress payments, 30% upon submittal of application; Final 10% payment upon receipt of permit	1
Landfill Closure Permit Mod.; up to 60% progress payments, 90% upon submittal of application; Final 10% payment upon receipt of permit modification	2
FDEP UIC application; up to 90% progress payment, Final 10% payment upon submittal of application	8
Respond to UIC RAI #1; Final payment upon submittal of RAI response	3
Respond to UIC RAI #2; Final payment upon receipt of notice of intent to issue permit	2
Construction drawings for pump station; 30%, 60% progress payments, 90% at submittal for construction permits; Final 10% payment once permits obtained	17.5
Public notice/meetings	1
Construction Permitting; Final payment upon obtaining permits	5
	100

During the course of the design and permitting, draws will be submitted monthly based on the work completed. A description of the work completed and a partial deliverable, as warranted, will be submitted by the Contractor to the Independent Engineer. Generally, the Independent Engineer will review progress against 30%, 60%, 90% and 100% milestone checkpoints. Interim percentages can be paid in the assessment and judgment of the Independent Engineer as to the project progression and completion. The Contractor and Independent Engineer will meet monthly and agree to the percent complete for the activities underway. Draws will be submitted by the Contractor using the standard AIA form and engineer's certification.

The PERA Phase Approach has increased and added items to the above Activity breakdown table. New items include Baseline Monitoring of the Phase 1 extraction system, Phase 1 3-month Pilot Test, updated Groundwater Modeling based on the aforementioned Baseline Monitoring and revisions to the remedial Action Plan (RAP) in the form of an addendum.

The costs associated with these new or increased items are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 (Exhibit A) of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

4. Construction-Phase Engineering, Surveying, and CQA (PERA Phased Approach Revised)

These services will include the following:

- Modification of design documents as necessary
- Surveying during construction and for as-builts
- Quality assurance testing and reporting
- Preparation of O&M Manual
- Operator training, start-up and balancing of the system
- Injection Well and Dual-Zone Monitor Well Engineering Report
- Engineer/Geologist of Record construction certification

Ten percent of the construction cost is provided in the SOV for this item. A majority of the cost for this item is for the supervision by a geologist during the drilling of the injection and dual-zone monitoring well. The contractor is planning on providing coverage by a geologist 24 hours per day during the drilling activities which are expected to last 10 to 12 months. Draws for construction-phase engineering services will be 10% of the amount for construction activities on each draw.

The PERA Phased Approach changes the above construction of the extraction system by doubling mobilization, dedicated engineering, surveying and CQA teams for the Phase 2. The costs associated with this item are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

5. Project Management

This task includes the following essential components of the project during the engineering, permitting, and construction phases:

- Management of in-house personnel and project delivery teams
- Ensuring QA/QC procedures are being implemented
- Coordination, meetings, and communication with Receiver/developer, City, County, and regulatory agencies
- Reporting as necessary throughout project
- Scheduling
- Contracting
- Permit compliance
- Construction administration
- Health and safety monitoring

Five percent of the construction cost is provided in the SOV for project management. The fee is based on past experience, general industry standards, and is commensurate with similar projects. Draws for project management will be based on % completion to a maximum 60% for the Engineering & Permitting Phase and 40% for the Construction Phase. For payment schedule, see Section R3.4 Page 32.

The PERA Phased Approach extends the above Project Management estimate and it is based on the Construction-Phase Engineering, Surveying and QA/QC for the Phase 2. The costs associated with this item are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

6. Mobilization for Site Work and Extraction System (excluding Injection Well System)

This item includes the mobilization of equipment, personnel, temporary offices, project signage, etc. (and also includes all estimated subcontractor mobilization charges). The fee of 7.5% of the construction cost is based on past experience and is commensurate with similar projects. Mobilization line item 6 of the SOV is only for the erosion control, electrical power supply, site preparation, and extraction system line items. A second mobilization line item (item 11) covers the remaining construction scope of work. A draw for mobilization will be submitted after the necessary permits are obtained to allow for construction commencement.

The PERA Phased Approach requires a second Mobilization for Site Work and Extraction System. The costs associated with this item are based on the above 7.5% of the construction cost and are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

7. Erosion Control/Silt Fence (PERA Phased Approach Revised)

In accordance with DERM Natural Resources Coastal Section requirements, it is expected that two rows of silt fence will be installed along the 6,000 foot eastern property boundary and one row along the 2,000 foot southern property boundary for a total of 14,000 linear feet of silt fence. Also, 6,000 feet of high visibility temporary construction fence will be required along the eastern property boundary because of the abutting wetlands.

The cost of \$6.00 per linear foot is less than the \$7.15/LF that was previously approved for the Homestead Landfill project and includes material, installation, and maintenance and repair of the fences for the duration of construction activities. Draws will be based on the percent completed of the total linear footage of silt fence required. 10% is to be paid upon submittal of the notice of intent to use the general NPDES permit and receipt of acknowledgement from the FDEP. 80% is to be paid based on completion of the installation, and the last 10% as 4 equal payments of 2.5% at 3 month intervals as the project progresses to ensure maintenance of the erosion silt fence and compliance with the FDEP and PERA (formerly DERM) regulations and closure of the NPDES permit.

The PERA above erosion control/silt fence costs are for the described 8,000 lineal feet and include maintenance for the original one-year construction period. Since the construction schedule will be increased by one more year with the Phased Approach, the cost to continue to maintain and repair the erosion control/silt fence for that extra year will require an additional \$12,000. The additional year maintenance cost is reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer

8. Electrical Supply to Work Site

Permanent electrical service is anticipated to be 480 volt, 3 phase, 500 amp service from FPL. Tie-in to existing high-voltage electrical service originating at the west side of the Biscayne Landing property will be needed. A lump sum fee of \$25,000 is included for this line item to be paid in full upon completion of the construction activities and energizing of the system.

9. Site Preparation

Significant site preparation activities will be required to enable access to the needed areas of the site by heavy equipment, including the sizable drilling equipment for the deep injection well. Other typical site preparations will also be needed. We have included the following as part of the site preparation activities:

- Approximately 3,500 linear feet of 30'wide access roads for heavy equipment
- Equipment staging area (approximately 50'x50')
- Temporary security fence for staging area
- Temporary electricity distribution for equipment
- Construction pathways, etc.
- Foundations (excavation of waste and replacement with structural fill as needed) for pump station ASTs

Draws for site preparation activities will be equally distributed over a four month period beginning at the inception of site construction work.

10. Extraction System (PERA Phased Approach Revised)

Based on our local experience, the Contractor expects to utilize from 20 to 40 vertical extraction wells to create a hydraulic barrier along the eastern and southern property boundaries. The wells will be sized to accommodate the required pumps and flows that will be needed to create the barrier, based on groundwater modeling results. The wells are expected to terminate at -15' to -25' NGVD, depending on the depth of the salt water interface at the well location. Well diameter will likely be from 8" to 12". The Contractor may utilize open boreholes (similar to those used at the Old South Dade Landfill) if the geology permits.

The recovery wells will be connected through a header system pumping the extracted groundwater to storage tank(s) associated with the injection well pump station. Instrumentation and controls will be installed to operate, monitor and record data from the individual groundwater recovery pumps. Communication with the injection well pump station will be provided as a fail-safe to prevent overflow of the groundwater storage tank(s) in the event of an injection well pump station outage.

The PERA Phased Approach extends the Extraction System components installation period and increases related construction costs for the Phase 2 portion of the system. The costs associated with this item are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

10.1 Recovery Wells

For purposes of preparing the lump sum fee in the SOV, the Contractor assumed an extraction well spacing of 250 feet, resulting in 32 wells to cover the 8,000 feet of eastern and southern property

boundary. The recovery wells will likely consist of flush mounted 8” to 12” diameter PVC slotted well screens with risers. To avoid garbage from entering the screen interval, a surface casing will be installed to seal off the waste from the borehole. Once the casing is installed and the waste removed, the borehole will be advanced until the depth at which the well will be set. The wells will be developed after installation and the development water will be disposed of appropriately. Garbage that comes to the surface during drilling activities will be relocated and covered with temporary cover as appropriate. The unit price of \$9,500.00 per well includes the work described herein as well as the technical supervision needed by an engineer or geologist.

Eight thousand feet of hydraulic barrier are needed. Groundwater model results will determine well spacing and the average linear foot of “coverage” each well provides; therefore, draws for the recovery wells will be based on the percent complete of the required linear feet of barrier needed. Draws may be split to include 30% after well installation; 50% upon installation of pumps and controls; 15% when operational; and 5% when approval of the construction certification for the system is obtained.

See Item 10 above. The PERA Phased Approach extends the Extraction System components installation period and increases related construction costs for the Phase 2 portion of the system. The costs associated with this item are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

10.2 Pumps/Appurtenances

Based on the expected flows of 5 mgd, we anticipate each of the extraction wells will be equipped with the following:

- Instantaneous and totalizing flow meter
- Manually operated flow control valve
- Vault to house flow meter and flow adjustment valve
- Stainless steel 2 hp submersible pump (150 gpm @ 20’ tdh) with Teflon seals and bearings
- Pump controller with level indicator and level alarm
- Level transducer
- 50’ motor lead
- 2” discharge connection
- Satellite monitoring system to display on/off and instantaneous flow for each well

This line item also includes the lateral piping from each recovery well and tapping into the header pipe. The necessary electrical conduit, wiring, and connection for the extraction system are also included in this line item.

The lump sum fee for this line item is based on a unit price of \$13,070 for the assumed 32 recovery wells. The draw basis for the pumps and controls is provided under item 10.1, Recovery Wells.

See Item 10 above. The PERA Phased Approach extends the Extraction System components installation period and increases related construction costs for the Phase 2 portion of the system. The costs associated with this item are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary

presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

10.3 Header Trench Excavation

A header pipe system will be needed to run the entire length of the extraction system to accept flows from the recovery wells. Using the 8,000 linear feet of eastern and southern property boundary and a 6' deep by an average of 4' wide trench to accommodate the pressure pipe results in the following calculation for the material excavation:

$$8,000 \text{ LF} \times 6' \text{ deep} \times 4' \text{ wide} = 192,000/27 = 7,111 \text{ cy}$$

The unit price of \$6.95 per cy of material/waste excavated includes equipment and operators, and is based on a production rate of 250' lf of excavation per day for the trench and is comparable to unit prices from prior projects and industry standards. Draws for the trench excavation will be based on the percent complete of the total required length of header. Draws will be made as follows: 80% based on the linear foot of trench excavated; 10% upon pipe installation; 5% when pipe is tested; and 5% when approval of the construction certification for the system is obtained.

See Item 10 above. The PERA Phased Approach extends the Extraction System components installation period and increases related construction costs for the Phase 2 portion of the system. The costs associated with this item are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

10.4 Relocate Waste from Header Trench

Approximately 7,111 cy of excavated waste from the header trench excavation will be relocated to an on-site location. A swell factor of 1.3 is added to the waste volume, bringing the total volume to 9,244 cy. This waste will be spread, lightly compacted and covered with 1' of temporary cover (see item 10.5).

The unit price of \$8.80 per cy includes \$4.00 per cy for loading, \$1.00 per cy for hauling to an on-site location and \$3.00 per cy for spreading the waste, plus 10% markup. Draws for the relocation of waste from the header trench will be based on the percent complete of the total required length of header, as these activities are expected to occur simultaneously with the header trench excavation.

See Item 10 above. The PERA Phased Approach extends the Extraction System components installation period and increases related construction costs for the Phase 2 portion of the system. The costs associated with this item are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

10.5 Temporary Cover over Waste

One foot of temporary cover will be used to cover the 9,244 cy of relocated waste from the header trench. Assuming a stockpile height of 3', an approximately 288' x 288' area of waste will need cover. One foot of cover over that area yields approximately 3,081 cy of cover material needed.

Using a conversion factor of 1.3 tons per cubic yard and a compaction rate of 1.2, yields a total of 4,807 tons of temporary cover material needed.

The unit price of \$20.88 per ton includes \$14.00 per ton of fill, 7% sales tax, \$4.00/ton to backfill and spread, plus 10% markup. Draws for the temporary cover will be based on the percent complete of the total required length of header, as these activities are expected to occur simultaneously with the header trench excavation.

See Item 10 above. The PERA Phased Approach extends the Extraction System components installation period and increases related construction costs for the Phase 2 portion of the system. The costs associated with this item are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

10.6 Header Pipe

The header system for the groundwater extraction will likely consist of an average of 18" diameter pressure HDPE or similar pipe running the entire length of the extraction system and terminating at the injection well pump station.

The unit price of \$63.25 per linear foot includes \$50.00/lf for materials, 7% sales tax, \$4.00/lf for installation, plus 10% markup. Draws for installation will be based on the percent complete of the total required length of header. Draws for the header pipe will be as follows: 30% when the pipe is delivered; 60% when installed; 5% when the pipe is tested; and 5% when approval of the construction certification for the system is obtained.

See Item 10 above. The Phased Approach extends the Extraction System components installation period and increases related construction costs for the Phase 2 portion of the system. The costs associated with this item are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

10.7 Header Trench Backfill

Select soil, such as crushed limerock, will be used to backfill the header trench. 7,111 cy (from item 10.3) using a conversion factor of 1.3 tons per cubic yard and a compaction factor of 1.2 yields a total of 11,093 tons of fill material needed.

The unit price of \$20.88 per ton includes \$14.00 per ton of fill, 7% sales tax, \$4.00/ton to backfill and spread, plus 10% markup. Draws for the trench backfill will be based on the percent complete of the total required length of header. Draws will be made as follows: 90% per linear foot of trench backfilled; 5% when pipe is tested; and 5% when approval of the construction certification for the system is obtained.

See Item 10 above. The PERA Phased Approach extends the Extraction System components installation period and increases related construction costs for the Phase 2 portion of the system. The costs associated with this item are reflected under the Phased Approach item extension of Table

R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

10.8 Piezometers/Monitoring Wells

We estimate that approximately 40 piezometers/monitoring wells may be required as part of the monitoring network for the remediation system. The piezometers/wells will be installed to various depths; therefore, we used an average cost of \$1,500 which includes drilling and supervision. Draws will be based on the percent complete of the total required piezometers/monitoring wells. Draws will be made as follows: 95% upon completion log submittal; and 5% when approval of the construction certification for the system is obtained.

Injection Well System for Groundwater Disposal

A Class I industrial injection well system will be constructed in accordance with Underground Injection Control requirements in F.A.C. 62-528 and the FDEP’s UIC Class I Test/Injection Well construction permit. The injection well system will include an injection well with an annular leak detection system, dual-zone Floridan aquifer monitor well, and a pump station with associated control and monitoring equipment.

11. Mobilization for Injection Well System

This item includes the mobilization of equipment, personnel, and temporary offices, etc. The fee of 7.5% of the construction cost is based on past experience and is commensurate with similar projects. Mobilization line item 11 of the SOV is only for Injection Well System components (deep injection well, dual-zone monitoring well, and the pump station). A draw for mobilization will be submitted after the necessary permits are obtained to allow for construction commencement.

12. and 13. Class I Industrial Injection Well and Dual Zone Monitor Well

The basis of cost for the construction of the proposed Biscayne Landing injection well system, including a Class I Industrial Injection Well and Dual-Zone Floridan aquifer monitor well, was developed from quotations received January 7, 2010 from three drilling contractors: Youngquist Brothers, Inc. (YBI), All Webbs Enterprises, Inc. (AWE), and Layne Christensen (Layne). Note that the quotations were based on an injection well with a disposal capacity of 5 MGD from groundwater produced from recovery trenches based on the initial groundwater production estimates from modeling. If groundwater recovery wells are used in lieu of trenches, the injection well with a capacity of 5 mgd will likely be needed for disposal at as safe operating velocities. The quotations are summarized as follows:

	YBI	AWE	Layne
Injection Well (3 mgd)	\$4,750,000*	\$3,082,707	\$4,703,711
Dual-Zone Monitor Well		\$1,278,962	\$1,597,925
Total Construction	\$4,750,000	\$4,361,669	\$6,301,636

*Lump sum quote provided for construction of both wells

Analysis of the bids determined that AWE’s quote was significantly lower than historical pricing for similar injection well systems. Also, their referenced projects do not list any injection well construction experience similar to the work required for Biscayne Landing. AWE’s quoted price was

not believed to be representative of the established scope of work. Both Layne's and YBI's quotations were within the expected range for the construction of the injection well system and both contractors have significant experience with the type of drilling required for the Biscayne Landing project. Based on the review of contractor quotations and experience, a price of \$5,525,818 for the construction of the injection well and dual-zone monitor well is appropriate; this price was developed by averaging Layne's and YBI's quotations. Due to the uncertainties in subsurface conditions, the requirements for testing and data evaluation concurrent with the drilling, and regulatory reviews and approvals throughout the well drilling operations, as well as potential cost escalation for commodity materials (i.e. cement, steel, FRP) \$300,000 is added to the quote average, which is normal and customary for the industry. This results in an estimated subcontractor cost for the injection and dual-zone monitor well construction of \$5,825,818.

For the Biscayne Landing groundwater remediation system, the injection well and dual-zone monitor wells are similar in design and depth to those constructed for Miami-Dade Water and Sewer Department (MDWASD) which successfully operate four injection wells and four dual-zone monitor wells at their North District Wastewater Treatment Plant. Additionally, FDEP has indicated that those wells are operating properly and there are no issues related to confinement of the wastewater effluent within the injection zone. Unlike MDWASD's injection wells, the Biscayne Landing injection well will be designed and constructed to comply with Class I industrial injection well standards which includes a pressurized monitoring annulus in the well. To meet the construction standards, an 11.75" FRP casing and packer will be installed in the final 16" steel casing. In the unlikely event of a leak in either the 16" or 11.75" casings, a drop and annulus pressure would occur. With the added 11.75" FRP casing, the injection capacity is 5 mgd at 12.5 ft/s.

In order to provide a basis for payment to ensure that grant funds are disbursed commensurate with the work progress, the following milestones will be used as a guideline for payment:

Activity	% of Line Item
<u>Deep Injection Well</u>	
Pump package/mud cleaning system setup	5
Drilling Rig Erection	5
Drilling Fluid Containment Pad & Pit Casing	5
Proposed 44" casing - drilling, testing & installation	5
Proposed 36" casing - drilling, testing & installation	10
Proposed 26" casing - drilling, testing & installation	35
Proposed 16" casing - drilling, testing & installation	20
Proposed 11.75" casing & packer - installation & testing	10
FDEP Cert & Clearance letter	5
<u>Dual-Zone Monitoring Well</u>	
Drilling Rig Erection	10
Drilling Fluid Containment Pad & Pit Casing	10
Proposed 30" casing - drilling, testing & installation	35
Proposed 20" casing - drilling, testing & installation	25
Proposed 12.75" casing - drilling, testing & installation	15
Proposed 6.625" casing - drilling, testing & installation	5

14. Injection Well Pump Station

Groundwater collected by the groundwater recovery system will be conveyed to the injection well pump station for disposal via deep well injection. For purposes of developing the SOV, we are including as part of the pump station the conveyance piping to the injection well, a hydraulic surge control system, hydropneumatic tank and annular leak detection system for the injection well, dual-zone monitor well sample/transfer pumps and piping, permanent electrical equipment for the pump station, temporary electrical service for the drilling rig, climate controlled precast concrete building (approximately 20' x 12'), monitor and control instrumentation, and ≤50,000 gallons aboveground storage tank(s) (AST).

The pump station will be designed for a maximum flow of 5 mgd and will include basic equipment and controls with a low degree of complexity. The pump station will not be designed or constructed to meet Class I redundancy as defined in EPA-430-99-74-001. No secondary/backup power (generator) will be provided or redundant pump(s), controls, valves and piping.

Three to four constant speed centrifugal pumps, generally off the shelf, will be used for injecting the recovered groundwater into the injection well. Based upon the projected operating pressure range, ±75 horsepower pumps are anticipated to be used to convey the full 5 mgd flow.

AST(s) will be low profile and designed to receive the estimated 5 mgd of groundwater flow produced by the recovery system. The tank(s) will be sized to prevent excessive cycling of the pumps, and to the extent practical, minimize visibility from neighboring properties.

Pump station piping will be Class 250 ductile iron; the primary method of protection of ductile iron and metallic valves will be with epoxy linings/coatings, as required, because the groundwater produced from the recovery system will be brackish. A hydraulic surge suppression system consisting of a bladder filled hydropneumatic tank may be required; hydraulic modeling will be provided for the piping system to evaluate and size the necessary hydraulic surge suppression equipment.

Telemetry between the individual groundwater recovery wells and injection well pump station will provide on/off controls to prevent overflow of the injection pump station AST(s) during outages; other safety elements will be provided as needed.

Temporary power will be required for electric motor powered drilling equipment including drill rig, mud pumps and mud cleaning systems. FPL connection for either 22.9 KV or 13.2 KV power will be provided to a portable sub-station. Tie-in to the existing high voltage power from FPL will occur west of the pump station site and may be run overhead; electrical power for local temporary service will be run at ground surface in 4,160 V shielded mining cable that is identified and protected. Temporary daily power demand will be approximately 500 KW.

Excavation and backfilling with structural fill will be conducted under the precast building, pump station, AST(s) and other places, as needed, to provide adequate foundations for installation of concrete slabs. Use of piles for support is not anticipated.

For collection of groundwater samples from the dual-zone monitor well, two manually operated centrifugal pumps (approximately 2 HP each) will be installed for purging and conveying the

groundwater to the AST(s). Each monitor zone will also be provided with pressure monitoring and recording instrumentation.

For the injection well, flow (instantaneous and totalized) and pressure will be monitored and recorded. Also, a hydropneumatic tank and pressurized nitrogen supply will be connected to the injection well's monitoring annulus. Monitoring and recording instrumentation for pressure and fluid level within the tank will be provided. This equipment comprises the leak detection system required under UIC industrial injection well construction requirements.

In order to provide a basis for payment to ensure that grant funds are disbursed commensurate with the work progress, the following milestones will be used as a guideline for payment:

Activity	% of Line Item
<u>Pump Station</u>	
Temporary Electrical Service for Portable Substation	10
Permanent Electrical Service for Pump Station	10
Concrete Foundations (Pumps, Tanks, Precast Bldg.)	5
Groundwater Storage Tank(s)	10
Injection Pumps, Piping, and Hydraulic Surge System	50
Precast Bldg (approx. 12' x 20')	3
Injection Well Annular Monitoring Tank	1
Dual-Zone Well Pumps and Piping	1
I&C	5
Start up Services	5

The Contractor will meet with the Independent Engineer each month prior to submittal of the draw to review the work progress and agree to the percentage complete on each of the pump station construction activities. Generally, the Independent Engineer will review progress against 30%, 60%, 90% and 100% milestone checkpoints. Interim percentages can be paid in the assessment and judgement of the Independent Engineer as to the project progression and completion.

15. Annual Pre-closure Operations, Monitoring and Maintenance (PERA Phased Approach Revised)

In accordance with the City-County grant, operations, monitoring and maintenance expenses for activities associated with the groundwater remediation system are grant eligible for the period of time up to the completion of the landfill closure. At this time, the expected completion date of the landfill closure is unknown; therefore, the five years of O&M activities allocated in the line item are simply based on the available grant funds for groundwater remediation. If the landfill is closed within the five years allocated in this line item, pre-closure O&M activities will no longer be grant eligible at the time of closure completion/certification, regardless if there is funding left in this line item.

As part of this item, we anticipate conducting the following activities specifically for the groundwater remediation system:

- Performing weekly inspections of the extraction and injection systems
- Repairing or replacing parts as needed to maintain performance of the system
- Balancing and adjusting the system as necessary

- Conducting water quality sampling and analyses as required for compliance of the extraction and injection systems
- Preparing quarterly reports of system performance and others as required by the regulatory agencies for the remediation system
- Preparing renewal applications for permits specifically for the remediation system
- Mechanical integrity testing of the injection well at year five as required by the FDEP UIC permit

The fee for Pre-closure Operations, Monitoring and Maintenance in the SOV is for a 5 year duration, beginning after system start-up and balancing. This item does not include activities associated with the landfill closure or routine site-wide water quality monitoring. Charges for electricity consumption are to be paid by the Developer or the City of North Miami. This will be determined by the administrator of the property. *(This section supersedes section 3.3.4)*

The total monies allocated for this item are \$1,405,000.00. Payment of O&M activities shall be disbursed in the form of a \$23,416.66 monthly fee. The Contactor must submit signed and sealed monthly reports for the O&M services rendered. Reports shall include the operation logs, maintenance logs, report of activities completed and significant invoices for equipment replacement (if required and verified by the City and PWWM (formerly DSWM) upon the expiration of the warranty period.

The PERA Phased Approach extends the Extraction System components installation period and increases related construction costs for the Phase 2 portion of the system. The costs associated with this item are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

The PERA Phased Approach requires that the extraction system be in operation and maintained upon completion of the Phase 1 portion. Since, the system will be operating for a year before the entire extraction system (Phase 2) is completed and on-line.

The total monies available for this item remain the same; however, the disbursement of the monies is changed to allow for the immediate O&M monthly payments required following the Class 1 Well, dual-zone monitoring well and pump station completion, certification and start-up and balancing procedure.

2.3.1 Original Ex Situ Treatment System (Deleted, Not Applicable)

2.3.2 In Situ Treatment System (Deleted, Not Applicable)

Process Theory (Deleted, Not Applicable)

Bench Scale and Pilot Scale Testing (Deleted, Not Applicable)

Prototype Treatment System (Deleted, Not Applicable)

Full Scale Treatment (Deleted, Not Applicable)

CHAPTER R3.0

SCHEDULE OF VALUES

The original Schedule of Values (SOV) developed for the Munisport Landfill Closure is the result of an extensive review of related reports, consent agreements and resolutions, cost estimates, actual engineering costs, and construction costs. A number of meetings were held between the DSWM, the Bond Engineer, the Developer and its representatives, and the City of North Miami during this effort.

The original Developer retained the services of the former Engineer of Record, PBS&J, and HSA Engineers and Scientists (HSA) to head the landfill closure and groundwater remediation efforts. The former Engineer of Record had been leading the landfill closure efforts and HSA developed the prototype for the in situ groundwater remediation system. Later ARCADIS proposed the funnel & gate ex-situ remediation system. Currently CH2M Hill, prime, and SCS ES, minority subcontractor have proposed a Class I Industrial well disposal system on a Lump Sum contract basis. The revised March 10, 2011, Amendment 4 SOV is based on the lump sum contract as indicated in the preceding Chapter 2.0 SOV REVISION, as per the June 2010 and the January 2011 Amendments # 2 & #3, respectively, and language in this Chapter 3.0 in addition to the agreed revisions by all parties at the February 22, 2011 meeting at the DSWM. Amendment 5 is a result of PERA's Phase Approach.

R 3.1 Basis of the Schedule of Values PERA's Phased Approach Revised

The Revised Schedule of Values presented in the Revised Table R3-1 dated April 26, 2012 is the agreed upon document that governs the Draw and Payment Basis for the Groundwater Remediation Lump Sum Contract. The Table is divided into two main sets of table rows:

- Landfill Closure (Not part of this revision); and
- Groundwater Remediation.

The original Schedule of Values incorporated two main concepts (and groups of table columns) for each component "Item" of the Munisport Project:

- Project Maximum Total (the maximum dollar amount, as adjusted for inflation annually, that is Grant-Eligible); and
- Draw Payment Basis (basis for measuring physical progress, and therefore payment, toward the Project Maximum Total.)

The Project Maximum Total is computed based on accepted unit costs (such as cost per acre), or on an accepted percent of a reference dollar amount (such as "hard" cost sub-total).

The Draw Payment Basis is presented either as a formula (such as acres completed or percent of total acres completed), as a reference to actual vendor invoices submitted. For the proposed Groundwater Remediation, the draw payment will be based on a percentage of completion of the items in the SOV as indicated on Amendment 4 Table R3.1. (Note that there is an existing Lump Sum Contract between the current Receiver, Charles DeSanti, and the Contractor, CH2M Hill and

SCS ES as a subcontractor based on the June 2010 Amendment 2 that is assignable to a future Developer or the City.) Amendment 5 is a result of PERA's Phased Approach. It is based on Amendment 4 with the addition of phased items.

In order to prepare the Revised Schedule of Values, the Independent Engineer reviewed the "Conceptual Closure and End Use Plan" dated August 2003 and its subsequent revisions prepared by the former Engineer of Record PBS&J and Brown & Caldwell (March 2005). For the Closure items there were no changes.

For the groundwater section, the Independent Engineer reviewed the proposed construction cost for the Class I disposal system with industry standard costs for similar projects.

3.2 Landfill Closure Schedule of Values (Not Changed) Original language from Brown & Caldwell March 2005. PBS&J Engineer of Record, Brown & Caldwell Bond Engineer

As part of the application to FDEP to close the Munisport Landfill, the Engineer of Record developed a cost estimate reflecting each component of the conceptual closure approach. This cost estimate was integrated into "Part S: Financial Responsibility Requirement" of the permit application. Part S provides a brief description of the required closure activities and the associated cost. The cost estimates were derived from actual landfill closures done in recent years, recent material cost and delivery quotes to nearby landfill, and well-known cost estimating sources such as RSMMeans Site Work & Landscape Cost Data.

The Bond Engineer reviewed the "Conceptual Closure and End Use Plan" for the Munisport Landfill and performed its own analysis to verify the data provided. A Schedule of Values was prepared which tied the format proposed by the Developer with the data provided by the Engineer of Record on the "Conceptual Closure and End Use Plan". This Schedule of Values was discussed in a series of meetings between the PWWM (formerly DSWM), the Bond Engineer, and the Developer and its consultants in order to reach agreement on a final Schedule of Values which would then be used as the basis for the review of draw requests.

The following paragraphs provide a description of the items listed in the Schedule and Values and the supporting data for the PMT. It was agreed that the PMT's would be divided by a standard measurement unit in order to facilitate work review and payment for work performed. The basic units used were: cost per acre, cost per linear foot, and percent of total system completed.

3.2.1 Mobilization (Not Changed) Original language from Brown & Caldwell March 2005. PBS&J Engineer of Record, Brown & Caldwell Bond Engineer

The first item on the Schedule of Values is Mobilization. General mobilization activities involve setting up field offices, storage, equipment staging and parking areas and transporting equipment and crews to the Site. Mobilization typically represents approximately 5% of the total construction cost (in Table 3-1, 5% of the Closure Construction Sub-Total of \$13,817,151 is used). The mobilization cost PMT corresponding to the estimated closure cost of the Munisport Landfill is therefore \$690,858. It is anticipated that the Mobilization item will be part of the first Draw Request.

3.2.2 Grading (Not Changed) Original language from Brown & Caldwell March 2005. PBS&J Engineer of Record, Brown & Caldwell Bond Engineer

The Grading item in the Schedule of Values is composed of the following components: Clearing, Cut and Chip, Lake Shore Regrading, Rough Grading, Remove Unsuitable Material, Initial Cover, and Temporary Fencing.

There has been little activity at the Site since the landfilling operations were discontinued. Therefore, the Site is overgrown with vegetation. Clearing and Cut and Chip activities will be required in order to remove this vegetation before any construction activities can commence at the Site. The Engineer of Record estimated that the entire Site (164 acres) will require Clearing, and Cut and Chip activities. Estimated unit costs are \$4,850.00/acre and \$4,425.00/acre, respectively. These unit costs were derived from data provided on RSMeans Site Work & Landscape Cost Data. The Bond Engineer reviewed the cost estimate and agreed that it represented a fair cost for these activities. The PMT's for these activities are \$795,400 for Clearing and \$725,700 for Cut and Chip, as reflected in the Schedule of Values.

A series of lakes and ponds are located within the Site that will be utilized as part of the stormwater management system. Current regulations require that a ledge be created along the shoreline of each lake and pond. The Engineer of Record provided an estimate of the cost of constructing a 6.0 foot ledge along the shoreline in Part S of the Conceptual Closure and End Use Plan and followed up with a more detailed quantity estimate prepared in December 2004. This later estimate resulted in calculation of a total of 10,900 linear feet of lake shore that would require reguarding and estimated the total cost PMT at \$501,019. The Schedule of Values reflects a per unit cost of \$45.97/linear foot used to develop the PMT.

The Engineer of Record estimated that half of the Site (82 acres) will require rough grading activities. Rough grading at the Site calls for an average of 1.5 feet of cut or fill in order to achieve a smooth surface that generally follows the natural contour of the original grade of the landfill. The quantity of material to be removed has been estimated to be approximately 200,000 cubic yards and the associated cost to be just over \$2.00/cy. The total cost estimate PMT for the rough grading activities is \$410,000. This total cost has been divided into the respective cost per acre unit, which results in a unit cost of \$2,500.00/acre, as shown in the Schedule of Values.

It is expected that, during the rough grading activities, some bulky waste materials (trash, tires, metal, white goods, etc.) will be exposed and will require removal to an off-site facility for disposal or recycling. The Engineer of Record estimated that a total of 20,000 cubic yards of this bulky material will require collection and removal. The unit cost has been estimated at \$15.00 per cubic yard. The total cost PMT for hauling is therefore \$300,000.

Once the rough grading activities are completed, an initial layer of cover will be placed and spread over the entire 164 acres. This Initial Cover layer will be 6.0 inches thick and is intended to provide initial cover to waste exposed during rough grading as well as a bedding layer to the final cover layers to be placed on top. The cost estimate for the initial cover item was developed using a total of 132,266 cubic yards of material (for the 6.0 inch thickness layer over the 164 acres) at a cost of \$12.28 per cubic yard for a total cost PMT of \$1,624,226. The corresponding per acre unit cost is \$9,903.82.

A temporary fence around the Site is required during the closure and construction activities to limit public access to the Site. The Engineer of Record established that a total of 16,500 linear feet of temporary fencing will be required to cover the perimeter of the Site. The cost estimate for a

temporary chain link fence has been set at \$15.00 per linear foot. Therefore, the total cost PMT for the Temporary Fence item is \$247,500.

3.2.3 Cap and Cover (Not Changed) Original language from Brown & Caldwell March 2005. PBS&J Engineer of Record, Brown & Caldwell Bond Engineer

The Final Cover system reflected in the Schedule of Values is different from that described in the “Part S Financial Responsibility Requirements” Section prepared by the Engineer of Record, in that the Part S 12.0 inches of slope and fill plus the 12.0 inches of top soil cover have been reconfigured to 6.0 inches of initial cover plus 20.0 inches of Final Cover and 4.0 inches of Ground Cover. The configuration reflected on the Schedule of Values resembles a typical configuration used for closure of landfills in Miami-Dade County. The unit cost for the Initial Cover material, discussed above, was kept consistent with the cost estimate shown in Part S.

It was estimated that a total of 440,886 cubic yards of material would be required to provide the 20.0-inch layer of Final Cover and 88,177 cubic yards of material for the 4.0- inch Ground Cover throughout the entire 164 acres. Using the cost estimate provided in Part S for the material, delivery, placement and spreading equal to \$12.28 per cubic yard, the total cost estimate for the Final Cover and the Ground Cover calculates to \$5,414,088 PMT and \$1,082,817 PMT, respectively. The respective unit cost for the Final Cover is \$33,012.73 per acre and the unit cost for the Ground Cover is \$6,602.55 per acre.

3.2.4 Stormwater Management System (Updated)

The conceptual Stormwater Management System for the Site was discussed in Chapter 2.0 of this report, and even though the final design has not been completed, the former Engineer of Record, PBS&J, provided a series of allowances for the different components that will be required in the final system. These allowances provide for 10,500 linear feet of swales and drainage channels, weirs to control discharge, 10 outfall structures, approximately 7,500 linear feet of piping and the construction of 15 drain wells and 16 basins. The total cost PMT for the entire Stormwater Management System has been estimated at \$2,229,000 and was divided into a unit value of \$13,591.46 per acre. It was anticipated that the payments will be based on the percent completion of each of the basins based on the total value calculated from the total acreage of the basin.

Draw Requests for this item were computed as follows. Drainage basins are of various acreages. Each drainage basin will therefore represent a unique portion of the overall PMT amount of \$2,229,000. Since there can be considerable elapsed time between the initiation and completion of each drainage basin, physical progress, and therefore Draw Request approval, will be based on the percent of each drainage basin completed. A drainage basin is considered 60% complete when only the basin is in place with the additional 40% slated for the drainage well installation. For example, if SW -15 (basin name) has an area of 12.58 acres, and during the walkthrough with the engineer of record the agreed upon completed acreage is 6, then the percent complete would be $6 \times 60\% = 3.6$ acres/203.17 (the total acres covered by the stormwater management system) = 1.77% x the inflated adjusted project maximum total in the schedule of values. This is applicable to all the catch basins. The current overall Engineer of Record, SCS ES, has obtained SFWMD and DERM permits and licenses since 2007. Payments have been made on previous Draws for this section under the above described method of payment.

3.2.5 Gas Management System (Not Changed) Original language from Brown & Caldwell March 2005. PBS&J Engineer of Record, Brown & Caldwell Bond Engineer

The cost estimate for the Gas Management System was based on the conceptual passive system described in Chapter 2.0. The conceptual system consists of installing 82 passive gas wells and 25 gas monitoring probes throughout the Site. The cost for installing the passive wells was estimated at \$5,700 per well and the monitoring wells were estimated at \$800 per well. The total cost PMT for the Gas Management System is \$487,400.

As mentioned in the discussion of the gas system in Chapter 2, the final Gas Management System will be different from the one described in the Conceptual Closure Plan and Part S of the same report. The Gas Management System that will be installed will consist of venting and barrier features constructed as part of the structures and utility lines that will be built. Therefore, Draw Request payments will be based on the percent completion of total footprint acreage of structures and utilities that require a gas venting system. For example, if the total acreage footprint of the structures and utilities that will require a gas venting or barrier system is 50 acres, the corresponding payments will be calculated by measuring the gas barrier system constructed and its associated acreage which will be divided by the total 50 acres to determine the percentage completed. This percentage will then be applied to the \$487,400 PMT to determine the corresponding payment.

3.2.6 Other Items (Not Changed) Original language from Brown & Caldwell March 2005. PBS&J Engineer of Record, Brown & Caldwell Bond Engineer

There are several eligible “soft costs” that are included in the cost estimate of the Closure. These costs are estimated as percentages of the Closure Construction Sub-Total of \$13,817,151. The Schedule of Values shows two distinct items for:

- a) Closure and Alternate Procedure Permitting, and
- b) Engineering, Modifications, Survey, Testing, and Inspections.

The Closure and Alternate Procedure Permitting has been estimated at 5% of the Closure Construction Sub-Total, which represents a PMT of \$726,860. The Engineering, Modifications, Survey, Testing, and Inspections are activities which will be on-going during the construction of the landfill closure and have been estimated as 10% of the Closure Construction Sub-Total, which represents a PMT of \$1,381,715. These items are included in Part S in items 10 and 11 as Engineering and Professional Services. The cost reflected in Part S and in the FDEP Forms is based on the corresponding closure cost estimate shown in the FDEP Form.

R3.3 Groundwater Remediation

It was agreed that draws for work associated with groundwater remediation at the site will be based on percent complete costs as per Amendment 4. The cost estimates developed in the Revised Schedule of Values originally were part of Amendment 2 and are included in the Lump Sum Contract between the Receiver, Charles DeSanti, and the Contractor (CH2M Hill, prime and SCS ES, subcontractor) that is assignable to a future Developer or the City. The costs presented in the Revised Schedule of Values were determined through the Independent Engineer’s review of cost estimates provided by CH2M Hill and SCS ES. Generally, the Revised Schedule of Values presented

is based on the assumption that the proposed system will be successful, and that implementation of the system will comply with the desired goals and regulatory criteria. Since a total new concept and system is being proposed, then the original Schedule of Values for the groundwater remediation had to be updated to match the proposed system. The City currently is the assigned party of the Lump Sum Contract originally entered into with the Receiver.

The CH2M Hill and SCS ES Project Overview and Basis of Estimate provide a description of the different items listed in the Revised Schedule of Values and the basis for the cost estimates. Each draw related to the groundwater remediation system will contain contractor's supporting design and permitting progress, proof of submittals, copies of permits, backup data for construction verification including surveys, tests results, permanent power installation and energizing, start up and system calibration on a percent complete of the Lump Sum Contract for the work performed.

3.3.1 Bench Scale and Pilot Scale Testing (Deleted, Not Applicable)

3.3.2 IRAP Prototype (Deleted, Not Applicable)

3.3.3 Full Scale Remediation System (Deleted, Not Applicable)

3.3.4 Pre-closure Operations, Monitoring and Reporting

The original language for this section 3.3.4 has been superseded in its entirety by section 15 on page 19. The following original language is depicted here for historical continuity only.

It had been agreed that the operation of monitoring would be eligible for draws for seven (7) years, the original estimated time it will take to complete the landfill closure. This element of the remediation cost includes power consumption supplies, sampling analysis, reporting and labor.

R3.4 Project Management (PERA Phased Approach Revised)

Significant eligible costs are incurred for project management of the Closure and Groundwater Remediation efforts, and these are reflected in the last item labeled "Project Management" at the bottom of the Schedule of Values. The Grant Agreement (Section III-Use of Grant Funds, Paragraph B) stipulates that administrative costs associated with the project are eligible uses of Grant Funds. The eligible amount is set at 5% of the available amount of \$10,350,792.98, which results in a dollar allowance of \$517,539.65 to be disbursed as follows:

Up to 60% during the Design and permitting phase (\$310,523.79)

The remaining 40% during the Construction phase. (\$207,015.86)

The PERA Phased Approach extends the above Project Management estimate and it is based on the construction costs for the Phase 2. The costs associated with this item are reflected under the Phased Approach item extension of Table R3.1 and on Table 1 of the Preliminary Extraction System Phasing Budget Amendment Summary presented by the Consultant to the City and subsequently reviewed and agreed upon by the City, the County and the Independent Engineer.

R3.5 Total Project Maximum PERA Phased Approach Revised

R3.5.1 Amendment 4 Total Project Maximum History

The Total Project Maximum for the entire project overall shown in the current Revised Schedule of Values is \$34,817,562.95 as of September 30, 2009. This amount is greater than the base grant amount of \$31,027,000, and includes approximately \$3,790,562.095 through September 30, 2009 in preliminarily projected interest that may be earned, and therefore, added into the Escrow Account. The Grant Agreement stipulates that interest earned by the Grant Funds in the Escrow Account may be used for eligible purposes. It should be noted that interest earned will vary widely as a function of applicable interest rates and of the pace with which the initial amount of \$31,027,000 is drawn down. It should be clarified that the County is funding eligible uses only up to the base grant amount (\$31,027,000) plus any interest earned. Any eligible amounts above the sum of the base amount and the earned interest cannot be funded by the County under the Grant Agreement.

R3.5.2 Amendment 5 PERA Phased Approach Total Project Maximum

The Total Revised and Updated Project Maximum for the entire project overall shown on Table R3.1 in the current Revised Schedule of Values including interest is \$35,014,787.12 as of December 31, 2011. The Grant Agreement stipulates that interest earned by the Grant Funds in the Escrow Account may be used for eligible purposes. Therefore, the PERA Phased Approach is to be funded from the remaining \$433,535 on the Project Allowance and transfer \$12,197 from the \$212,823.20 available interest as of March 31, 2012 to the Project Allowance Item in order to satisfy the Total Phased Project Change Order. Furthermore, the City of North Miami has requested that after the transfer of interest funds to the Project Allowance Item, the available remaining interest monies as of December 31, 2011 be paid to the City as compensation for the City's Project Management of the Project. Note that the County's funding is eligible only up to the base grant amount (\$31,027,000) plus any interest earned. Any eligible amounts above the sum of the base amount and the earned interest cannot be funded by the County under the Grant Agreement.

See Table R3.1 following page 36.

CHAPTER 4.0

CONSTRUCTION OVERSIGHT WORK PLAN

R4.1 The Bond Engineer Scope of Work

The Independent Engineer will determine compliance with the following terms of the Grant Agreement as follows:

- a) Allowable use of grant funds as set out in Section III of the Grant Agreement, including those uses of grant funds set forth in paragraph A, B and C of the Agreement; and
- b) Compliance with regulatory agency technical and permitting requirements, including those referenced in paragraph A, B and C of the Grant Agreement.

Together, these two components constitute the Construction Oversight function that must be accomplished by the Independent Engineer. The purpose of this Chapter 4.0 is to document and describe the steps involved in accomplishing the Construction Oversight function. The major tasks required to address Independent Engineer Construction Oversight items a) and b) presented immediately above are:

- Preparation for Draw Request Processing (Section 4.2 below)
- Draw Request Processing (Section 4.3 below)

Each construction Draw Request from the Escrow Account shall be based upon the Revised Schedule of Values (Table R3-1 dated April 26, 2012) and associated backup documentation prepared by the City or its Contractor (CH2M Hill and SCS ES) certified by the Engineer of Record and agreed upon by the City. Draw Requests will be reviewed provided supporting design and permitting progress, proof of submittals, copies of permits, backup data for construction verification including surveys, tests results, physical observation of physical construction progress, permanent power installation and energizing, start up and system calibration on a percent complete of the Lump Sum Contract for the work performed are included. Review of each Draw Request for Grant Eligibility and for compliance with regulatory agency technical and permitting requirements will occur simultaneously.

R4.2 Preparation for Draw Request Processing

Preparation for Draw Request Processing will be accomplished through the following sub-tasks:

- Review Draw Request Package, verify percentage of completion and confirm status of Accompanying Documentation with the regulatory and permitting agencies
- Review and Compare Draw Request and Field Data, and verify physical work progress
- Submit Request for Additional Information from the Developer, Receiver and /or his Engineers (as required)
- Additional Corroborative Activity

Descriptions of these sub-tasks are presented below:

4.2.1 Attend Weekly Progress Meeting (Deleted, Not Applicable)

4.2.2 Perform Walk-Through Inspections to Verify Physical Work Progress and Compile Bond Engineer Weekly Report (Deleted, Not Applicable)

4.2.3 Conduct Monthly Walk-Through with the Engineer of Record (Deleted, Not Applicable)

R4.2.4 Review Draw Request Package and Accompanying Documentation

Upon receipt of the preliminary Draw Request Package from the City or its Contractor (CH2M Hill and SCS ES), the Independent Engineer will have, subject to data completeness, fifteen business days to validate the percentage completion by checking documents provided and those at or in the process to be submitted to the regulatory agencies, quantities of materials, percentage of construction completion, Contractor's invoices, subcontract documents and releases of liens etc. submitted as part of the Draw Request Package.

R4.2.5 Review and Compare Draw Request and Field Data, and Site Visit

Upon receipt of a Draw Request during construction or other field activities and during the fifteen business days required for the Independent Engineer to review a preliminary Draw Request package, documentation and other data requests agreed upon during the walkthrough with the City or its Contractor (CH2M Hill and SCS ES) and the Engineer of Record and the Independent Engineer shall be confirmed as being a part of the Draw Request Package and shall be made available to the Independent Engineer as promptly as possible.

Any additional information required by the Independent Engineer to verify information contained in the Draw Request Package will be sent to the City or its Contractor in writing.

For each Draw Request, the City or its Contractor shall submit to the Independent Engineer, a complete package of quantities, and backup paperwork supporting the quantities for which payment is been requested. Draw Requests shall be in a summary format consistent with the agreed upon Schedule of Values as part of the Revised Table R 3.1 dated April 26, 2012, included Chapter 3.0 of this report. During the construction or field activities phase, upon the submittal of a Draw Request package, the Engineer of Record, along with the Independent Engineer, will conduct a comprehensive walk-through of the areas for which the City or its Contractor will be submitting quantities for a payment for Draw Request.

R4.2.6 Submit Request for Additional Information from the City or its Contractor (as required)

During the initial fifteen business days required by the Independent Engineer to process the Draw Request, any additional information required to provide clarity to data contained in the Draw Request Package will be sent to the City in writing.

The time taken by the City or its Contractor to respond to the Independent Engineer's request will be additional time that will be added to the initial 15 working days processing time.

R4.3 Approval of Draw Request

Upon corroborating the quantities in the preliminary Draw Request package submitted by the City or its Contractor with field data collected during the walkthrough with the Contractor and the Engineer of Record, and upon receipt of a response from the City or its Contractor to request(s) for additional information needed to process the Draw Request, the final agreed upon document will be processed, approved within three days and then routed by the Independent Engineer to the PWWM.

The Independent Engineer will prepare a Draw Request approval cover letter for Grant Eligible items as agreed upon the Revised Schedule of Values Table R 3.1 and said letter will accompany the Draw documents routing to the PWWM. This cover letter will also include comment on Regulatory Compliance.

R4.4 Additional Corroborative Activity

R4.4.1 Maintain Photographic History of Project during Construction

The Engineer of Record and the City or its Contractor shall compile a picture catalogues of all phases of construction as it progresses and submit them to the Independent Engineer.

- Digital photographs should be taken in color so as to best display the situation being depicted
- All digital photographs should have a description following the number sequence by using the “rename” feature on most computers.

The following items will be photographed, as applicable:

1. Preconstruction Site condition
2. Equipment, both special and typical
3. Material stockpile showing condition, location and method of storage
4. Unsafe or potentially hazardous conditions
5. Severe weather conditions and storm damage
6. Cave-ins, settlement
7. Unusual ground or water conditions
8. Casing driving, drilling and testing activities
9. Building and mechanical equipment progress
10. Completion photographs
11. Accident report photographs

R4.4.2 Meetings with DSWM as Required

As needs dictate the Independent Engineer will meet with PWWM staff to discuss issues related to the project. These meetings may include, as required, members of the Munisport stakeholders: City of North Miami representatives. Contractor and Engineer of Record.

4.5 Summary Draw Request Processing Flow Chart (Deleted, Not Applicable)

R4.6 Forms

The Independent Engineer and other project stakeholders shall utilize the following key Forms during the

Construction Oversight and Draw Request processing effort:

- AIA G703
- City of North Miami Draw Request Letter
- Stormwater Management System Draw Worksheet
- Landfill Gas Management System Worksheet

Table R3-1 [1-4,6&7]
Munisport Landfill Closure and Remediation
Schedule of Values and Grant Escrow Draw Bases
Revision April 26, 2012

AMENDMENT 5

		Project Maximum Calculation					Draw Payment Basis	
Item	Description	Progress Unit	Project Maximum		Base Project Maximum Total	Inflation Adjusted [5] Unit Cost	Inflation Adjusted [5] Project Maximum Total	Progress Measurement as Basis for Draw Payment
			Number of Units	Unit Cost				
Closure^[9]								
1. Mobilization		See Draw Payment Basis	NA	NA	\$690,857.55	NA	\$690,857.55	Project Maximum set at 5% of Closure Construction Sub-Total. This draw is paid at beginning of Oversight Period.
	Mobilization Sub-Total				\$690,858		\$690,857.55	
2. Grading								
	a. Clearing	Acres	164	\$4,850.00	\$795,400.00	\$5,184.65	\$850,282.60	Actual Acres Completed.
	b. Cut and Chip	Acres	164	\$4,425.00	\$725,700.00	\$4,730.33	\$775,773.30	Actual Acres Completed.
	c. Lake Shore Regrading	Linear Feet	10,900	\$45.97	\$501,019.00	\$49.14	\$535,589.31	Actual Linear Feet Completed.
	d. Rough Grading	Acres	164	\$2,500.00	\$410,000.00	\$2,672.50	\$438,290.00	Actual Acres Completed.
	e. Remove Unsuitable Material	Acres	164	\$1,829.27	\$299,999.95	\$1,955.49	\$320,699.95	Actual Acres Completed.
	f. Initial Cover	Acres	164	\$9,903.82	\$1,624,226.48	\$10,587.18	\$1,736,298.11	Actual Acres Completed.
	g. Temporary Security Fencing	Linear Feet	16,500	\$15.00	\$247,500.00	\$16.04	\$264,577.50	Actual Linear Feet Completed.
	Grading Sub-Total				\$4,603,845.43		\$4,921,510.77	
3. Cap and Cover								
	a. Final Cover	Acres	164	\$33,012.73	\$5,414,088.00	\$35,290.61	\$5,787,660.07	Actual Acres Completed.
	b. Ground Cover	Acres	164	\$6,602.55	\$1,082,817.65	\$7,058.12	\$1,157,532.07	Actual Acres Completed.
	Cap and Cover Sub-Total				\$6,496,905.65		\$6,945,192.14	
4. Stormwater Management System		Acres	164	\$13,591.46	\$2,229,000.00	\$14,529.27	\$2,382,801.00	Project Maximum Total for each basin is that basin's percent of total project basin acreage. Each basin's Project Maximum Total will be paid in two parts: 60% once grading is completed, and 40% once drainage wells are completed.
5. Gas Management System		Percent	NA	NA	\$487,400.00		\$521,030.60	Draws based on percent completion of total project footprint acreage of structures and utilities venting system.
	Systems Sub-Total				\$13,817,151.08		\$2,903,831.60	
6. Other								
	a. Closure and Alternate Procedure Permitting	See Draw Payment Basis	NA	NA	\$726,860.00		\$726,860.00	Draws based on actual costs on vendor invoices. Draws should not exceed 5% of Closure Construction Sub-Total.
	b. Engineering, Mods, Survey Testing, and Inspections	See Draw Payment Basis	NA	NA	\$1,381,715.11		\$1,477,053.00	Closure Construction Sub-Total. Draws based on 10% of Closure Construction Draws as draws are processed. Aggregate draws for this item should not exceed 10% of Closure Construction Sub-Total.

Table R3-1 [1-4,6&7]
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Revision April 26, 2012

AMENDMENT 5

		Project Maximum Calculation					Draw Payment Basis	
Item	Description	Progress Unit	Project Maximum		Base Project Maximum Total	Inflation Adjusted [5] Unit Cost	Inflation Adjusted [5] Project Maximum Total	Progress Measurement as Basis for Draw Payment
			Number of Units	Unit Cost				
Others Sub-Total					\$2,108,575.11		\$2,203,913.00	
Total Closure					\$16,616,583.00		\$17,665,305.06	
<u>Groundwater Remediation</u>								
1. Bench Scale and Pilot Testing [10]	See Draw Payment Basis	NA	NA		\$580,152		\$580,152.00	Actual costs per vendor invoices. This draw is paid at beginning of Oversight Period. 100% of the budget was utilized. See previous draws documentation (AIA form G-703).
Test Sub-Total					\$580,152.00		\$580,152.00	
2. IRAP Prototype [10]	See Draw Payment Basis	NA	NA		\$1,461,641		\$1,461,641.19	Actual costs per vendor invoices and based on \$1,500,000 budget. See previous draws documentation (AIA form G-703).
IRAP Prototype Sub-Total					\$1,461,641.19		\$1,461,641.19	
3. Funnel & Gate Pilot Test [11]	See Draw Payment Basis	NA	NA		\$92,398.41		\$92,398.41	Actual costs per vendor invoices. Actual budget was \$2,659,000.00. See previous draws documentation (AIA form G-703).
Funnel & Gate Sub-Total					\$92,398.41		\$92,398.41	
4. Extraction & Class I Well Disposal [12]	See Draw Payment Basis	LS	\$13,171,718.72		\$13,171,718.72		\$13,171,718.72	Percent completion in categories; Section references are in the February 2011 CLCP Update.
1. Payment & Performance Bond	See Section R2.3.02-1	NA	\$130,540		\$130,540.00		\$130,540.00	Direct reimbursement of actual cost estimated at 1.1 to 1.3 % of Groundwater Remediation Total construction cost.
Subsection 1. Sub-Total					\$130,540.00		\$130,540.00	
2. Permits & Agency Review Allowance	See Section R2.3.02-2	NA	\$100,000		\$100,000.00		\$100,000.00	
Subsection 2. Sub-Total					\$100,000.00		\$100,000.00	
3. Engineering & Permitting	See Section R2.3.02-3 & Activity Table	Percentage Applied	\$1,035,294.30					Activity Table appears on Page 10 of Jun 2010, Jan 2011 & March 2011 CLCP Generally, the Independent Engineer will review progress against 30%, 60%, 90% milestone checkpoints. Interim percentages can be paid in the assessment and judgement of the Independent Engineer as to the project progression and completion.
3.1 Initial Concept Meetings		3.0%	\$31,058.83		\$31,058.83		\$31,058.83	
3.2 Groundwater Modelling		15.0%	\$155,294.15		\$155,294.15		\$155,294.15	30%, 60%, 90% and 100% Progress payments from the indicated unit cost. See page 10 of March 2011 CLCP.
	Progress Draws up to 90%	90.0%	\$139,764.73					
	100% Payment	At RAP Submittal	10.0%	\$15,529.41				
3.3 Wetland Issues		5.0%	\$51,764.72		\$51,764.72		\$51,764.72	30%, 60%, 90% and 100% Progress payments from the indicated unit cost. See page 10 of March 2011 CLCP.
	Progress Draws up to 90%	90.0%	\$46,588.24					

Table R3-1 [1-4,6&7]
Munisport Landfill Closure and Remediation
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Revision April 26, 2012

AMENDMENT 5

		Project Maximum Calculation					Draw Payment Basis	
Item	Description	Progress Unit	Project Maximum		Base Project Maximum Total	Inflation Adjusted [5] Unit Cost	Inflation Adjusted [5] Project Maximum Total	Progress Measurement as Basis for Draw Payment
			Number of Units	Unit Cost				
	<i>100% Payment</i>	At RAP Submittal	<i>10.0%</i>	\$5,176.47				
3.4	RAP Preparation		18.0%	\$186,352.97	\$186,352.97		\$186,352.97	30%, 60%, 90% and 100% Progress payments from the indicated unit cost. See page 10 of March 2011 CLCP.
	<i>Progress Draws up to 90%</i>		<i>90.0%</i>	\$167,717.68				
	<i>100% Payment</i>	At RAP Submittal	<i>10.0%</i>	\$18,635.30				
3.5	Response RAP RAI #1		3.0%	\$31,058.83	\$31,058.83		\$31,058.83	100% upon submittal of response to RAI.
3.6	Response RAP RAI #2	At RAP Approval	2.0%	\$20,705.89	\$20,705.89		\$20,705.89	100% upon RAP approval.
3.7	Construction Drawings for Extraction System		12.5%	\$129,411.79	\$129,411.79		\$129,411.79	60% payment at RAP submittal; 30% payment at construction permit submittal and 10% payment once all permits are obtained. See page 10 Mar 2011 CLCP.
	<i>Draw #1</i>	At RAP Submittal	<i>60.0%</i>	\$77,647.07				
	<i>Draw #2</i>	At Construction Permit Submittal	<i>30.0%</i>	\$38,823.54				
	<i>100% Payment</i>	Final Permit Obtained	<i>10.0%</i>	\$12,941.18				
3.8	Water Use Permit		2.0%	\$20,705.89	\$20,705.89		\$20,705.89	60%, 90% and 100% Progress payments from the indicated unit cost. See page 10 of March 2011 CLCP.
	<i>Progress Draws up to 60%</i>		<i>60.0%</i>	\$12,423.53				Interim percentages can be paid in the assessment and judgement of the Independent Engineer as to the project progression and completion.
	<i>Draw 90%</i>	Upon Application Subittal	<i>30.0%</i>	\$6,211.77				
	<i>100% Payment</i>	Final Permit Obtained	<i>10.0%</i>	\$2,070.59				
3.9	ERP Permit		1.0%	\$10,352.94	\$10,352.94		\$10,352.94	60%, 90% and 100% Progress payments from the indicated unit cost See page 10 of March 2011 CLCP.
	<i>Progress Draws up to 60%</i>		<i>60.0%</i>	\$6,211.77				Interim percentages can be paid in the assessment and judgement of the Independent Engineer as to the project progression and completion.
	<i>Draw 90%</i>	Upon Application Subittal	<i>30.0%</i>	\$3,105.88				

Table R3-1 [1-4,6&7]
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Revision April 26, 2012

AMENDMENT 5

		Project Maximum Calculation					Draw Payment Basis	
Item	Description	Progress Unit	Project Maximum		Base Project Maximum Total	Inflation Adjusted [5] Unit Cost	Inflation Adjusted [5] Project Maximum Total	Progress Measurement as Basis for Draw Payment
			Number of Units	Unit Cost				
	100% Payment	Final Permit Obtained	10.0%	\$1,035.29				
3.10	Landfill Closure Permit Modification		2.0%	\$20,705.89	\$20,705.89		\$20,705.89	60%, 90% and 100% Progress payments from the indicated unit cost. See page 10 of March 2011 CLCP.
	Progress Draws up to 60%		60.0%	\$12,423.53				Interim percentages can be paid in the assessment and judgement of the Independent Engineer as to the project progression and completion.
	Draw 90%	Upon Application Submittal	30.0%	\$6,211.77				
	100% Payment	Final Permit Obtained	10.0%	\$2,070.59				
3.11	FDEP UIC Application		8.0%	\$82,823.54	\$82,823.54		\$82,823.54	30%, 60%, 90% and 100% Progress payments from the indicated unit cost. See page 10 of March 2011 CLCP.
	Progress Draws up to 90%		90.0%	\$74,541.19				
	100% Payment	Upon Application Submittal	10.0%	\$8,282.35				
3.12	Response UIC RAI #1	Upon Response Submittal	3.0%	\$31,058.83	\$31,058.83		\$31,058.83	
3.13	Response UIC RAI #2	Upon Notice of Intent to Issue	2.0%	\$20,705.89	\$20,705.89		\$20,705.89	
3.14	Construction Drawings for Pump Station		17.5%	\$181,176.50	\$181,176.50		\$181,176.50	30%, 60%, 90% and 100% Progress payments from the indicated unit cost. See page 10 of March 2011 CLCP.
	Draw #1 30%		30.0%	\$54,352.95				Interim percentages can be paid in the assessment and judgement of the Independent Engineer as to the project progression and completion.
	Draw #2 60%		30.0%	\$54,352.95				Interim percentages can be paid in the assessment and judgement of the Independent Engineer as to the project progression and completion.
	Draw #3 90%	At Construction Permit Submittal	30.0%	\$54,352.95				Interim percentages can be paid in the assessment and judgement of the Independent Engineer as to the project progression and completion.
	100% Payment	Final Permit Obtained	10.0%	\$18,117.65				
3.15	Public Notice/Meetings		1%	\$10,352.94	\$10,352.94		\$10,352.94	
3.16	Construction Permitting	Final Permit Obtained	5%	\$51,764.72	\$51,764.72		\$51,764.72	

Table R3-1 [1-4,6&7]
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		Project Maximum Calculation					Draw Payment Basis	
Item	Description	Progress Unit	Project Maximum		Base Project Maximum Total	Inflation Adjusted [5] Unit Cost	Inflation Adjusted [5] Project Maximum Total	Progress Measurement as Basis for Draw Payment
			Number of Units	Unit Cost				
Subsection 3. Sub-Total					\$1,035,294.30		\$1,035,294.30	
	4. Construction Phase Engineering, Surveying & Construction Quality Assurance (CQA)	See Section R2.3.02-4; 10% of the amount of construction activity contained in each draw		\$1,035,294.30	\$1,035,294.30		\$1,035,294.30	Generally, the Independent Engineer will review progress against % completed milestone checkpoints. Interim percentages can be paid in the assessment and judgement of the Independent Engineer as to the project progression and completion.
Subsection 4. Sub-Total					\$1,035,294.30		\$1,035,294.30	
	5. Project Management			\$517,647.15	\$517,647.15		\$517,647.15	See page 11 and 25 of March 2011 CLCP.
	5.1 Design & Permitting Phase		60%	\$310,588.29			\$310,588.29	See section R2.3.02 Item 3 Engineering and Permitting on pages 9-10 . Includes DRY RUN of City of North Miami Bldg. Dept. permits.
	5.2 Construction Phase		40%	\$207,058.86			\$207,058.86	
Subsection 5. Sub-Total					\$517,647.15		\$517,647.15	
	6. Mobilization for Site Work & Extraction System			\$159,450.50	\$159,450.50		\$159,450.50	Start of Construction. See page 12 of Jun 2010, Jan 2011 & Mar 2011 CLCP.
Subsection 6. Sub-Total					\$159,450.50		\$159,450.50	
	7. Erosion Control/Silt Fence			\$120,000.00	\$120,000.00		\$120,000.00	10% is to be paid upon submittal of the notice of intent to use the general NPDES permit and receipt of acknowledgement from the FDEP. 80% is to be paid based on completion of the installation, and the last 10% as 4 equal payments of 2.5% at 3 month intervals as the project progresses to ensure maintenance of the erosion silt fence and compliance with the FDEP and DERM regulations and closure of the NPDES permit. See page 12 of Mar 2011 CLCP.
Subsection 7. Sub-Total					\$120,000.00		\$120,000.00	
	8. Electrical Supply to Work Site			\$25,000.00	\$25,000.00		\$25,000.00	100% upon completion of construction activities and energizing of the system. See page 12 of March 2011 CLCP.
Subsection 8. Sub-Total					\$25,000.00		\$25,000.00	
	9. Site Preparation			\$230,000.00	\$230,000.00		\$230,000.00	4 payments for 4 months at start of construction. See page 12 of Mar 2011 CLCP.
Subsection 9. Sub-Total					\$230,000.00		\$230,000.00	
	10. Extraction System				\$1,751,006.63			
	10.1 Recovery Wells			\$304,000.00			\$304,000.00	Basis of payment: 30% well inst., 50% pump inst.,15% operational, 5% const cert. See page 13 of Mar 2011 CLCP.
	10.2 Pumps/Controls			\$418,240.00			\$418,240.00	Basis of payment: 30% well inst., 50% pump inst.,15% operational, 5% const cert. See page 13 of Mar 2011 CLCP.
	10.3 Header Trench Excavation			\$49,421.45			\$49,421.45	Basis of Payment: 80% per LF, 10% per LF pipe, 5% operational, 5% const cert. See page 14 of Mar 2011 CLCP.
	10.4 Relocate Waste from Header Trench			\$81,349.84			\$81,349.84	Based on item 10.3, see page 14 of Mar 2011 CLCP.

Table R3-1 ^[1-4,6&7]
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		Project Maximum Calculation					Draw Payment Basis	
Item	Description	Progress Unit	Project Maximum		Base Project Maximum Total	Inflation Adjusted [5] Unit Cost	Inflation Adjusted [5] Project Maximum Total	Progress Measurement as Basis for Draw Payment
			Number of Units	Unit Cost				
	10.5 Temporary Cover (1 ft) over Item 10.4 Waste			\$100,370.16			\$100,370.16	Based on item 10.3, see page 14 of Mar 2011 CLCP.
	10.6 Header Pipe (18")			\$506,000.00			\$506,000.00	Basis of Payment: 30% delivery, 60% inst, 5% test, 5% const cert. See page 15 of Mar 2011 CLCP.
	10.7 Header Trench Backfill			\$231,625.18			\$231,625.18	Basis of Payment: 90% per LF backfill, 5% test, 5% const cert. See page 15 of Mar 2011 CLCP.
	10.8 Piezometers/Monitoring Wells			\$60,000.00			\$60,000.00	Basis of Payment: 95% completion log submittal, 5% const cert. See page 15 of Mar 2011 CLCP.
Subsection 10. Sub-Total					\$1,751,006.63		\$1,751,006.63	
	11. Mobilization for Injection System			\$562,847.85	\$562,847.85		\$562,847.85	Start of UIC construction. See page 15 of Mar 2011 CLCP.
Subsection 11. Sub-Total					\$562,847.85		\$562,847.85	
	12. Deep Injection Well	See Section R2.3.02-12 &13 & Activity Table		\$4,483,000.00	\$4,483,000.00			Activity Table appears on Pgs 16 & 17 of Mar 2011 CLCP Generally, the Independent Engineer will review progress against % milestone checkpoints. Interim percentages can be paid in the assessment and judgement of the Independent Engineer as to the project progression and completion.
	12.1 Pump Package/Mud Cleaning System		5%	\$224,150.00			\$224,150.00	
	12.2 Drill Rig Erection		5%	\$224,150.00			\$224,150.00	
	12.3 Drilling Fluid Containment Pad & Pit Casing		5%	\$224,150.00			\$224,150.00	
	12.4 Proposed 44" Casing - drilling, testing, installation		5%	\$224,150.00			\$224,150.00	
	12.5 Proposed 36" Casing - drilling, testing, installation		10%	\$448,300.00			\$448,300.00	
	12.6 Proposed 26" Casing - drilling, testing, installation		35%	\$1,569,050.00			\$1,569,050.00	
	12.7 Proposed 16" Casing - drilling, testing, installation		20%	\$896,600.00			\$896,600.00	
	12.8 Proposed 11.75" Casing - drilling, testing, installation		10%	\$448,300.00			\$448,300.00	
	12.9 FDEP Certification & Clearance Letter		5%	\$224,150.00			\$224,150.00	
Subsection 12. Sub-Total					\$4,483,000.00		\$4,483,000.00	
	13. Deep Dual Zone Monitoring Well	See Section R2.3.02-12 &13 & Activity Table		\$1,885,000.00	\$1,885,000.00			Activity Table appears on Pages 16 & 17 of Mar 2011 CLCP. Generally, the Independent Engineer will review progress against % milestone checkpoints. Interim percentages can be paid in the assessment and judgement of the Independent Engineer as to the project progression and completion.

Table R3-1 ^[1-4,6&7]
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Item	Description	Progress Unit	Project Maximum		Base Project Maximum Total	Inflation Adjusted [5] Unit Cost	Inflation Adjusted [5] Project Maximum Total	Progress Measurement as Basis for Draw Payment
			Number of Units	Unit Cost				
13.1	Drill Rig Erection		10%	\$188,500.00			\$188,500.00	
13.2	Drilling Fluid Containment Pad & Pit Casing		10%	\$188,500.00			\$188,500.00	
13.3	Proposed 30" Casing - drilling, testing, installation		35%	\$659,750.00			\$659,750.00	
13.4	Proposed 20" Casing - drilling, testing, installation		25%	\$471,250.00			\$471,250.00	
13.5	Proposed 12.75" Casing - drilling, testing, installation		15%	\$282,750.00			\$282,750.00	
13.6	Proposed 6.625" Casing - drilling, testing, installation		5%	\$94,250.00			\$94,250.00	
Subsection 13. Sub-Total					\$1,885,000.00		\$1,885,000.00	
14.	Pump Station	See Section R2.3.02-14 & Activity Table		\$1,136,638.00	\$1,136,638.00			Activity Table appears on Page18 of Mar 2011CLCP Generally, the Independent Engineer will review progress against % milestone checkpoints. Interim percentages can be paid in the assessment and judgement of the Independent Engineer as to the project progression and completion.
14.1	Temporary Electric for Portable Substation		10%	\$113,663.80			\$113,663.80	
14.2	Permanent Electric for Pump Station		10%	\$113,663.80			\$113,663.80	Must be 100% completed including energizing to satisfy subsection 7 above .
14.3	Concrete Foundations (Pumps, Tanks, Bldg,)		5%	\$56,831.90			\$56,831.90	
14.4	Groundwater Storage Tanks		10%	\$113,663.80			\$113,663.80	
14.5	Injection pumps, Piping & Hydraulic Surge System		50%	\$568,319.00			\$568,319.00	
14.6	Precast Bldg./Concrete		3%	\$34,099.14			\$34,099.14	
14.7	Injection Well Annular Monitoring Tank		1%	\$11,366.38			\$11,366.38	
14.8	Dual-Zone Well Pumps & Piping		1%	\$11,366.38			\$11,366.38	
14.9	I&C		5%	\$56,831.90			\$56,831.90	
14.10	Start up Services		5%	\$56,831.90			\$56,831.90	Must have City of North Miami Certificate of Occupancy or Certificate of Completion and upon system capable of operating on a continuous basis.
Subsection 14. Sub-Total					\$1,136,638.00		\$1,136,638.00	

Table R3-1 [1-4,6&7]
Munisport Landfill Closure and Remediation
Schedule of Values and Grant Escrow Draw Bases
Revision April 26, 2012

AMENDMENT 5

		Project Maximum Calculation					Draw Payment Basis	
Item	Description	Progress Unit	Project Maximum		Base Project Maximum Total	Inflation Adjusted [5] Unit Cost	Inflation Adjusted [5] Project Maximum Total	Progress Measurement as Basis for Draw Payment
			Number of Units	Unit Cost				
Extraction & Class I Well Disposal Sub-Total					\$13,171,718.73		\$13,171,718.73	
Sub-Total Groundwater Remediation					\$15,305,910.33		\$15,305,910.33	Item includes the Deep Injection Well in addition to the previous systems.
15	Pre-Closure Operations, Monitoring and Reporting			\$1,405,000.00	\$1,405,000.00		\$1,405,000.00	5 Years O&M Levelized Monthly Fee of \$23,416.66; Backup in the form of operations logs, maintenance logs, report of activities completed and significant invoices are required on a monthly basis. See page 19 of March 10, 2011 CLCP.
Pre-Closure Sub-Total					\$1,405,000.00		\$1,405,000.00	
Total Groundwater Remediation					\$16,710,910.33		\$16,710,910.33	
Sub-Total Project Maximum							\$34,376,215.39	
Amendment 5 [13]								This Amendment is necessary to accommodate the PERA requirement to Phase the project. These are additional monies that are added to the allocations listed above. The description of these items can be found in the Basis of Estimate Section (R2.3.02) of the April 2012 revision of the CLCP document for the project. Section numbers specific to the line item appear below.
	Baseline Sampling and Reporting	See Section R2.3.02 - 3		\$61,600				
	Phase 1 System 3-Month Pilot Test	See Section R2.3.02 - 3		\$32,942				
	Groundwater Modeling	See Section R2.3.02 - 3		\$80,200				
	RAPA	See Section R2.3.02 - 3		\$42,000				
	SFWMD Water Use Permit Modification	See Section R2.3.02 - 2		\$5,200				
	Construction Permitting	See Section R2.3.02 - 2		\$5,176				
	Construction-Phase Engineering, Surveying & CQA	See Section R2.3.02 - 4		\$70,000				
	Project Management	See Section R2.3.02 - 5		\$21,225				
	Erosion Control/Silt Fence	See Section R2.3.02 - 7		\$12,000				
	Mobilization Site Work & Extracation System Phase 2	See Section R2.3.02 - 6		\$8,070				
	Extraction System Construction	See Section R2.3.02 - 10 to 10.7		\$107,319				
Sub-Total Amendment 5					\$445,732			
Project Allowance used for Amendment 5 PERA's Phased Approach							\$433,535.00	Discretionary fund to be used for unexpected permit or licenses renewals other than the regulatory permits outlined above including the City of North Miami Building Department permits. Dispersal of funds requires prior concurrence from PWWM and approval from the Independent Engineer.
Interest Transfer	used for Amendment 5 PERA's Phased Approach			\$12,197.00			\$12,197.00	Transferred available funds from Grant's interest after 12/31/2011

Table R3-1 ^[1-4,6&7]
Munisport Landfill Closure and Remediation
Schedule of Values and Grant Escrow Draw Bases
Revision April 26, 2012

AMENDMENT 5

		Project Maximum Calculation					Draw Payment Basis	
Item	Description	Progress Unit	Project Maximum		Base Project Maximum Total	Inflation Adjusted [5] Unit Cost	Inflation Adjusted [5] Project Maximum Total	Progress Measurement as Basis for Draw Payment
			Number of Units	Unit Cost				
Sub-Total Project Allowance Account							\$445,732.00	
Total Project Maximum							\$34,821,947.39	
City Administrative Costs		Month	60	\$3,214.00	\$192,839.73		\$192,839.73	Allocated to the City of North Miami for monitoring and project management of the Project on a 60 month disbursement basis to be invoice with each Pay Request Draw. \$192,839.73/60mo = \$ 3214.00 monthly
Total Project Maximum Including City Costs							\$35,014,787.12	

Grant Recap	
Total Grant Amount Including Interest as of 12/31/11	\$35,014,787.12
Total Project Maximum Cost (Consultant/Contractor)	\$34,821,947.39
Residual Amount (Allocated to City)	\$192,839.73

Interpretation & Use of the April 9, 2012 Schedule of Values (SOV) Revision

1. This version was published based on the CLCP Amendments 2, 3 and 4 issued by A.D.A. Engineering on June 28, 2010, January 26, 2011 and March 10, 2011 to reflect the tasks and draws associated with the design-build lump sum contract for the "Extraction and Class 1 Deep Well Disposal Groundwater Remediation Option" (item 4 of the Groundwater Remediation Schedule) developed by Charles DiSanti et al, Court appointed Receiver, CH2M Hill and ES Consultants, Engineers.
2. Should a contradiction between the CLCP documents and this April 9, 2012 SOV Table R3.1 version be noted, this April 9, 2012 SOV Table R 3.1 will take precedent in matter of values and payment.
3. Amendment 5 is a result of PERA's Phased Approach. It has been determined that in order to comply with PERA's request for a Phased Approach, the available Project Allowance monies must be supplemented with a transfer of funds from the available Grant's interest monies. The PERA request post dates the signed Lump Sum Agreement between the Receiver (Assignee the City) and the consultants CH2MHill/ES Consultants.
4. The City has requested and it is allowed to use the residual amount interest monies to fund the City's monitoring and Project Management of the Project.

Footnotes

1. Project Maximum Calculation, as previously adjusted for inflation, represents the maximum that is Grant Eligible for each item. Progress Payment Basis (right block in Schedule) presents actual basis for individual draw request review. Overall intent is for draws to track actual physical progress for each item as reasonably closely as possible.
2. Original Unit Costs and Project Maximum Totals based primarily on PBS&J Part S Financial Responsibility Requirements for landfill components and on H.S.A. estimates provided for items 1 & 2 as reviewed by Brown and Caldwell. Groundwater item 3 based on conceptual system estimate provided by ARCADIS as reviewed by MPI and preliminary ARCADIS design payment review by ADA Engineering. Groundwater remediation cost estimates provided by ES Consultants and CH2MHill for Item 4 (proposed in 2010) as reviewed by ADA Engineering. Groundwater remediation costs (item 4) are based on a lump sum design/build contract.
3. Draws for most Closure items are based on actual acres completed (where Progress Unit is "Acres".) Other items are based on actual progress units or actual vendor invoices as shown. 2010 Draws for groundwater remediation invoicing based upon percent completion, operational capabilities, certifications, and operating permits from regulatory agencies
4. Unit Costs in the Closure Schedule for non one-time items going forward can be adjusted each January 15th (effective January 1st) based on ENR's Construction Cost Index for preceding 12 months. Groundwater Remediation Schedule item 4 costs are all fixed as it is a lump sum contract.
5. This is an historical note. The Inflation Index used for the 2005 adjustment versus Base was ENR's Construction Cost Index listed in ENR's January 3/10, 2005 Issue. The index reported was 6.9% for calendar year 2004. Closure Unit Costs from Part S information were adjusted for one year inflation, as Part S costs were developed at least 12 months before this calculation.
6. The June 2010 Groundwater Remediation Schedule amended table is based on a fixed total cost of \$15,305,910.33
7. Total Project Maximum (the sum of the Project Maximum Totals) may show a figure higher than the base Grant Amount of \$31,027,000; any draw amounts above the base Grant Amount will be funded from accrued interest earnings, if any, of the Escrow Account. The Grant Agreement provides for interest earnings to be retained in the Escrow Account. It should be noted, however, that the County is not obligated, under the Grant Agreement, to fund draws above the sum of: the base grant amount plus earned interest. **Groundwater Remediation completion is for a lump sum.**
8. (Reserved)
9. Closure Section of SOV Unchanged from original Agreements & Document Prepared by Brown & Caldwell
10. Authorized by BCC in 2004 Grant Agreement
11. Groundwater Remediation Treatment Concept Approved by MPI; A.D.A. Engineering approved a reduced amount from the Receiver's invoice after forensic analysis of design documents
12. System proposed by Receiver and Its Engineers; SOV verified by A.D.A. Engineering
13. PERA's Phased Approach proposal by the City of North Miami and their Consultants has been reviewed and verified by A.D.A. Engineering See Exhibit A Copy of Revised Amendment to Design/Build Groundwater Remediation Contract Implementation of Phased Approach

EXHIBIT A



CH2M HILL Engineers, Inc.
North Park 400
1000 Abernathy Road, Suite 1600
Atlanta, GA 30328
Tel 770.604.9182
Fax 770.604.9282
www.ch2mhill.com

March 7, 2012

Mr. Stephen Johnson, City Manager
City of North Miami
776 N.E. 125th Street
North Miami, Florida 33161

Re: Munisport Landfill (a.k.a. Biscayne Landing)

**Subject: Revised Amendment to Design/Build Groundwater Remediation Contract
Implementation of Phased Approach**

Dear Mr. Johnson:

As you know, the Miami-Dade County Department of Planning, Environment and Regulatory Affairs (PERA; formerly DERM) issued a letter dated November 23, 2011 requiring the groundwater extraction portion of the remediation project for the referenced site be completed in phases. In general, the phased approach requested by PERA in the letter and in several meetings will consist of installing the groundwater extraction system in two phases and implementing a testing program for a period of time while the first phase is operated. The results of the testing program will then be used to further refine the groundwater model and complete the design and layout of the second phase of the extraction system.

CH2M HILL and ES Consultants (collectively the Contractor) have evaluated the cost and schedule impacts of PERA's required two-phased approach and are herein submitting this request for an Amendment to the existing contract between CH2M HILL and the City for the additional work. This revision of the Amendment incorporates the agreements made with the Miami-Dade County Public Works and Waste Management Department (PWWM) and their Independent Engineer during our February 6, 2012 meeting. See **Attachment 1** for relevant meeting summaries.

BACKGROUND

The sensitivity of the mangroves that lie east of the landfill is dictating this phased approach. There is concern that by extracting the fresh groundwater lens at the property boundary, which we are required to do to capture the ammonia contamination, changes in hydro-period and/or salinity may impact the wetland ecosystem. Because the northern altered mangroves generally exhibit better water quality and are less saline than the southern altered mangroves, at PERA's request, the first phase of the extraction system will include about 3,700 linear feet along the southern and southeastern property boundary of the total 8,000 linear feet proposed. See **Figure 1** for the proposed phasing layout.

OVERVIEW

On a macro-level, the phased project includes the following additional activities and considerations:

- Initial (prior to system start-up) water elevation and quality monitoring in the mangroves and select groundwater wells to establish baseline conditions in the wet and dry seasons in order to be able to make informed decisions after start-up of the groundwater withdrawals. We will also conduct one to two tidal-impact studies for one week. If two are conducted, one will be during the dry season and one during the wet season. This work must begin as soon as possible in order to have sufficient data collected in both dry and wet seasons before Phase 1 system start-up, which is expected between September and November 2012.
- The first phase of the extraction system will be installed and ready for operation when the injection well and pump station are completed. Extracted groundwater in Phase 1 will be conveyed to the pump station and then to the Class 1 injection well for disposal. The operations and maintenance (O&M) of the system will commence after system start-up and balancing. During the first three months of O&M, we will conduct a pilot test. The Phase 2 portion is expected to come on-line approximately one year after the Phase 1 start-up.
- The existing groundwater model will be revised based on the baseline sampling and Phase 1 monitoring data. The model will then be run to simulate the full extraction system and provide the basis and further demonstration for the design and operation of the Phase 2 extraction system.
- We will then prepare and submit a RAP Addendum (RAPA) to PERA with the design and layout of the Phase 2 system. Upon RAPA approval, we will complete the construction plans, obtain the necessary permit modifications and construction permits and mobilize for construction of Phase 2.
- Because the Phase 2 system is adjacent to the freshwater wetlands (northern altered mangrove preserve (AMP)), PERA has suggested that the Phase 2 system may move westward instead of along the eastern property boundary to avoid potential impacts on the northern AMP (see Figure 1).

SCOPE OF WORK AND FEES

The sections below describe the items requiring additional funding and the basis for the phased approach cost estimate in accordance with Munisport Site Comprehensive Landfill Closure Plan (CLCP) and Schedule of Values, Amendment 4, dated March 10, 2011, and the Munisport Landfill Groundwater Remediation System Design Build contract, dated September 9, 2010.

Table 1 (attached) summarizes the phased approach cost estimate. A revised project schedule accounting for the phased extraction approach is provided as **Attachment 2**.

1. Baseline Monitoring

Baseline monitoring is required prior to the operation of the Phase 1 extraction system to establish the pre-operating surface water quality and water levels in the wetlands and the locations where the groundwater extraction is proposed. The baseline monitoring will consist of up to ten sampling events (routine semi-annual sampling at the landfill not funded by the grant will supplement the baseline data). The following will be completed:

- Collect surface water samples at 12 locations within the wetlands
- Surface water sample analysis for TDS, ammonia, and chloride
- Collect water level measurements at seven surface water locations
- Collect groundwater level measurements at 45 monitoring wells
- Tidal study - daily continuous water level recording at 10 groundwater and 3 surface water locations for one week to monitor the water levels in the mangrove preserve, altered mangrove preserve, and groundwater. A second tidal study may be conducted if required by PERA
- Procure and install up to two continuous surface water samplers in the mangrove preserve and/or altered mangroves.
- Tabulate and evaluate the data. The reporting is included in the RAPA.

The fee for the Baseline Monitoring is **\$61,600** and is detailed in the attached cost spreadsheet.

2. Pre-closure Operations, Monitoring and Maintenance – First Year

Once the injection system (injection well, dual-zone monitoring well, and pump station) and the Phase 1 extraction system are constructed, the system will go through a rigorous start-up and balancing procedure. After that, we will commence the first year of system O&M in accordance with the CLCP. Below is an excerpt from the CLCP regarding the scope of work and fees for O&M (additional information added in parentheses):

- “Performing weekly inspections of the extraction and injection systems
- Repairing or replacing parts as needed to maintain performance of the system
- Balancing and adjusting the system as necessary
- Conducting water quality sampling and analyses as required for compliance of the extraction and injection systems (as stipulated in the approved RAP and UIC Permit)
- Preparing quarterly reports of system performance and others as required by the regulatory agencies for the remediation system
- Preparing renewal applications for permits specifically for the remediation system
- Mechanical integrity testing (MIT) of the injection well at year five as required by the FDEP UIC permit (assumes Contractor is maintained throughout five-year O&M period)

The fee for Pre-closure Operations, Monitoring and Maintenance in the SOV is for a 5 year duration, beginning after system start-up and balancing. This item does not include activities associated with the landfill closure or routine site-wide water quality monitoring. Charges for electricity consumption are to be paid by the Developer or the City of North Miami. This will be determined by the administrator of the property.

The total monies allocated for this item are \$1,405,000.00. Payment of O&M activities shall be disbursed in the form of a \$23,416.66 monthly fee (annual fee of \$281,000). The Contactor must submit signed and sealed monthly reports for the O&M services rendered. Reports shall

include the operation logs, maintenance logs, report of activities completed and significant invoices for equipment replacement (if required and verified by the City and DSWM) upon the expiration of the warranty period.”

Although the entire extraction system will not be on-line for the first year of O&M, the monthly fees are still applicable because of the following:

- There will not be an appreciable savings of time during each site visit when inspecting 15 versus 30 extraction wells
- The full injection system will be operational
- Due to the phasing, a second rigorous, labor-intensive start-up of the system will be required when the second phase comes on-line, and we will not charge for that additional work.
- There still must be an allocation for the MIT in year five

3. Phase 1 System 3-Month Pilot Test

The Phase I System pilot test will begin after system start-up and balancing. It will occur simultaneous with the system O&M that is described in Item 2. During the pilot test, additional labor will be required to make system adjustments (more than is typical) as well as to gather the water quality and level data needed for the study. The work required to supplement the typical O&M will generally include the following:

- Water quality monitoring
 - Weekly sampling and gauging of 9 monitoring wells
 - Weekly gauging at 6 surface water locations and collecting samples at 9 locations
 - Monthly sampling at injection well pump station (effluent)
 - Analyze groundwater, surface water, and effluent samples for TDS, ammonia, and chloride
 - Gauge an additional 37 wells daily for 5 days, then monthly (additional three events)
- System adjustments for pilot testing
- Tabulate and evaluate the data

The fee for the 3-month Pilot Test is **\$32,942** and is detailed in the attached cost spreadsheet. Reporting for this item is included in the RAPA.

4. Groundwater Modeling

After we collected additional hydrogeologic data within the mangrove wetlands, our modeling team was able to calibrate the existing groundwater model to average wet- and dry-season conditions, and then use the model to simulate various extraction systems under these two seasonal conditions. This work was completed and presented to PERA and the USGS. PERA subsequently raised concerns about the system capturing too much groundwater that feeds the mangrove areas and requested the additional data collection from the mangrove areas and further model refinement to assess effects of the extraction system on the hydrology of the mangroves.

The original groundwater modeling effort was intended to serve as a basis for the hydraulic and civil design of the plume capture system. Now that the wetland hydrology has been

introduced as one of the deciding factors in the design of the extraction system, this additional modeling, which was not contemplated or necessary for a plume-capture scenario, is being requested. It is beyond the scope for the modeling included in the CLCP. The additional modeling effort includes the following tasks:

- Tidal Evaluation (part of the Baseline monitoring task)
- Model Calibration Refinement
- Predictive Simulations
 - System Design
 - Evaluate Change in the Position of the Saltwater Interface
 - Evaluate Drought Conditions
- Model Verification
- Reporting
 - Respond to USGS and SFWMD
 - Update Model Documentation
 - Incorporation into the RAPA (part of the RAP A task)

The fee for the additional groundwater modeling is **\$80,200** and is detailed in the attached cost spreadsheet.

5. Remedial Action Plan Addendum (RAPA)

As discussed above, we will prepare and submit a RAPA that will include the reporting for the baseline monitoring, pilot test, and include the modification to the extraction system based on simulations using the modified groundwater model. Specifically, the RAPA will include the following:

- Review and evaluation of Phase I system monitoring data
- Evaluation of Phase I extraction system and operations
- Modification of Phase II extraction system design
- Evaluation and modification of Phase II system operations and maintenance plan
- Evaluation and modification of the long term monitoring and O&M plan
- Response to RAI(s) on RAPA

The fee for the RAPA is **\$42,000** and is detailed in the attached cost spreadsheet.

6. Permit Modification

Due to the phased approach, the SFWMD water use permit will need to be modified and approved for the Phase 2 construction.

The **\$5,200** fee for preparing the permit modification is based on 25% of the initial permit cost in the CLCP.

7. Construction Permitting

After approval of the RAPA, we will prepare final construction drawings for the Phase 2 extraction system and we will obtain permits for construction from the County and City of North Miami.

The **\$5,176** fee for this additional construction permitting is based on 10% of the initial construction permit cost in the CLCP.

8. Construction-Phase Engineering, Surveying, and CQA

The original schedule contemplated construction of the entire extraction system at once while the pump station and injection well were being constructed. Phasing the extraction system will require that we have a dedicated engineering, surveying and CQA team for the second mobilization when only the Phase 2 extraction system is being constructed. We anticipate the Phase 2 system will require three to four months to install. See the schedule provided in Attachment 2.

In the CLCP, the total cost for this task was \$1,035,294.30 and is allocated evenly for the expected 10 to 12 month construction period. As described in the CLCP, the majority of the cost for this item is for the supervision during the drilling of the injection and dual-zone monitoring wells. Approximately 20% of the cost for this task was anticipated for the extraction system, resulting in approximately \$20,000 per month for the extraction system. Therefore, the total cost for this task during the Phase 2 construction period is estimated to be **\$70,000** (\$20,000 per month for 3.5 months).

9. Project Management

Similar to the existing SOV, project management is estimated based on 50% of the construction-phase services cost; therefore, the fee for project management during the Phase 2 construction is **\$35,000**.

10. Erosion Control/Silt Fence

The CLCP includes the cost for installing 8,000 LF of silt fence (along southern and eastern property lines). The last 10% of the construction cost is being paid for maintenance of the silt fence for the original one-year construction period. Because the schedule will be increased by one year, 10% of the total erosion control/silt fence cost is included to continue maintaining and repairing the silt fence as necessary. The additional cost is **\$12,000**.

The cost for the items below depends on the layout of the Phase 2 extraction system, which will be determined through groundwater modeling, after Phase 1 pilot testing. Therefore, we suggest that the costs provided below be used as budgetary numbers that will be verified once the Phase 2 design is completed.

11. Mobilization for Site Work and Extraction System

In the CLCP, the mobilization was calculated at 7.5% of the construction cost. The increase in construction cost due to the phasing (see Item 13 below) results in an increase in mobilization of **\$8,070**.

12. Extraction System Construction

We anticipate that Phase 2 of the extraction system will be re-routed to be further west of the adjacent wetlands to minimize any potential impacts (see **Figure 1**). It is therefore anticipated that an additional 200 LF of extraction system will be needed in the final full-scale system. Also, a temporary piping system is needed to convey the extracted groundwater from the termination of the Phase 1 system to the pump station. Lastly, due to the increase in the construction schedule, we have included escalation on the cost of the Phase 2 portion of the extraction system.

The additional cost for extraction is calculated as follows:

Mr. Stephen Johnson

March 7, 2012

Page 7 of 7

- Additional 200 LF of extraction system, which is 2.5% of the originally proposed extraction system ($200/8000 = 2.5\%$). Additional cost is estimated based on 2.5% of the total extraction system construction cost.
- Approximately 1800 LF of piping for conveying the extracted groundwater in Phase 1 to the deep injection well. An 8-inch diameter PVC pipe is proposed. The unit price of \$19/ LF includes \$8.54/LF for materials, 7% sales tax, \$8/LF for installation, plus 10% markup.
- Escalation of approximately 55% of the total extraction system construction cost for one year ($(8200-3700)/8200 = 55\%$). A factor of 3% is estimated.

We greatly appreciate the opportunity to provide these services to the City of North Miami. Please feel free to contact Steve Offner (770.604.9182 extension 54257 or 678.447.5048) or Thomas McSweeney (786.473.3899) if you have any questions.

Regards,

CH2M HILL Engineers, Inc.



Stephen Offner, P.G.
Principal Project Manager



Rex K. Long
Construction Operations Manager

Table 1:

Cost Summary

Figure 1:

Proposed Phasing Layout

Attachments:

Summary of February 6, 2012 Meeting
Proposed Schedule

C: Aleem Ghany, City of North Miami
Oscar Rubio, ADA Engineering, Inc.
Lee Casey, PWWM
Eduardo F. Smith, ES Consultants
Thomas McSweeney, CH2M HILL

Table 1

**Table 1 Munisport Groundwater Remediation
Preliminary Extraction System Phasing Budget Amendment
Summary**

Task	Description	Fee Allocated	
		in CLCP	Unallocated Fee
Fixed Fee			
1	Baseline Sampling and Reporting		\$ 61,600
2	Pre-closure Operations, Monitoring and Maintenance – First Year	\$ 281,000	
3	Phase 1 System 3-Month Pilot Test		\$ 32,942
4	Groundwater Modeling		\$ 80,200
5	RAPA		\$ 42,000
6	Permit Modification (SFWMD Water Use)		\$ 5,200
7	Construction Permitting		\$ 5,176
8	Construction-Phase Engineering, Surveying, CQA		\$ 70,000
9	Project Management		\$ 21,225
10	Erosion Control/Silt Fence		\$ 12,000
Budgetary Estimate			
11	Mobilization for Site Work and Extraction System		\$ 8,070
12	Extraction System Construction		
12.1	Additional construction cost		\$ 43,775
12.2	Escalation		\$ 29,614
12.3	Connection of Phase I system to Injection well		\$ 33,930
TOTAL		\$ 281,000	\$ 445,732

Munisport Phased Extraction - O&M Entire System for the First Year

ID	Task/Subtask Description	Technical Staff Hours						Fee	Subcontractors		Total Cost
		Principal	Senior Engineer	Engineer	Equipment Technician with tool truck	Field Engr./Geo.	Draft person		Direct	w/ Markup	
		TOTAL									
	Rate w/ Multiplier	\$ 150.00	\$ 135.00	\$ 95.00	\$ 90.00	\$ 75.00	\$ 60.00				
	Start-up for a week										
	System start up and flow balancing	2	8	80	40	80	210	\$ 18,580.00			
	Field vehicle							\$ -		\$ 750.00	
	Subtotal							\$ 18,580.00	\$ -	\$ 750.00	
	Sampling for one year										
	Field Sampling and lab Coordination	2	6	24		24	56	\$ 5,190.00			
	Quarterly GW Sampling at 13 monitoring wells and gauging select wells (4 quarters)					64	64	\$ 4,800.00			
	Monthly sampling at pump station-12 months					6	6	\$ 450.00			
	Monthly surface water sampling at 13 locations and gauging at 7 locations					192	192	\$ 14,400.00			
	Monthly gauging at additional 6 wells					32	32	\$ 2,400.00			
	Laboratory analysis					0	0	\$ -	\$ 9,460.00	\$ 10,406.00	
	Subtotal	2	6	24	0	318	0	\$ 27,240.00	\$ 9,460.00	\$ 10,406.00	
	Operational inspection										
	Weekly inspection and flow recording (1 person 1.5 day per event) and coordination (52 events)	2	10	40	624		676	\$ 61,610.00			
	Subtotal	2	10	40	624	0	0	\$ 61,610.00	\$ -	\$ -	
	Reporting										
	Monthly data evaluation and validation, tables and figures			24		48	48	\$ 8,760.00			
	Monthly operation reporting		24	64			88	\$ 9,320.00			
	Quarterly monitoring report	2	16	64			82	\$ 8,540.00			
	Subtotal	2	40	152	0	48	48	\$ 26,620.00	\$ -	\$ -	
	Project Management & Engineering										
	PM	72	192				264	\$ 36,720.00			
	Engineering/troubleshooting		192				192	\$ 25,920.00			
	Subtotal	72	384	0	0	0	0	\$ 62,640.00	\$ -	\$ -	
	Pump Station, Class I Well and DZMW O&M										
	Pump and motor maintenance						0	\$ -		\$ 20,000.00	
	Water quality testing						0	\$ -		\$ 18,000.00	
	Subtotal	0	0	0	0	0	0	\$ -	\$ -	\$ 38,000.00	
	Subtotal									\$ 245,846.00	
	Expense										
	Spare parts/replacement									\$ 10,000.00	
										\$ 20,000.00	
	TOTAL									\$ 275,846.00	

Notes:

1. GW and SW sampling parameters: ammonia, TDS and chloride

Munisport Phased Extraction - Phase I System 3-Month Pilot Test

ID	Task/Subtask Description	Technical Staff Hours						Fee	Subcontractors		Total Cost	
		Principal	Senior Engineer	Engineer	Equipment Technician with tool truck	Field Engr./Geo.	Draft Person		Direct	w/ Markup		
							TOTAL					
	Rate w/ Multiplier	\$ 150.00	\$ 135.00	\$ 95.00	\$ 90.00	\$ 75.00	\$ 60.00					
	Start-up for a week											
	System start up and flow balancing	2	8	80	40	40		170	\$ 15,580.00			
	Field Vehicles								\$ -	\$ 750.00		
	Subtotal	2	8	80	40	40	0	170	\$ 15,580.00	\$ - \$ 750.00	\$ 16,330.00	
	Sampling for 3 months											
	Field sampling and lab coordination (12 events)	2	4	12		12		30	\$ 2,880.00		\$ 2,880.00	
	GW weekly sampling and gauging at 9 monitoring wells; SW weekly gauging at 6 locations; SW sampling at 9 locations; Weekly gauging 3 piezometers (12 weeks)					288		288	\$ 21,600.00		\$ 21,600.00	
	Monthly sampling at Pump station (3 months)					3		3	\$ 225.00			
	Laboratory analysis							0	\$ -	\$ 7,095.00	\$ 7,804.50	\$ 7,804.50
	Sampling equipment and vehicle								\$ -		\$ 3,600.00	\$ 3,600.00
	Subtotal	2	4	12	0	303	0	321	\$ 24,705.00	\$ 7,095.00	\$ 11,404.50	\$ 35,884.50
	Well gauging per CH2M Hill											
	Daily gauge 37 wells for a week and monthly thereafter for 3 months (8 events)					64		64	\$ 4,800.00			
	Data tables and figures			16			40	56	\$ 3,920.00			
	Subtotal	0	0	16	0	64	40	120	\$ 8,720.00	\$ -	\$ -	\$ 8,720.00
	Inspection											
	Daily inspection (working day) and flow recording for 1 month (1 person 1 day/event), and coordination	1	2	8	160			171	\$ 15,580.00			
	3 days/week inspection and flow recording for 2 months (1 person 1-day/event), and coordination		2	12	192			206	\$ 18,690.00			
	Subtotal	1	4	20	352	0	0	377	\$ 34,270.00	\$ -	\$ -	\$ 34,270.00
	Data organization											
	Data evaluation and validation, figures and tables	2	12	48				48	\$ 9,360.00			
	Reporting included in RAPA								\$ -			
	Subtotal	2	12	48	0	0	48	110	\$ 9,360.00	\$ -	\$ -	\$ 9,360.00
	Subtotal											\$ 104,564.50
	Expense											
	Replacement/Parts Budget											\$ 5,000.00
	TOTAL											\$ 109,564.50

Notes:

1. GW and SW sampling parameters: ammonia, TDS and chloride

Phase I for 3 months

Sample	Matrix	Parameters	frequency	unit cost	total
84	GW	ammonia		\$12.50	\$1,050.00
		TDS		\$18.00	\$1,512.00
		Chloride		\$12.50	\$1,050.00
	subtotal				\$3,612.00
81	SW	ammonia		\$12.50	\$1,012.50
		TDS		\$18.00	\$1,458.00
		Chloride		\$12.50	\$1,012.50
	subtotal				\$3,483.00
					\$7,095.00

baseline

Sample	Matrix	Parameters	frequency	unit cost	total
0	GW	ammonia		\$12.50	\$0.00
		TDS		\$18.00	\$0.00
		Chloride		\$12.50	\$0.00
	subtotal				\$0.00
			1		\$0.00
7	SW	ammonia		\$12.50	\$87.50
		TDS		\$18.00	\$126.00
		Chloride		\$12.50	\$87.50
	subtotal				\$301.00
			10		\$3,010.00
					\$3,010.00

Entire system

Sample	Matrix	Parameters	frequency	unit cost	total
64	GW	ammonia		\$12.50	\$800.00
		TDS		\$18.00	\$1,152.00
		Chloride		\$12.50	\$800.00
	subtotal				\$2,752.00
156	SW	ammonia		\$12.50	\$1,950.00
		TDS		\$18.00	\$2,808.00
		Chloride		\$12.50	\$1,950.00
	subtotal				\$6,708.00
					\$9,460.00

Munisport Phased Extraction - RAPA

ID	Task/Subtask Description	Technical Staff Hours						Fee	Subcontractors		Total Cost	
		Principal	Senior Engineer	Engineer	Equipment Technician with tool truck	Field Engr./Geo.	Draft person			Direct		w/ Markup
									TOTAL			
	Rate w/ Multiplier	\$ 150.00	\$ 135.00	\$ 95.00	\$ 90.00	\$ 75.00	\$ 60.00					
	RAPA											
	Review and evaluation of Phase I system water quality monitoring data for Phase II system design, and reporting	2	8	40		24	16	90	\$ 7,940.00			
	Evaluation of Phase I extraction system operations for Phase II system operation, and reporting	2	6	24		16	16	64	\$ 5,550.00			
	Modification of Phase II extraction system design	4	12	60			40	116	\$ 10,320.00			
	Evaluation and modification of Phase II system operations and maintenance plan	2	8	32			8	50	\$ 4,900.00	\$ -		
	Evaluation and modification of the long term monitoring and operational plan	4	12	40			16	72	\$ 6,980.00			
	Response to RAI(s) on RAPA	2	6	24			8		\$ 3,870.00			
	Subtotal	16	52	220	0	40	104	392	\$ 39,560.00	\$ -	\$ -	
	Subtotal										\$ 39,560.00	
	Expense (5%)										\$ 1,978.00	
	TOTAL										\$ 41,538.00	

Munisport Phased Extraction - Baseline Sampling for One Year

ID	Task/Subtask Description	Technical Staff Hours						Fee	Subcontractors		Total Cost
		Principal	Senior Engineer	Engineer	Equipment Technician with tool truck	Field Engr./Geo.	Draft person		Direct	w/ Markup	
							TOTAL				
	Rate w/ Multiplier	\$ 150.00	\$ 135.00	\$ 95.00	\$ 90.00	\$ 75.00	\$ 60.00				
	Sampling for 10 Events										
	Field Sampling and Lab Coordination	2	4	20		20		46	\$ 4,240.00		
	SW Monthly Sampling at 12 locations, SW gauging at 7 locations and GW monthly gauging at 5 wells (10 events)		1	5		200		206	\$ 15,610.00		
	Laboratory analysis							0	\$ -	\$ 3,612.00	
	Field equipment and vehicle								\$ -	\$ 3,973.20	
	Subtotal	2	5	25	0	220	0	252	\$ 19,850.00	\$ 6,973.20	
	Cost for additional equipment										
	surface water gauge/continuous recorder installation-3; chloride ion probe-1			2		8		10	\$ 790.00	\$ 1,200.00	
	TOC survey-3			2				2	\$ 190.00	\$ 1,320.00	
	Subtotal	0	0	4	0	8	0	12	\$ 980.00	\$ 2,640.00	
	Well gauging and tidal survey										
	Monthly gauging 40 wells more (10 events)					80		80	\$ 6,000.00	\$ -	
	Tables and figures			20			40		\$ 4,300.00	\$ -	
	Tidal monitoring - 1 wk data logging, 10 wells					24			\$ 1,000.00	\$ 1,100.00	
	Field equipment and vehicle								\$ 750.00		
	Subtotal	0	0	20	0	104	40	80	\$ 10,300.00	\$ 1,850.00	
	Reporting										
	Data evaluation and validation, figures and tables	4	12	40		80	80	216	\$ 16,820.00		
	Subtotal	4	12	40	0	80	80	216	\$ 16,820.00	\$ -	
	Subtotal									\$ 59,413.20	
	Expense (5%)									\$ 2,970.66	
	TOTAL									\$ 62,383.86	

Notes:

1. GW and SW sampling parameters: ammonia, TDS and chloride
2. No GW sampling for baseline sampling

Munisport Phased Extraction - Phase 1 O&M for 1st Year

ID	Task/Subtask Description	Technical Staff Hours						Fee	Subcontractors		Total Cost
		Principal	Senior Engineer	Engineer	Equipment Technician with tool truck	Field Engr./Geo.	Draft person		Direct	w/ Markup	
							TOTAL				
	Rate w/ Multiplier	\$ 150.00	\$ 135.00	\$ 95.00	\$ 90.00	\$ 75.00	\$ 60.00				
	Sampling for 12 months										
	Field Sampling and lab Coordination	2	8	32		32	74	\$ 6,820.00			
	GW Sampling at 13 monitoring wells and gauging select wells (4 quarters)					60	60	\$ 4,500.00			
	Monthly sampling at pump station					6	6	\$ 450.00			
	Monthly surface water sampling at 13 locations and gauging at 7 locations					192	192	\$ 14,400.00			
	Monthly gauging at additional 6 wells					40	40	\$ 3,000.00			
	Laboratory analysis						0	\$ -	\$10,000.00	\$11,000.00	
								\$ -			
	Subtotal	2	8	32	0	330	0	\$ 29,170.00	\$10,000.00	\$11,000.00	\$ 40,170.00
	Operational inspection										
	Weekly inspection and flow recording (1 person 1.5-day per event) and coordination (52 events)	4	12	52	624		692	\$ 63,320.00			
								\$ -			
	Subtotal	4	12	52	624	0	0	\$ 63,320.00	\$ -	\$ -	\$ 63,320.00
	Reporting										
	Monthly data evaluation and validation, tables and figures			24		64	64	\$ 10,920.00			
	Monthly operation reporting		24	64			88	\$ 9,320.00			
	Quarterly monitoring report	4	12	64			80	\$ 8,300.00			
								\$ -			
	Subtotal	4	36	152	0	64	64	\$ 28,540.00	\$ -	\$ -	\$ 28,540.00
	Project Management & Engineering										
	PM	72	192				264	\$ 36,720.00			
	Engineering/troubleshooting		192				192	\$ 25,920.00			
								\$ -			
	Subtotal	72	384	0	0	0	0	\$ 62,640.00	\$ -	\$ -	\$ 62,640.00
	Pump Station, Class I Well and DZMW O&M										
	Pump and motor maintenance						0	\$ -		\$20,000.00	
	Water quality testing						0	\$ -		\$24,000.00	
								\$ -			
	Subtotal	0	0	0	0	0	0	\$ -	\$ -	\$44,000.00	\$ 44,000.00
	Subtotal										\$ 238,670.00
	Expense										\$ 18,000.00
	Spare parts/replacement										\$ 24,000.00
	Total for One Year O&M										\$ 280,670.00

Notes:

1. GW and SW sampling parameters: ammonia, TDS and chloride

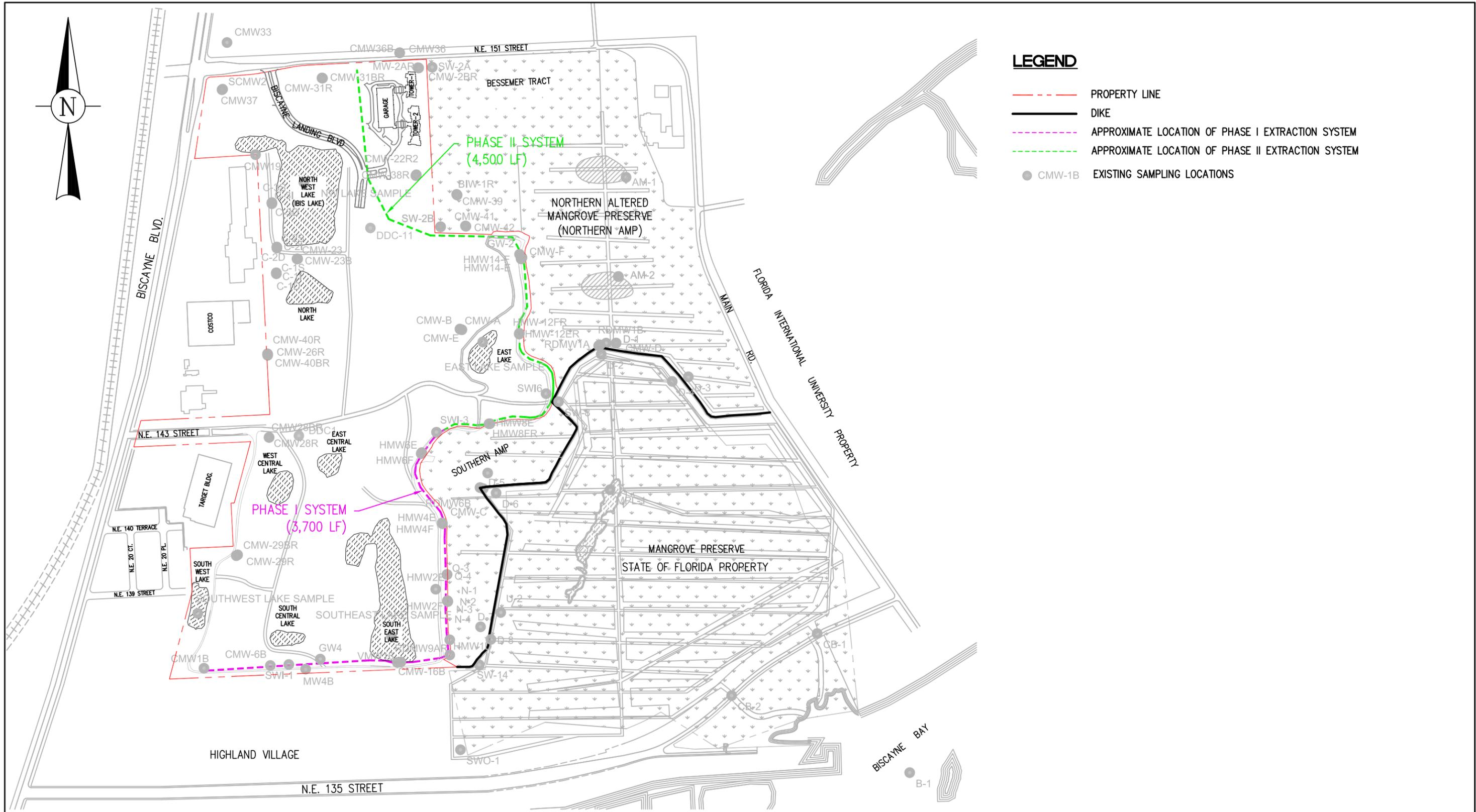
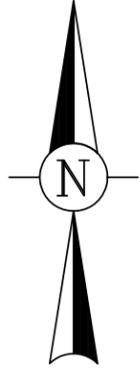
Munisport Phased Extraction - Phase 1 System 3-Month Pilot Test

ID	Task/Subtask Description	Technical Staff Hours						Fee	Subcontractors		Total Cost
		Principal	Senior Engineer	Engineer	Equipment Technician with tool truck	Field Engr./Geo.	Draft Person				
									TOTAL	Direct	
	Rate w/ Multiplier	\$ 150.00	\$ 135.00	\$ 95.00	\$ 90.00	\$ 75.00	\$ 60.00				
	Additional Sampling for 3 months										
	Field sampling and lab coordination (9 events)	1	3	6		9		19	\$ 1,800.00		\$ 1,800.00
	GW weekly sampling and gauging at 9 monitoring wells; SW weekly gauging at 6 locations; SW sampling at 9 locations; Weekly gauging 3 piezometers (9 events)					180		180	\$ 13,500.00		\$ 13,500.00
	Laboratory analysis							0	\$ -	\$ 7,095.00	\$ 7,804.50
	Sampling equipment and vehicle								\$ -	\$ 2,400.00	\$ 2,400.00
	Subtotal	1	3	6	0	189	0	199	\$ 15,300.00	\$ 7,095.00	\$ 10,204.50
	Well gauging per CH2M Hill										
	Daily gauge 37 wells for a week and monthly thereafter for 3 months (8 events)					32		32	\$ 2,400.00		
	Data tables and figures			8			16	24	\$ 1,720.00		
								0	\$ -		
	Subtotal	0	0	8	0	32	16	56	\$ 4,120.00	\$ -	\$ -
	Data organization										
	Data evaluation and validation, figures and tables	2	4	9			27	42	\$ 3,315.00		
	Reporting included in RAPA								\$ -		
	Subtotal	2	4	9	0	0	27	42	\$ 3,315.00	\$ -	\$ -
	TOTAL										\$ 32,939.50

Notes:

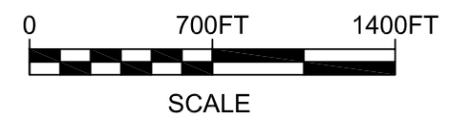
1. Sampling, testing and data evaluation beyond the above are included in the first year O&M

Figure 1



LEGEND

- - - PROPERTY LINE
- DIKE
- - - APPROXIMATE LOCATION OF PHASE I EXTRACTION SYSTEM
- - - APPROXIMATE LOCATION OF PHASE II EXTRACTION SYSTEM
- CMW-1B EXISTING SAMPLING LOCATIONS



CITY OF NORTH MIAMI 776 NE 125th Street North Miami, Florida 33161	BISCAYNE LANDING (FORMER MUNISPORT LANDFILL) NORTH MIAMI, FLORIDA	APPROXIMATE LOCATIONS OF PROPOSED EXTRACTION SYSTEM
ES CONSULTANTS, INC. environmental & civil engineering	Project 2011003	MAY 2011 Fig. 1

Attachment 1

**BISCAYNE LANDING GROUNDWATER REMEDIATION SCHEDULE
PHASED EXTRACTION SYSTEM
03-07-12**

ID	Task Name	Duration	Start	Finish	Predecessors	09 2010 2011 2012 2013 20													
						H2	H1	H2	H1	H2	H1	H2	H1	H2	H1				
1	GROUNDWATER REMEDIATION SYSTEM DESIGN AND CONSTRUCTION	1068 days	Tue 12/1/09	Thu 1/2/14		[Summary bar from 12/1/09 to 1/2/14]													
2	Grant and Contract Activities	558 days	Thu 1/28/10	Mon 3/19/12		[Summary bar from 1/28/10 to 3/19/12]													
3	Meet with DSWM and Bond Engr. to revise SOV	0 days	Thu 1/28/10	Thu 1/28/10		[Milestone 1/28]													
4	Submit SOV to Bond Engr.	0 days	Fri 2/12/10	Fri 2/12/10	3	[Milestone 2/12]													
5	Grant Negotiations on Hold Until City Agrees to Proceed	44 days	Wed 2/17/10	Mon 4/19/10	4	[Task bar from 2/17/10 to 4/19/10]													
6	Submit Revised SOV and Basis to Bond Engr.	0 days	Mon 4/26/10	Mon 4/26/10		[Milestone 4/26]													
7	Bond Engr. Review	27 days	Tue 4/27/10	Wed 6/2/10	6	[Task bar from 4/27/10 to 6/2/10]													
8	Provide Additional Information	0 days	Fri 6/11/10	Fri 6/11/10	7	[Milestone 6/11]													
9	Bond Engr. Review and Finalize Revised CLCP	10 days	Fri 6/11/10	Thu 6/24/10	8	[Task bar from 6/11/10 to 6/24/10]													
10	Approved Revised SOV	0 days	Fri 7/2/10	Fri 7/2/10		[Milestone 7/2]													
11	Meet with City Re: Contract Issues	0 days	Wed 7/14/10	Wed 7/14/10		[Milestone 7/14]													
12	City Approval of Revised CLCP	0 days	Thu 8/19/10	Thu 8/19/10		[Milestone 8/19]													
13	Executed Contract	0 days	Fri 10/1/10	Fri 10/1/10		[Milestone 10/1]													
14	Prepare Amendment No. 1 for the Design/Build GW Remediation Contract - Implementation of Phased Approach	37 days	Fri 4/29/11	Mon 6/20/11	34	[Task bar from 4/29/11 to 6/20/11]													
15	Submit Amendment No. 1 to City of North Miami	0 days	Mon 6/20/11	Mon 6/20/11	14	[Milestone 6/20]													
16	Receive Approval of Amendment No. 1	195 days	Tue 6/21/11	Mon 3/19/12	15	[Task bar from 6/21/11 to 3/19/12]													
17	Groundwater Extraction System - Phase 1	1041 days	Tue 12/1/09	Tue 11/26/13		[Summary bar from 12/1/09 to 11/26/13]													
18	Engineering and Permitting	670 days	Tue 12/1/09	Mon 6/25/12		[Summary bar from 12/1/09 to 6/25/12]													
19	Initial permitting, owner and agency meetings	134 days	Tue 12/1/09	Fri 6/4/10		[Task bar from 12/1/09 to 6/4/10]													
20	Preliminary Groundwater Modeling	47 days	Thu 2/18/10	Fri 4/23/10		[Task bar from 2/18/10 to 4/23/10]													
21	Address Initial Wetland Issues	47 days	Thu 4/1/10	Fri 6/4/10		[Task bar from 4/1/10 to 6/4/10]													
22	Resolve Wetland Issues	150 days	Mon 10/4/10	Fri 4/29/11	13,38FF	[Task bar from 10/4/10 to 4/29/11]													
23	Groundwater Modeling	150 days	Mon 8/2/10	Mon 2/28/11	13	[Task bar from 8/2/10 to 2/28/11]													
24	Mangrove Muck Sampling and Geotechnical Analysis	25 days	Mon 12/6/10	Fri 1/7/11		[Task bar from 12/6/10 to 1/7/11]													
25	Prepare Mangrove Muck Sampling Results Technical Memorandum to DERM [for information only]	5 days	Mon 1/10/11	Fri 1/14/11	24	[Task bar from 1/10/11 to 1/14/11]													
26	Submit Mangrove Muck Sampling Results Technical Memorandum to DERM [for information only]	0 days	Fri 1/14/11	Fri 1/14/11	25	[Milestone 1/14]													
27	Preliminary Groundwater Model Results	116 days	Mon 8/2/10	Mon 1/10/11		[Task bar from 8/2/10 to 1/10/11]													
28	Submit Preliminary Groundwater Model Results to DERM [for information only]	0 days	Fri 1/28/11	Fri 1/28/11	27FS+14 days	[Milestone 1/28]													
29	Complete Final Groundwater Model	29 days	Tue 1/11/11	Fri 2/18/11	27	[Task bar from 1/11/11 to 2/18/11]													
30	Submit Groundwater Model Report	0 days	Mon 2/28/11	Mon 2/28/11		[Milestone 2/28]													
31	Stakeholder Meetings	94 days	Mon 1/31/11	Fri 6/10/11	29	[Task bar from 1/31/11 to 6/10/11]													
32	Stakeholder Mtg. #4 re: Groundwater Model Results & Path Forward	0 days	Mon 1/31/11	Mon 1/31/11	27FS+7 days	[Milestone 1/31]													
33	Stakeholder Mtg. #5 re: Groundwater Model Review with USGS	0 days	Wed 3/30/11	Wed 3/30/11		[Milestone 3/30]													
34	Stakeholder Mtg. #6 re: DERM Request for Extraction Phasing	0 days	Fri 4/29/11	Fri 4/29/11		[Milestone 4/29]													
35	Stakeholder Mtg. #7 re: Extraction Phasing Funding and Install Phase 1	0 days	Fri 6/10/11	Fri 6/10/11		[Milestone 6/10]													
36	Remedial Action Plan (RAP)	408 days	Fri 10/1/10	Tue 4/24/12		[Summary bar from 10/1/10 to 4/24/12]													
37	Prepare RAP	311 days	Fri 10/1/10	Fri 12/9/11	13	[Task bar from 10/1/10 to 12/9/11]													
38	Submit RAP to DERM	0 days	Mon 12/19/11	Mon 12/19/11	37	[Milestone 12/19]													
39	ERP Permitting	30 days	Mon 1/2/12	Fri 2/10/12		[Task bar from 1/2/12 to 2/10/12]													
40	Landfill Closure Permit Mod.	30 days	Mon 1/2/12	Fri 2/10/12	39SS	[Task bar from 1/2/12 to 2/10/12]													
41	DERM Review	52 days	Mon 12/19/11	Tue 2/28/12	38	[Task bar from 12/19/11 to 2/28/12]													
42	DERM RAI #1	0 days	Tue 2/28/12	Tue 2/28/12	41	[Milestone 2/28]													
43	Respond to RAI for RAP	10 days	Mon 3/12/12	Fri 3/23/12	42	[Task bar from 3/12/12 to 3/23/12]													
44	DERM Review	22 days	Mon 3/26/12	Tue 4/24/12	43	[Task bar from 3/26/12 to 4/24/12]													
45	DERM Approval of RAP	0 days	Tue 4/24/12	Tue 4/24/12	44	[Milestone 4/24]													
46	Prepare Construction Drawings for Phase 1 Extraction	30 days	Mon 3/26/12	Fri 5/4/12	43	[Task bar from 3/26/12 to 5/4/12]													
47	Industrial Water Use Permitting	431 days	Mon 11/1/10	Mon 6/25/12		[Summary bar from 11/1/10 to 6/25/12]													
48	Permit Preparation	55 days	Mon 11/1/10	Fri 1/14/11		[Task bar from 11/1/10 to 1/14/11]													
49	Submit Industrial Water Use Permit to SFWMD	0 days	Fri 1/14/11	Fri 1/14/11	48	[Milestone 1/14]													
50	SFWMD Review 1	22 days	Mon 1/17/11	Tue 2/15/11	49	[Task bar from 1/17/11 to 2/15/11]													
51	SFWMD RAI#1	0 days	Tue 2/15/11	Tue 2/15/11	50	[Milestone 2/15]													

Project: Groundwater design permiting; Date: Wed 3/7/12

Task: [Blue bar] Progress; Split: [Dotted bar]

Milestone: [Diamond]

Summary: [Thick black bar]; Project Summary: [Thin black bar]

External Tasks: [Grey bar]; External Milestone: [Diamond]

Deadline: [Green arrow]

Page 1

**BISCAYNE LANDING GROUNDWATER REMEDIATION SCHEDULE
PHASED EXTRACTION SYSTEM
03-07-12**

ID	Task Name	Duration	Start	Finish	Predecessors	09	2010		2011		2012		2013		20
						H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
107	P&P Bond	0 days	Fri 11/4/11	Fri 11/4/11											
108	Procure DIW	113 days	Tue 7/5/11	Thu 12/8/11											
109	Deep Injection Well & Dual Zone Monitoring Well Construction	218 days	Thu 11/17/11	Mon 9/17/12											
110	Permitting and Pre-Con Submittals	77 edays	Thu 11/17/11	Thu 2/2/12											
111	Mobilization of DIW Drilling Contractor, Site Prep & Rig Setup	27 edays	Mon 1/9/12	Sun 2/5/12											
112	Temporary Power from FP&L for Drilling Operations	0 edays	Tue 12/27/11	Tue 12/27/11											
113	Drilling, Sampling and Analysis of Pad Monitor Wells (PMWs)	5 edays	Tue 12/27/11	Sun 1/1/12											
114	Sample and Analyze Lake Water for Injection Testing	1 eday	Sun 2/5/12	Mon 2/6/12	111										
115	Order TAM Packer with 16 wk lead time	1 eday	Sat 2/25/12	Sun 2/26/12	137SS-112 edays										
116	IW-1 & MW-1 Drilling and Testing	160 days	Mon 2/6/12	Mon 9/17/12											
117	Construction of IW-1	104 days	Mon 2/6/12	Fri 6/29/12	111FS+1 day										
118	Install 54-in Pit Casing to 50-ft	1 eday	Mon 2/6/12	Tue 2/7/12	111										
119	Pilot hole and geophysical logging to 375-ft	3 edays	Tue 2/7/12	Fri 2/10/12	118										
120	Reaming and geophysical logging	4 edays	Fri 2/10/12	Tue 2/14/12	119										
121	Install 44-in casing	2 edays	Tue 2/14/12	Thu 2/16/12	120										
122	Pilot hole and geophysical logging to 1050-ft	3 edays	Thu 2/16/12	Sun 2/19/12	121										
123	Reaming and geophysical logging	5 edays	Sun 2/19/12	Fri 2/24/12	122										
124	Install 36-in casing	3 edays	Fri 2/24/12	Mon 2/27/12	123										
125	Change to reverse air drilling	3 edays	Mon 2/27/12	Thu 3/1/12	124										
126	Pilot hole, coring, packer testing and logging to 1750-ft	19 edays	Thu 3/1/12	Tue 3/20/12	125										
127	FDEP Approval of Casing Setting Depth	5 edays	Tue 3/20/12	Sun 3/25/12	126										
128	Backplug, Reaming and logging	8 edays	Sun 3/25/12	Mon 4/2/12	127										
129	Install 26-in casing	5 edays	Mon 4/2/12	Sat 4/7/12	128										
130	Pilot hole, coring, packer testing and logging to 2950-ft	30 edays	Sat 4/7/12	Mon 5/7/12	129										
131	FDEP Approval of Casing Setting Depth	5 edays	Mon 5/7/12	Sat 5/12/12	130										
132	Backplug, Reaming and logging	11 edays	Sat 5/12/12	Wed 5/23/12	131										
133	Install 16-in casing and CBL	10 edays	Wed 5/23/12	Sat 6/2/12	132										
134	16-in casing pressure test	3 edays	Sat 6/2/12	Tue 6/5/12	133										
135	Pilot hole, logging and sampling to 3,300-ft	6 edays	Tue 6/5/12	Mon 6/11/12	134										
136	FDEP Approval of Tubing Install	5 edays	Mon 6/11/12	Sat 6/16/12	135										
137	Install 11.75-in FRP Tubing, TAM Packer and annular fluid	6 edays	Sat 6/16/12	Fri 6/22/12	136										
138	Set up and conduct video survey	2 edays	Fri 6/22/12	Sun 6/24/12	137										
139	Annular Pressure Test	1 eday	Wed 6/27/12	Thu 6/28/12	142										
140	Radioactive Tracer Survey	1 eday	Thu 6/28/12	Fri 6/29/12	139										
141	Construction of MW-1	55 days	Sun 6/24/12	Fri 9/7/12											
142	Relocate Rig to Monitoring Well	3 edays	Sun 6/24/12	Wed 6/27/12	138										
143	Install 40-in Pit Casing to 50-ft	2 edays	Wed 6/27/12	Fri 6/29/12	142										
144	Pilot hole and geophysical logging to 375-ft	3 edays	Fri 6/29/12	Mon 7/2/12	143										
145	Reaming and geophysical logging	4 edays	Mon 7/2/12	Fri 7/6/12	144										
146	Install 30-in casing	3 edays	Fri 7/6/12	Mon 7/9/12	145										
147	Pilot hole and geophysical logging to 1050-ft	3 edays	Mon 7/9/12	Thu 7/12/12	146										
148	Reaming and geophysical logging	2 edays	Thu 7/12/12	Sat 7/14/12	147										
149	Install 20-in casing	3 edays	Sat 7/14/12	Tue 7/17/12	148										
150	Change to reverse air drilling	3 edays	Tue 7/17/12	Fri 7/20/12	149										
151	Pilot hole, coring, packer testing and logging to 1650-ft	21 edays	Fri 7/20/12	Fri 8/10/12	150										
152	FDEP Approval of Monitoring Zones	5 edays	Fri 8/10/12	Wed 8/15/12	151										
153	Backplug, Reaming and logging	5 edays	Wed 8/15/12	Mon 8/20/12	152										
154	Install 12.75-in casing and CBL	6 edays	Mon 8/20/12	Sun 8/26/12	153										
155	12.75-in casing pressure test	1 eday	Sun 8/26/12	Mon 8/27/12	154										
156	Geophysical logging	1 eday	Mon 8/27/12	Tue 8/28/12	155										
157	Install 6 5/8-in casing and CBL	4 edays	Tue 8/28/12	Sat 9/1/12	156										
158	6 5/8-in casing pressure test	1 eday	Sat 9/1/12	Sun 9/2/12	157										
159	Develop monitoring zones	1 eday	Sun 9/2/12	Mon 9/3/12	158										
160	Geophysical logging and sampling	1 eday	Mon 9/3/12	Tue 9/4/12	159										

Project: Groundwater design permitting; Date: Wed 3/7/12

Task: Progress: Summary: External Tasks: Deadline: Split: Milestone: Project Summary: External Milestone:

**BISCAYNE LANDING GROUNDWATER REMEDIATION SCHEDULE
PHASED EXTRACTION SYSTEM
03-07-12**

ID	Task Name	Duration	Start	Finish	Predecessors	09		2010		2011		2012		2013		20
						H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	
161	Demob drilling equipment	3 edays	Tue 9/4/12	Fri 9/7/12	160											
162	Wellheads - IW-1 and MW-1	3 edays	Fri 9/7/12	Mon 9/10/12	161											
163	Injection Testing	5 edays	Mon 9/10/12	Sat 9/15/12	162											
164	Complete Permanent Wellheads IW-1 and MW-1	2 edays	Sat 9/15/12	Mon 9/17/12	163											
165	Pump Station Permitting and Installation	75 days	Sat 4/14/12	Fri 7/27/12												
166	Revised Plans and Specs to FDEP and CNM	1 eday	Sat 4/14/12	Sun 4/15/12	167FS-62 edays											
167	FDEP and CNM Review, RFI, and Approval	60 edays	Mon 4/16/12	Fri 6/15/12	168FS-71 edays											
168	Subcontractor Mobilization	10 edays	Sat 6/16/12	Tue 6/26/12	169FS-21 edays											
169	Concrete Pads (PS/IW-1 and Electrical)	10 edays	Wed 6/27/12	Sat 7/7/12	142											
170	Tank and Pump Station Mechanical	20 edays	Sat 7/7/12	Fri 7/27/12	169											
171	Electrical Building	10 edays	Sat 7/7/12	Tue 7/17/12	169											
172	Standby and Completion	63 days	Mon 9/17/12	Thu 12/13/12												
173	Standby and Additional Work	27 edays	Mon 9/17/12	Sun 10/14/12	164											
174	Obtain Substantial Completion	30 edays	Sun 10/14/12	Tue 11/13/12	173											
175	Punch List/Final Completion	30 edays	Tue 11/13/12	Thu 12/13/12	174											
176	Injection Well System Operational Testing	282 days	Sun 10/14/12	Tue 11/12/13												
177	Report, O&M Manual and Op Testing Request Completion for FDEP	14 edays	Sun 10/14/12	Sun 10/28/12	173											
178	FDEP Operational Testing Approval	14 edays	Sun 10/28/12	Sun 11/11/12	177											
179	System Startup	10 days	Mon 11/12/12	Fri 11/23/12	178											
180	Pump Station and Injection Well O&M	262 days	Mon 11/12/12	Tue 11/12/13	179SS											
181																
182	Construction-Phase Engr., Certification, Survey and QA/QC (Phase I)	232 days	Mon 1/9/12	Tue 11/27/12	111SS,116FF											
183																
184	Project Management	792 days	Fri 10/1/10	Thu 1/2/14	13,77FF											

Project: Groundwater design permittin; Date: Wed 3/7/12

Task: Progress: Summary: External Tasks: Deadline: Split: Milestone: Project Summary: External Milestone: