

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE PLAN**

Prepared for:

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## **B1.0 SUMMARY**

### ***B1.1 Purpose and Content of Plan***

This closure and post-closure plan complies with 18 Alaska Administrative Code (AAC) 60.390, 60.395, 60.396 and 60.397, closure and post-closure standards for Class II and III municipal solid waste (MSW) landfills (MSWLF). It contains a planned approach to close and provide post-closure care of the City and Borough of Wrangell Landfill, a permitted Class III landfill owned and operated by the City and Borough of Wrangell (CBW), in Wrangell, Alaska.

This plan is supported by Construction Drawings and Technical Specifications, which further describe plans to close the Wrangell Landfill. The Construction Drawings are provided in Appendix A and the Technical Specifications are provided in Appendix B.

### ***B1.2 Facility Description and Site History***

The Wrangell Landfill facility is located on a 10-acre parcel 1.5 miles north of downtown Wrangell, turning left off of Evergreen Avenue onto Third Avenue, Section 13, T. 62 S., R. 83 E., CRM, Lot 2, U.S. Survey 2096. Approximately 6.6 acres of the area has been used for landfill disposal of municipal solid waste (MSW). The landfill serves the city and its immediate surroundings, a population of approximately 3,000 people and has been in operation since the 1950's. It is the primary solid waste repository for the CBW. The landfill has been developed with compacted MSW covered with soil and rock cover material. A materials recovery and handling facility (MHRF) was put into operation in 1996 for use in baling MSW.

The Wrangell Landfill has been operated as a conventional small volume disposal site for the past 35 to 40 years. Soil cover has been used inconsistently during the past 5 years and steep slopes (1 vertical to 1 horizontal) exist on the west side of the landfill site where waste was pushed to the edge of landfill and left at a natural angle of repose nearly 70 feet high. The landfill was originally developed as a rock quarry and filled with municipal waste material. The original ground of the site had slopes ranging from 15 to 20 percent. Zimovia Strait is located to the west of the landfill.

The facility operates on a 5-day a week basis (Tuesday through Saturday) with a single attendant/operator at the facility. Waste deliveries are separated at the landfill depending upon what is delivered to the landfill. Household waste is brought inside the metal building and placed in container vans. Scrap metal including automobiles and appliances, plastics, glass and aluminum are segregated for recycling. Scrap wood and wood wastes are deposited in separate areas for removal and periodic burning, as permitted by ADEC.

The facility operates under ADEC Permit No. 3M2005002A for the Class III landfill including the MHRF. This includes the portion of the landfill that was previously designated as a Class II landfill. This closure plan applies to closing out of the Wrangell Landfill.

## **B2.0 CLOSURE PLAN**

### **B2.1 Final Grading Plan**

R&M Engineering Inc. (R&M) has performed an on the ground topographic survey of the Wrangell Landfill in May 2008. The original topographic conditions, with 2-foot contour intervals, are shown on Drawing C100 in Appendix A. The final grading plan contours at the completion of the fill and with the final cover in place are shown on Drawing C101. The fill slopes have been designed to maximize capacity while providing adequate stability for the fill and final cover. Typical slopes are designed at 3 horizontal to 1 vertical (3H:1V). These slopes form the west and south face of the landfill. The grading plan is designed to meet requirements of 18 AAC 60.395, Closure Standards for a Class I or II MSWLF including but not limited to:

- Guide placement of inert landfill materials and unclassified soil fill to meet the final grading of the cover for the entire site, including those areas already closed;
- Minimize the potential for adverse drainage resulting from long-term settlement;
- Divert stormwater runoff from the closed disposal area to existing surface water control systems;
- Provide long-term stable and erosion-resistant slope conditions and;
- Provide access to the closed disposal area for maintenance and repair of the final cover system.

The final grading plan includes surface water control features. Drainage intercept ditches are designed to prevent the sheet flow distances from exceeding 125 feet. There are two 10' wide drainage benches designed on the graded 3:1 slope. The intercept bench is sloped to the north and south from the center of the west face at a 2% slope to divide the flow between the major surface water ditches to the north and south of the fill. The drainage ditches are cross sloped at 5% to collect surface water in a impervious lined drainage channel. Runoff from the east side of the fill and from the main access road and building site may be directed to the drainage to the south of the landfill or along the berm access road to the south of the fill. Achieving the final cover grading plan contours will require setting frequent grade control stakes and having the equipment operators adhere to the staked grades.

The MSW area, which is the area most likely to experience post-closure settlement, has been inactive for more than 20 years. Therefore, it is likely that primary settlement is complete and secondary settlement is already occurring and should be minor. The Wrangell Landfill contains mostly inert materials and shot rock used as cover, and these materials will not decompose. Therefore, settlement in these areas is expected to be minimal. Any settlement that does occur can be corrected by regrading the area.

### **B2.2 Description of Landfill Closure System**

The CBW proposes a landfill closure system that includes a final cover system, a geosynthetic clay liner, a drainage and gas layer, post-closure access for maintenance, post-closure landfill gas monitoring and a post-closure leachate collection system. The final closure will include completion of the surface water control system, revegetation of the landfill and certification that the closure is consistent with the closure plan. A typical section of the final cover profile is shown on Drawing C200. The final cover system

consists of five distinct layers, starting with the lowest layer, the soil types and purposes include the following:

**SUBGRADE.** The existing waste material in the landfill will require grading and compaction to achieve the 3:1 slope requirements. This will entail excavating and filling of existing landfill waste material and recompacting the waste to a stable condition to allow placement of the drainage and gas layer material.

**DRAINAGE AND GAS LAYER.** This is shot rock material, generally consisting of rock sizes 4-inch and smaller placed in a layer 8-inches thick over the subgrade. Leachate which may collect on intermediate cover layers could flow out to the margin of the fill and break through the final cover without a drainage and gas layer. This layer will allow leachate to migrate to the leachate collection system. Landfill gas in this layer can flow unobstructed to the gas collection lateral and vent. The 4-inch minus rock material in this layer will also add to the structural stability of the landfill.

**GEOSYNTHETIC CLAY LINER.** This is the key element of the final cover system. A Geosynthetic Clay Liner (GCL) was chosen during the design process as Wrangell does not have the required quantity of infiltration material needed to meet the in-place permeability requirement of less than  $1 \times 10^{-5}$  centimeter per second for a 18-inch depth layer. GCL's have been used in other Alaska landfill closure systems (Fairbanks) and many other States with great success. The GCL is a manufactured hydraulic barrier consisting of a layer of sodium bentonite clay between two nonwoven geotextiles, which are needlepunched together to resist rainfall and eliminate water contact with the landfill waste. A screened sand/gravel material from the Wrangell Institute property soil stockpiles will be placed in a 2-inch layer below the GCL to fill any voids and provide a puncture free surface. The top of the GCL will also be filled with a 4-inch depth of screened sand/gravel material from the Wrangell Institute stockpiled material.

**VEGETATIVE LAYER.** An erosion layer capable of supporting vegetative growth will be placed in a layer 8-inches deep (minimum 6-inches required) over the GCL layer. The soil will be moderately coarse in texture and high in organic content to support vegetation.

**REVEGETATION.** Establishing vegetative growth on the final cover is extremely important to protect the soil cover from erosion by wind and precipitation. Final cover placement and revegetation will be accomplished on areas of the landfill closure once the vegetative soil layer is at final grade. Vegetative seeding will be specified to take place in the growing season. Seed and fertilizer will be required to make a successful installation. The seed mix listed below has been established from U.S. Forest Service Wrangell District revegetative test plots performed in the 1990's. It is assumed that a majority of the landfill area can be seeded hydraulically with a Hydro-seed machine from the upper and lower perimeter roads. The following recommendations for seed type and application rates are provided:

**Seed Mix:**      Creeping Red Fescue – 37%  
                         Climax Timothy – 25%  
                         Annual Ryegrass – 13%  
                         Alsike Clover – 25%

**Application:** Apply mulch at a minimum rate of 1,500-lb./acre dry weight but not less than the rate required to obtain seed sowing rate of 5 lb. per 1,000 square feet.

**Fertilizer:** 67% 8N – 32P -16K fertilizer mix.  
33% 34N -0P – 0K ammonium nitrate.

**Application:** 250 pounds per acre.

### **B2.2.1 Final Cover**

The final cover material is designed to:

- Reduce the infiltration of precipitation into the landfill and control leachate generation;
- Minimize fugitive emissions of landfill gas through the surface of the cap (in combination with a passive gas extraction system);
- Separate the waste in the landfill from its surrounding environment.

Proposed post-closure monitoring and post-closure maintenance of the closed landfill is discussed in Section B3.0.

### **B2.2.2 Stormwater Management**

The surface water control system is designed to transmit precipitation and snowmelt off of the final cover and route run-on from adjacent areas around the landfill to minimize infiltration and generation of leachate. The slopes of the final cover must be maintained to ensure no ponding occurs. Stormwater run-on will be controlled by existing run-on control ditches located around the perimeter of the landfill. These existing ditches divert stormwater around the waste disposal area and discharge it to existing stormwater management systems constructed and maintained by the CBW. Stormwater runoff from the final cover will sheet flow to the existing perimeter run-on control ditches.

### **B2.2.3 Landfill Gas Control**

Decomposition of organic materials in landfills occurs primarily in the absence of oxygen, producing a mixture of methane and carbon dioxide gas. The gas may migrate through porous soils to void spaces where it can be smelt. Protection from gases is the purpose of landfill gas control and venting systems, as well as the gas monitoring probes at the boundary of the landfill. The CBW landfill is likely to produce minor quantities of gas due to the small amount of waste that has been deposited on site.

The gas control system for the CBW landfill consists of a transmission layer under the GCL liner (the drainage and gas layer described above) and lateral collection pipes. The lateral pipes will be located at the grade breaks in the intercept drainage benches at the top of the 3:1 slopes. Gas vents will be installed at the center of the laterals, allowing gas to vent to the atmosphere and preventing confinement and pressure that could lead to migration.

### **B2.2.4 Post-Closure Access Roads**

Access to the closed landfill will be provided by Third Avenue which is off of Evergreen Avenue. Access to the lower landfill access road will be off of the main access road on what is known as the south access road. These access roads and access routes are shown on Drawing C101 included in Appendix A.



### **B2.2.5 Leachate Collection and Pumping System**

A new leachate collection system will include an 8-inch perforated HDPE drain located at the toe of the landfill. The leachate collection and conveyance system will drain by gravity to a new leachate pump station. The pump station will be equipped with automated pumps which will pump the collected leachate into a 4-inch diameter force main pipe up the south access road to an existing CBW sanitary sewer manhole in the Third Avenue right-of-way. The leachate will then flow through the CBW wastewater collection system to the CBW wastewater treatment plant. The existing leachate collection discharges through an existing 12-inch marine outfall to the waters of Zimovia Strait.

### **B2.3 Closure Notification and Scheduling**

Within 90 days after completing final closure of Wrangell Landfill, the CBW will notify ADEC in writing that closure has been completed. Written notification will include documentation that the final cover system was constructed in accordance with the design presented in this closure plan and as shown on the Construction Drawing(s) presented in Appendix A.

### **B2.4 Closure Construction Schedule and Other Considerations**

The CBW will begin closure activities when funding has been received to complete the project. Closure activities would start with the advertising for construction of the project.

Landfill closure construction, particularly earthwork, can be adversely impacted by wet weather. Therefore, final closure construction is planned for the drier months of the year (May through September). Bidding and contract award is anticipated to occur once funding for the project has been obtained, estimated to be summer 2009.

Construction will be performed by the CBW or its contractors. Construction will be observed by the CBW or its designated agent to assure all materials and installations meet or exceed the requirements of the closure plan. Documentation will include assurances that appropriate final cover soil was installed, that its depth meets final cover thickness requirements, and that drainage courses are constructed that control stormwater runoff.

The CBW will complete all closure activities at the Wrangell Landfill within 360 days of initiating closure construction.

Upon completing closure of the Wrangell Landfill, the CBW will submit written notification to the ADEC certifying that closure has been completed in accordance with the closure plan, and will place the certification in the operating record. The certification will be signed and sealed by a registered engineer, or be approved by the ADEC.

### **B2.5 Deed Notification**

Upon completing closure of Wrangell Landfill, the CBW will record a notation on the landfill facility property deed, and submit written notification to the ADEC that the notation has been recorded and that a copy has been placed in the operating record. The notation of the deed will, in perpetuity, notify any potential purchaser of the property that the land was used as a MSWLF, and that use of the land is restricted in accordance with 18 AAC 60.397(c)(3).

## **B3.0 POST-CLOSURE PLAN**

### **B3.1 Post-Closure Procedure**

Upon completion of final site closure and verification from the ADEC that the facility has been closed in accordance with the approved Closure Plan, long-term care activities will commence. These long-term care activities will include visual inspections, maintenance, repair, and reporting. Visual inspections will take place monthly or more frequently if deemed necessary by the CBW. Long-term care will continue for a minimum of 30 years and until the CBW can demonstrate that the site has stabilized and post-closure activities are no longer needed to maintain the functionality of the closure.

### **B3.2 Post-Closure Maintenance and Repair**

Post-closure requirements will include routine inspections, non-routine inspections, system maintenance, and system repair. The purpose of these inspection, maintenance, and repair procedures is to maintain the intended function of the landfill closure system.

### **B3.3 Routine and Non-Routine Inspections**

#### **B3.3.1 Routine Inspections**

Routine inspections will be performed monthly to following closure system components; inspect the functioning condition of the Site security and signage; Final cover; Landfill gas monitoring probes; Surface water control ditches and culverts; and Access roads.

Table B3-1 summarizes the inspections that will take place.

**Table B3-1  
Post Closure Inspection Activities and Frequencies**

<b>Item</b>	<b>Frequency</b>	<b>Summary Description of Inspection</b>
Security and Signage	Monthly	Condition of fences, gates, signs and locks.
Final Cover System	Monthly and after 10-year storm event	Erosion, subsidence, distressed vegetation, bare patches, grass composition
Gas Vents	Monthly	Access clear. Condition of vents, piping and security systems
Surface Water Control Systems	Monthly and after 10-year storm event	Erosion of ditches, erosion of channel lining; blockage or subsidence of ditches, pipes or culverts
Access Roads	Monthly and after 10-year storm event	Condition of road surface, condition of road shoulders, subsidence. Assure all weather access maintained
Leachate Pumping System	Monthly	Inspect pumps for proper operation.

### **B3.3.2 Non-Routine Inspections**

In addition to scheduled monthly inspections, non-routine visual inspections of the closed landfill will be made within 24 hours following a major rain event. A major rain event is defined as a 10-year, 24-hour storm event measured at the Wrangell Airport. Non-routine inspections will also occur following any earthquakes that occur during the post-closure monitoring period.

### **B3.4 General Maintenance and Repair Criteria**

The following paragraphs provide a description of the more general and common inspection, maintenance, and repair scenarios that may occur during post-closure. These will be refined by the CBW as closure is completed and actual systems are installed.

It is the responsibility of the CBW to assure that the closure system continues to function as it was designed throughout the post-closure period. To meet this responsibility, the CBW must use good judgment and implement inspection criteria provided in this post-closure plan to determine the need for system maintenance and system repair.

#### **B3.4.1 Maintenance**

Maintenance is required to prevent the need for a repair. For example, sparse vegetation in areas that are designed to prevent erosion could lead to erosion. If erosion becomes severe, a major function of the final cover system, which is to prevent surface water contact with waste, has failed. In this example, maintenance of vegetation is required to prevent cover system failure.

#### **B3.4.2 Repair**

Repair is required when a system no longer functions as designed. For example, if settlement results in surface water ponding on the final cover, then a function of the cover system, which is to promote surface water runoff, has failed. In this case, repair is required to return the system to its designed function.

#### **B3.4.3 Final Cover**

Routine and non-routine inspection of the final cover will be performed to evaluate disturbances that result in erosion, settlement, ponding stormwater, sparse vegetation, and vegetation distress.

##### **B3.4.3.1 Maintenance**

Where minor erosion (less than approximately 4 inches deep over a 100-square-foot area or larger) occurs, maintenance will be performed within 10 working days of discovering the erosion. Maintenance will be performed by regrading the surface by hand or with a small tractor used for field maintenance. Surrounding soil cover materials will be used to regrade the eroded area. The area will then be re-seeded in accordance with seed mix designs used during the initial closure construction.

##### **B3.4.3.2 Repairs**

Where erosion is greater than 4 inches in depth, the cover will be repaired by placing soil obtained from off-site sources. It will be placed in accordance with specifications and procedures used during the initial closure construction. The repaired surface will then be re-seeded, if in an area covered by grass, using a seed mix consistent with the existing grass surface area.

If settlement becomes so significant that ponding develops, then the cover will be repaired. To repair the area, additional soil will be placed as required to provide a minimum 3:1 slope as indicated on the original closure construction drawings. Placement of additional soil cover will be performed in accordance with the original closure construction documents.

#### **B3.4.4 Stormwater Control Ditches**

##### **B3.4.4.1 Inspections**

Routine and non-routine inspections will be performed on stormwater control ditches to evaluate disturbances that result in erosion, settlement, ponding stormwater, and blockage of ditch flow lines.

##### **B3.4.4.2 Maintenance**

If debris such as wind-blown vegetation or litter collects in the flow line of the ditch, it will be removed and disposed.

Where minor erosion occurs (less than 4 inches deep) along the ditch flow line, ditches will be maintained by regrading and replacing erosion control systems. They will be regraded using existing soil and relined using materials complying with the original closure construction documents.

Where sediment build-up occurs, ditches will be maintained by removing the sediment. After removing the sediment, ditches will be inspected for the cause of sediment buildup. Causes may include blockage or settlement. If discovered, these causes will be corrected.

Settlement may occur in ditches constructed over waste. Ditches will be inspected for settlement visually and by survey methods such as hand levels or other surveying devices once a year. Areas where settlement occurs will be noted in inspection reports. Where settlement is minor (ponding water less than 4 inches deep), ditches will be maintained by regrading soil in the ditch to prevent ponding and then replacing erosion protection systems. Erosion protection systems will be installed in accordance with the original closure construction documents. Routine inspections will continue throughout the post-closure period.

##### **B3.4.4.3 Repairs**

Where erosion removes ditch lining materials to a depth greater than 4 inches in perimeter ditches they will be repaired by replacing ditch-lining materials. If settlement becomes so severe that it causes ponding greater than 4 inches deep or over-topping of the ditches, they will be repaired. Repair will include regrading the soil that forms the ditch or removal and replacement of the ditch-lining materials. All repair work will be performed in accordance with the original closure construction documents.

#### **B3.4.5 Culverts**

##### **B3.4.5.1 Inspection**

Routine and non-routine inspections of culverts will be performed to evaluate disturbances that result in blockage, erosion at inlets and outlets, sediment buildup, and settlement along the culvert flow line. During winter months, the culverts will also be inspected to assure they are not blocked by ice.

#### **B3.4.5.2 Maintenance**

If debris such as wind-blown vegetation, soil, or litter blocks the culvert it will be removed. Where minor erosion occurs at inlets and outlets, culverts will be maintained by re-establishing erosion control rock protection or by regrading the soil that forms ditches at the inlets and outlets.

Settlement may occur along the alignment of culverts that are constructed over waste. Culverts will be visually inspected for settlement monthly. Areas where settlement is occurring will be noted in inspection reports and routine inspections will continue in that area throughout the post closure period. If ice buildup is detected during runoff periods, it will be monitored and removed as necessary.

#### **B3.4.5.3 Repairs**

Where erosion removes ditch-lining materials to a depth greater than 2 inches at the inlet or greater than 4 inches at the outlet of culverts, ditches will be repaired by replacing ditch-lining materials. If settlement becomes severe enough to reduce slope on the culvert to less than 2.5 percent, the culverts will be repaired. Culverts will be repaired by removing the culvert and regrading or repairing grade on the underlying cover system components and replacing the culvert. All culvert repair work will be accomplished in accordance with the original closure construction documents.

#### **B3.4.6 Access Roads**

##### **B3.4.6.1 Inspection**

In addition to scheduled monthly inspections, non-routine visual inspections of the landfill access roads will be made within 24 hours following a major rain event. A major rain event is defined as a 10-year, 24-hour storm event measured at the Wrangell Airport. Non-routine inspections will also occur following any earthquakes that occur during the post-closure monitoring period.

##### **B3.4.6.2 Maintenance**

Maintenance of these roads is required to allow access for routine and non-routine inspections. If the road becomes rutted due to vehicle traffic or washes out due to rainfall, it will be resurfaced and regraded to its original condition. All maintenance and repair work will comply with the original closure construction documents.

#### **B3.4.7 Leachate Pumping System**

##### **B3.4.7.1 Inspection**

The leachate conveyance system will be inspected monthly. Items inspected include:

- Correct valve positions
- Piping connections for deteriorating gaskets or loose bolts
- Pump operations
- Control panels for proper function and display

### **B3.4.7.2 Operations**

The leachate conveyance and pumping system operates automatically and requires little operation and maintenance. Mechanical and electrical operations and maintenance of the automatic pumps are discussed in an Operations Manual maintained by the CBW. The leachate pump station will be operated by the CBW Public Works Department. The leachate pump station will have duplex pumps operated and maintained with the same diligence and care as all the CBW sanitary pump stations.

Leachate collected in the pump station is automatically pumped through the leachate force main, which then discharges into the CBW sanitary wastewater system to the wastewater treatment plant. The pumps are activated by a transducer level control system, which allows the pump to maintain a minimum and maximum water level in the pump station. An alarm is activated in case of pump failure or if high or low water level readings exceed the preset limits.

### **B3.4.7.3 Maintenance**

Water level sensor inspection and maintenance is conducted monthly. Valves are exercised according to the manufacturer's instructions. Pumps and controls are maintained according to manufacturer's instructions.

### **B3.4.7.4 Diagnostics**

Problems with the leachate conveyance system can be related to exceeding low or high water level settings, a pump malfunction, or line blockage. The following table presents symptoms and problem identification techniques to establish the appropriate repairs as needed.

**Table B3-2  
Leachate Conveyance System Diagnostics**

<b>If</b>	<b>Then</b>
Pump station low water level alarm is activated	Check controls and instrumentation
Pump station high water level alarm is activated	Check valve positions
	Check force main for blockage
	Check controls and instrumentation
	Check pump
Pump malfunction is suspected	Check manual operation of pump
	Ensure there is an alternate pump available in time so that the leachate wetwell does not overflow
	Conduct pumping with alternate pump until pump can be repaired or replaced

### **B3.5 Post-Closure Environmental Monitoring**

Environmental monitoring will continue through the post-closure period in accordance with the current permit requirements. Environmental monitoring includes sampling and testing of surface water within the adjacent creeks and leachate from the landfill.

1. Leachate flowing from the landfill leachate collection system into the CBW sewer system shall be sampled twice each year for the following chemical analyses: specific conductance, chemical oxygen demand, pH, alkalinity, salinity, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, and zinc. The results of those analyses shall be submitted to the department on March 1 and September 1 of each year. The ADEC may require an increase in the testing frequency based upon the test results.
2. Every effort shall be made to ensure that samples be taken as close as possible to the quarterly, annual and biannual reporting dates.

If constituent concentrations in the leachate are stable or show a decrease after five years of closure, the CBW will request to reduce testing from twice per year to once per year.

### **B3.6 Landfill Gas Monitoring**

Historical landfill gas monitoring at Wrangell Landfill does not indicate that an imminent health or safety hazard exists. Gas generation at the landfill appears to be localized and does not pose a health risk, but continued monitoring is appropriate. Landfill gas monitoring is to be conducted when the barometer is 30.0 Hg or lower, with a steady or falling barometer. The following post-closure landfill gas monitoring is proposed.

1. The closure design includes installation of two landfill gas monitoring wells located at the property boundary (as shown on Drawings C102 and C303 in Appendix A) allowing the CBW to monitor for methane gas migration. This monitoring will be performed monthly to assure the methane concentration at the property boundary does not exceed the lower explosive limit (LEL). If methane gas levels exceed the LEL, the owner or operator shall immediately notify ADEC by telephone and in writing. If no landfill gas is detected during the first year following completion of final closure, the CBW will request that this monitoring be reduced to quarterly.
2. Methane gas monitoring will be conducted quarterly within the Material Recovery Handling Facility. Monitoring locations will be within the office and corners of the building. Results above 50 ppm require more frequent monitoring, and above 100 ppm require reporting to ADEC. At 500 ppm, ventilation of the building is required. At 12,500 ppm (25 percent of the lower explosive limit), corrective action is required as is immediate notification of ADEC. If no methane gas is detected or a decreasing trend of gas concentration is shown during the first five years following completion of final closure, the CBW will request that this surface monitoring be reduced to quarterly.

Landfill gas monitoring equipment that allows measurement of methane concentration volumes in parts per million, LEL, and percent by volume will be maintained by CBW.

### **B3.7 Reporting**

CBW will submit monitoring reports (as they are completed in the schedules outlined in Sections B3.5 and B3.6, above) to the ADEC within one month of receiving the test results.

Upon conclusion of the post-closure period, the CBW will submit a report to ADEC that contains the following:

- Photographs of the facility taken periodically during the post-closure period
- A description of maintenance and repairs that occurred during the post-closure period (including report sheets/copies of logbook pages)
- All surface water monitoring data, leachate monitoring data, and landfill gas monitoring data collected during the post-closure period.
- Documentation indicating that the closed landfill has stabilized and post-closure inspection, maintenance, and repair are no longer necessary

### **B3.8 Deed Recording**

When the ADEC accepts the CBW's assertion that the post-closure period is completed, the CBW will record a notation on the deed to the property that:

- The property was used as a Class II and III MSWLF;
- The property may not be suitable for some uses;
- Maintenance and repairs to the property might become necessary to prevent pollution problems at the site and;
- Activities that threaten the integrity of the final cover material are prohibited. Any activity that results in damage to the final cover must be corrected to control potential pollution problems.

### **B3.9 Post-Closure Period Contacts**

The following person can be contacted regarding post-closure activities at the City and Borough of Wrangell:

Carl Johnson  
Director of Public Works  
P.O. Box 531  
Wrangell, Alaska 99929  
(907) 874-3904

### **B3.10 Post-Closure Use**

No uses of the Wrangell Landfill are anticipated after closure.

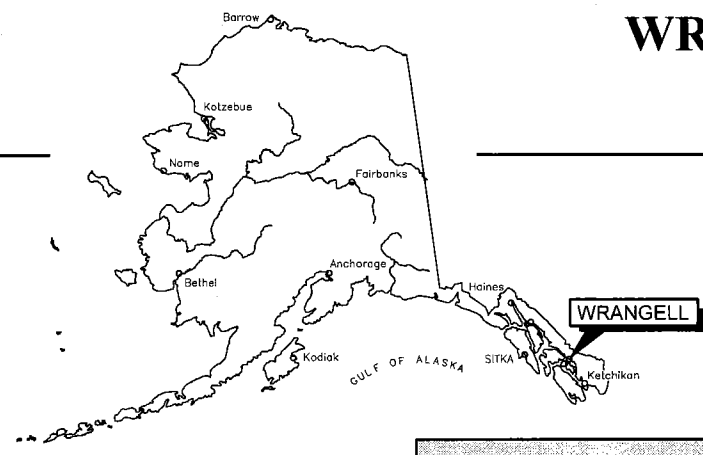
### **B3.11 Post-Closure Certification**

Upon completion of the post-closure care period for Wrangell Landfill, the CBW will provide certification to the ADEC that post-closure care has been completed in accordance with the post-closure plan. The certification will be signed and sealed by a registered engineer or be approved by the ADEC.



Appendix A

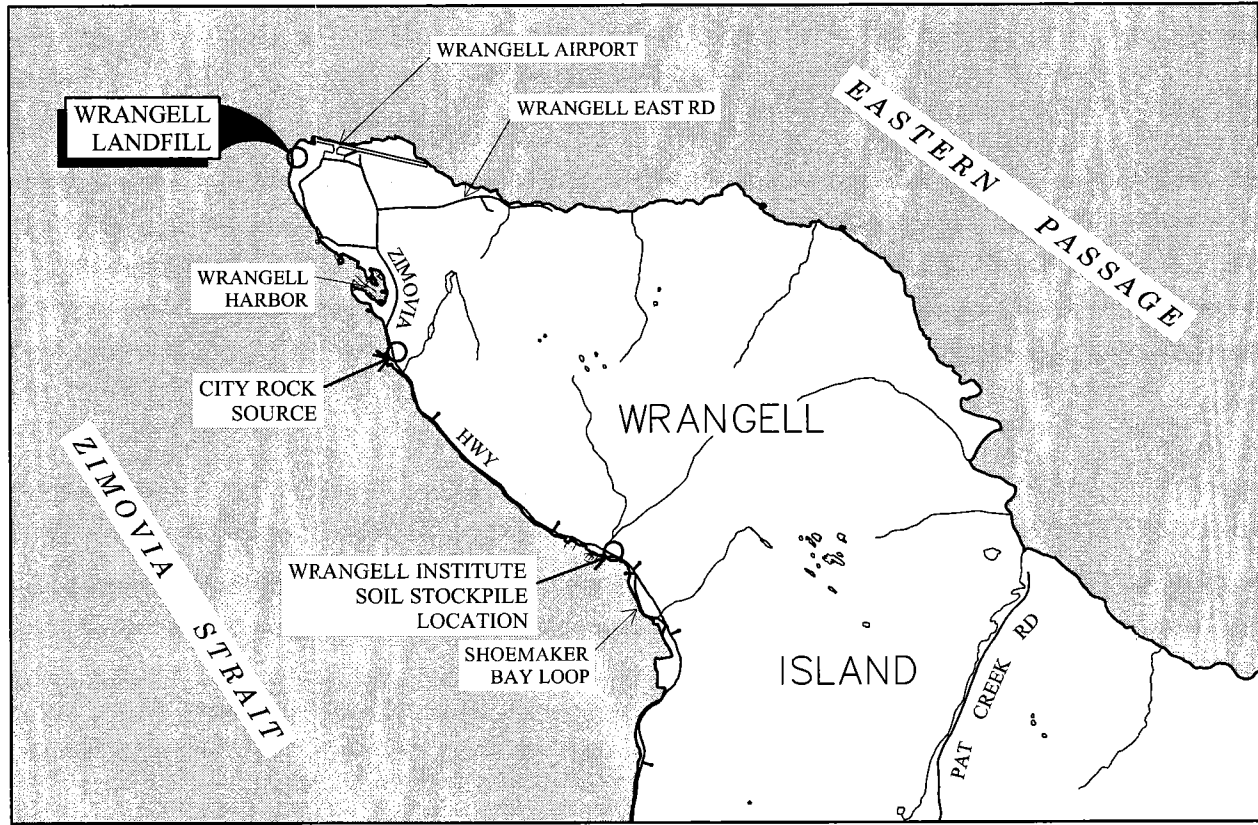
# CITY AND BOROUGH OF WRANGELL MUNICIPAL SOLID WASTE LANDFILL CLOSURE PLAN WRANGELL, ALASKA



**AGENCY REVIEW SET  
NOT FOR CONSTRUCTION**

**SHEET INDEX**

SHEET No.	DESCRIPTION
C001	COVER SHEET AND PROJECT LOCATION MAP
C002	GENERAL NOTES, ABBREVIATIONS AND SYMBOLS
C003	SURVEY CONTROL DIAGRAM
C100	EXISTING SITE CONDITIONS
C101	GRADING & DRAINAGE PLAN
C102	LANDFILL VENT PIPE LAYOUT AND DETAILS
C200	TYPICAL SECTIONS
C201	TYPICAL SECTION
C300	CONSTRUCTION DETAILS
C301	LEACHATE COLLECTION AND PUMPING DETAILS
C302	CONSTRUCTION DETAILS
C303	LANDFILL GAS EXTRACTION WELL DETAILS
C400	LANDFILL ACCESS ROAD PROFILE
C501-C512	LANDFILL CROSS SECTIONS
C600	WRANGELL INSTITUTE STOCKPILED MATERIALS
C700	EROSION AND SEDIMENT CONTROL PLAN



**PROJECT LOCATION MAP**

APPROXIMATE SCALE: 1" = 1 MILE

**MAYOR:**  
DONALD McCONACHIE, SR.

**ASSEMBLY MEMBERS:**  
WILMA STOKES  
JEREMY MAXAND  
JAMES STOUGH  
ERNEST CHRISTIAN  
PAMELLA McCLOSKEY  
WARREN EDGLEY

<b>APPROVED BY</b>	
<b>CITY MANAGER</b>	
SIGNATURE	DATE
<b>PUBLIC WORKS DIRECTOR</b>	
SIGNATURE	DATE

I:\2008\081336\Design Drawings\Coverdwg PLOT: April 10, 2009 at: 1:53pm

DESIGN	JMP
DRAWN	MLL/KAP
CHECK	JMP
APPROVED	JMP
FILE:	

No.	DATE	REVISION	BY	APPRD.

**COVER SHEET AND  
PROJECT LOCATION MAP**



**RAM**  
**R & M ENGINEERING, INC.**  
ENGINEERS      GEOLOGISTS      SURVEYORS  
6205 GLACIER HIGHWAY      Phone 907-780-6060  
JUNEAU, AK. 99801      Fax 907-780-4611  
rmengineering@rmjuneau.com

CITY AND BOROUGH OF WRANGELL  
MUNICIPAL SOLID WASTE  
LANDFILL CLOSURE PLAN  
WRANGELL, ALASKA

### GENERAL CONSTRUCTION NOTES

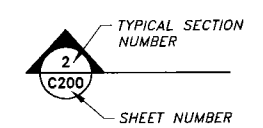
- LANDFILL RE-GRADING AND COMPACTING OPERATIONS CAN EXPECT ENCOUNTERING METAL SCRAP, WIRE ROPE, PIPE, CONSTRUCTION DEBRIS, EARTH MIXED WITH WASTE, BOULDERS, SHEET ROCK, TREE STUMPS, LOGS, ASPHALT PAVEMENT WASTE, WOOD CHIPS, MATTRESS SPRINGS, WOOD PALLETS AND OTHER LANDFILL MATERIALS.
- LANDFILL FINISH GRADES SHOWN ON THESE PLANS MAY BE REVISED AS LONG AS THE 3:1 SLOPES CAN BE MAINTAINED AND ARE APPROVED BY THE ENGINEER.
- LOCATION OF STORM DRAIN PIPES, SANITARY SEWER MANHOLES, PIPING AND PIPE LENGTHS ARE SUBJECT TO MINOR REVISIONS AS APPROVED BY THE ENGINEER.
- UNLESS OTHERWISE NOTED, ALL DISTURBED AREAS WITHIN THE PROJECT SHALL BE SEEDED BY THE HYDROSEEDING METHOD.
- LOCATIONS OF EXISTING UNDERGROUND SEWER, WATER, TELEPHONE, CABLE TELEVISION, AND POWER UTILITIES SHOWN ON THESE PLANS WERE DERIVED FROM A COMBINATION OF AS-BUILT PLANS AND FIELD LOCATES. ACTUAL LOCATIONS MAY VARY FROM THOSE SHOWN. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING, PROTECTING, AND MAINTAINING THE UTILITIES THROUGHOUT THE CONSTRUCTION OF THIS PROJECT. ANY DAMAGE RESULTING TO THESE UNDERGROUND UTILITIES DURING CONSTRUCTION SHALL BE PAID FOR BY THE CONTRACTOR AND SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT. CALL 874-3904, PRIOR TO ANY EXCAVATION ACTIVITIES.
- PROPERTY LINE LOCATIONS USED IN THESE PLANS ARE DERIVED FROM RECORD PLATS AND DO NOT REPRESENT A BOUNDARY SURVEY.
- WHERE PROPOSED STORM DRAIN LINES, SANITARY SEWER LINES AND WATER LINES CROSS EXISTING OR PROPOSED DRAINAGE DITCHES, WATER, SEWER OR STORM PIPES, THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND INSTALL RIGID BOARD INSULATION WHERE REQUIRED.
- PROVIDE KNOCKOUTS IN MANHOLE STRUCTURES FOR ALL PIPES SHOWN ON THE PLANS.
- ONLY HORIZONTAL ELBOW FITTINGS (BENDS) ARE SHOWN ON THE PLANS. ADDITIONAL FITTINGS WILL BE REQUIRED FOR VERTICAL DEFLECTIONS NEAR CONNECTION TO EXISTING PIPES AND AT OTHER LOCATIONS REQUIRING GRADE CHANGES TO AVOID CONFLICTS.
- APPLY "CONCRETE INTERNATIONAL CORPORATION" ASHFORD FORMULA, OR APPROVED EQUAL, TO ALL NEWLY EXPOSED CONCRETE SURFACES PER MANUFACTURERS RECOMMENDATIONS.
- THE CONTRACTOR SHALL REFERENCE ALL EXISTING PROPERTY CORNER AND OTHER MONUMENTS PRIOR TO CONSTRUCTION THAT WILL BE DISTURBED DURING HIS WORK, AND REMONUMENT AFTER CONSTRUCTION OPERATIONS. ALL WORK SHALL BE DONE BY, OR UNDER THE DIRECT SUPERVISION OF, AN ALASKA REGISTERED LAND SURVEYOR. ALL EXISTING MONUMENTS ARE NOT NECESSARILY SHOWN ON THE PLANS.
- THE PLAN SHEETS DO NOT NECESSARILY SHOW ALL TREES AND BRUSH THAT WILL BE ENCOUNTERED DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL REMOVE AND DISPOSE (AT AN APPROVED SITE) OF ALL TREES AND BRUSH AS NECESSARY FOR CONSTRUCTION AND AS DIRECTED BY THE ENGINEER.
- THE CLEARING AND GRUBBING LIMITS SHALL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER PRIOR TO ANY CLEARING, GRUBBING OR EXCAVATION ACTIVITIES TAKING PLACE. CLEARING AND GRUBBING LIMITS FOR ALL ROADS, PARKING LOTS AND DITCHES SHALL BE A MAXIMUM OF 5 FEET FROM SLOPE LIMITS OR PROPERTY LINES IF APPLICABLE, WHICHEVER IS LESS.
- "JUMPING JACK", OR SIMILAR TYPE COMPACTORS SHALL BE USED FOR COMPACTION WITHIN 18 INCHES OF ALL MANHOLES WITHIN THE ACCESS ROADWAY.
- THE CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL DEVICES DURING CONSTRUCTION AS INDICATED ON THE CONTRACTOR'S APPROVED SWPPP.
- THERE ARE BOTH "FEET AND DECIMALS THEREOF" AND "FEET AND INCHES" CALLED FOR ON THESE PLANS. CONTRACTOR TO USE CAUTION WHEN REVIEWING EACH CALL.

### ABBREVIATIONS

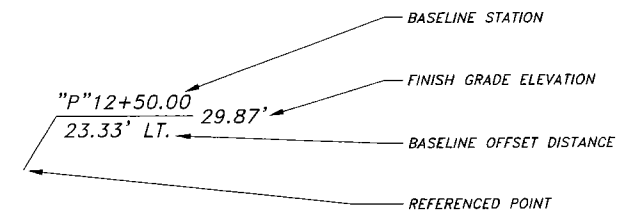
A.P.	ANGLE POINT	M.J.	MECHANICAL JOINT
APPROX.	APPROXIMATE	M.T.E.	MATCH TO EXISTING
B.C.	BEGIN CURVE	N=	NORTHING
BLDG.	BUILDING	N.F.S.	NON-FROST SUSCEPTIBLE
B.O.E.	BOTTOM OF EXCAVATION	N.I.C.	NOT IN CONTRACT
B.O.F.	BOTTOM OF FOOTING	N.T.S.	NOT TO SCALE
B.O.P.	BEGINNING OF PROJECT	N.V.C.	NO VERTICAL CURVE
C.I.	CAST IRON	O.C.	ON CENTER
C.B.	CATCH BASIN	O.D.	OUTSIDE DIAMETER
C.B.W.	CITY AND BOROUGH OF WRANGELL	P.C.	POINT OF CURVATURE
CL	CENTERLINE	P.C.C.	POINT OF COMPOUND CURVE
CLR	CLEAR	P.I.	POINT OF INTERSECTION
C.M.P.	CORRUGATED METAL PIPE	P/L	PROPERTY LINE
CONC.	CONCRETE	P.O.C.	POINT ON CURVE
CONT.	CONTINUOUS	P.R.C.	POINT OF REVERSE CURVE
C.P.P.	CORRUGATED POLYETHYLENE PIPE	P.T.	POINT OF TANGENCY
C.T.E.	CONNECT TO EXISTING	P.V.C.	POLYVINYL CHLORIDE
CTRL	CONTROL	R.D.	ROOF DRAIN
CU	COPPER	RT.	RIGHT
DH	DRILL HOLE	R.O.W.	RIGHT-OF-WAY
DIA.	DIAMETER	S.D.M.H.	STORM DRAIN MANHOLE
DIAG.	DIAGONAL	SDWK	SIDEWALK
D.I.P.	DUCTILE IRON PIPE	S.S.	SANITARY SEWER
DOT/PF	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES	S.S.C.O.	SANITARY SEWER CLEANOUT
E=	EASTING	S.S.M.H.	SANITARY SEWER MANHOLE
E.C.	END CURVE	STA.	STATION
EL	ELEVATION	STD.	STANDARD
E.O.P.	END OF PROJECT	SWPPP	STORM WATER POLLUTION PREVENTION PLAN
EQ.	EQUATION	T.B.M.	TEMPORARY BENCH MARK
EXP.	EXPANSION	T.B.O.C.	TOP BACK OF CURB
EXIST.	EXISTING	T.O.B.	TOP OF BANK
F.D.	FOUNDATION DRAIN	T.O.P.	TOP OF PIPE
F.F.	FINISH FLOOR	TP	TEST PIT
F.G.	FINISH GRADE	TYP.	TYPICAL
F.H.	FIRE HYDRANT	U.D.	UNDERDRAIN
F.M.	FORCE MAIN	U.E.	UNDERGROUND ELECTRICAL
GCL	GEOSYNTHETIC CLAY LINER	U.S.T.	UNDERGROUND STORAGE TANK
G.P.	GRADE POINT	VERT.	VERTICAL
G.V.	GATE VALVE	VPC	VERTICAL POINT OF CURVATURE
H.D.P.E.	HIGH DENSITY POLYETHYLENE	VPI	VERTICAL POINT OF INTERSECTION
HOR.	HORIZONTAL	VPT	VERTICAL POINT OF TANGENCY
H.P.	HIGH POINT	W/	WITH
I.E.	INVERT ELEVATION		
LT.	LEFT		
MAX.	MAXIMUM		
MIN.	MINIMUM		

### SYMBOLS

EXISTING	PROPOSED	
---	---	PROPERTY / BOUNDARY LINE
---	---	PROJECT BASELINE
○	○ SSMH-1	SANITARY SEWER MANHOLE
---	--- SP-1	SANITARY SEWER LINE
---	--- FM	LEACHATE FORCE MAIN
---	--- P-2	STORM DRAIN PIPE
---	---	WATER LINE
---	---	WATER VALVE
○	○	FIRE HYDRANT W/ BOLLARDS
○	○	LIGHT POLE
---	---	ELECTRIC LINE
E	E	ELECTRIC PEDESTAL
⊗	⊗	ELECTRIC TRANSFORMER
---	---	TELEPHONE LINE
P	P	TELEPHONE PEDESTAL
---	---	CABLE TV LINE
C	C	CABLE TV PEDESTAL
---	---	TOP OF BANK/SHOULDER
---	---	TOE OF FILL SLOPE
---	---	DRAINAGE DITCH
60	80	CONTOURS
~	~	TREE LINE
■	■	SIGN
→	→	DRAINAGE FLOW INDICATOR
▒	▒	CONCRETE SURFACE
~	~	SILT FENCE
○	○ 33	GRADING POINT
▒	▒	STRUCTURE
○	○	LEACHATE PUMP STATION



REFERENCE BUBBLE EXPLANATION  
N.T.S.



FINISH GRADE EXPLANATION  
N.T.S.

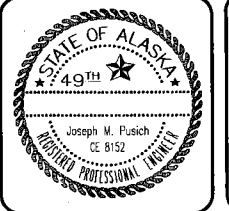
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No.	DATE	REVISION	BY	APRVD.

## GENERAL NOTES, ABBREVIATIONS AND SYMBOLS



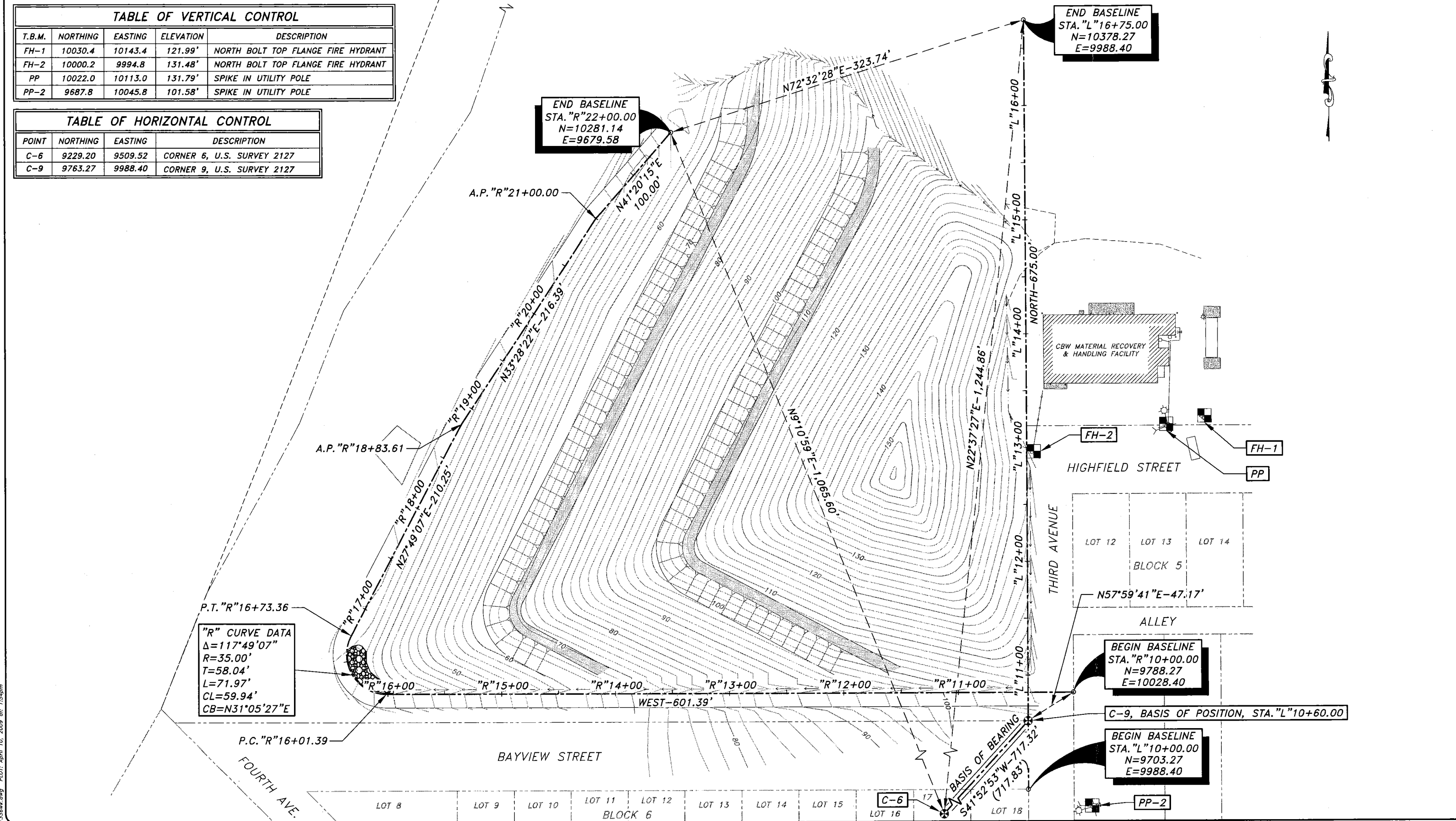
**R & M ENGINEERING, INC.**  
ENGINEERS      GEOLOGISTS      SURVEYORS  
6205 GLACIER HIGHWAY      Phone 907-780-6060  
JUNEAU, AK. 99801      Fax 907-780-4611  
rmengineering@rmjuneau.com

CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE LANDFILL CLOSURE PLAN**  
WRANGELL, ALASKA

DATE: MARCH, 2009  
R & M NO. 081336  
SHEET **C002**

TABLE OF VERTICAL CONTROL				
T.B.M.	NORTHING	EASTING	ELEVATION	DESCRIPTION
FH-1	10030.4	10143.4	121.99'	NORTH BOLT TOP FLANGE FIRE HYDRANT
FH-2	10000.2	9994.8	131.48'	NORTH BOLT TOP FLANGE FIRE HYDRANT
PP	10022.0	10113.0	131.79'	SPIKE IN UTILITY POLE
PP-2	9687.8	10045.8	101.58'	SPIKE IN UTILITY POLE

TABLE OF HORIZONTAL CONTROL			
POINT	NORTHING	EASTING	DESCRIPTION
C-6	9229.20	9509.52	CORNER 6, U.S. SURVEY 2127
C-9	9763.27	9988.40	CORNER 9, U.S. SURVEY 2127



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 DRAWN MLL/KAP  
 CHECK JUMP  
 APPROVED JUMP  
 FILE:

No.	DATE	REVISION	BY	APPRD.

**SURVEY CONTROL DIAGRAM**

GRAPHIC SCALE

0' 20' 40' 80' 160'



**RAM**

**R & M ENGINEERING, INC.**  
 ENGINEERS GEOLOGISTS SURVEYORS

6205 GLACIER HIGHWAY Phone 907-780-6060  
 JUNEAU, AK. 99801 Fax 907-780-4611  
 rmengineering@mjuneau.com

CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE  
 LANDFILL CLOSURE PLAN**  
 WRANGELL, ALASKA

DATE: MARCH, 2009  
 R & M NO. 081336  
 SHEET **C003**

**GENERAL NOTES**

1. THE BASIS OF BEARING OF BEARING FOR THIS SURVEY WAS BETWEEN RECOVERED ORIGINAL G.L.O./B.L.M. MONUMENTS FOR CORNERS 9 AND 6, U.S. SURVEY 2127 HAVING A COMPUTED RECORD BEARING OF S41°52'53"W.
2. THE BASIS OF VERTICAL CONTROL FOR THIS SURVEY WAS A RECOVERED T.B.M. (TEMPORARY BENCH MARK) LOCATED IN A UTILITY POLE ADJACENT TO THE WRANGELL LANDFILL OPERATIONS BUILDING WITH A ACCEPTED ELEVATION OF 131.79'
3. THIS SURVEY WAS CONDUCTED UTILIZING A TOPCON GTS-3000 SERIES TOTAL STATION AND STANDARD PRISM RANGING METHODS.
4. WHERE RECORD SURVEY COURSES (BEARINGS AND/OR DISTANCES) DIFFER FROM THAT OF FIELD MEASURED AND/OR COMPUTED SURVEY COURSES THE RECORD COURSE IS SHOWN WITHIN PARENTHESIS WHILE THE FIELD MEASURED AND/OR COMPUTED COURSE IS SHOWN WITHOUT PARENTHESIS.
5. THE TOPOGRAPHIC INFORMATION SHOWN WAS FIELD SURVEYED BY R&M ENGINEERING INC. IN MAY OF 2008. SITE CONDITIONS IN THE ACTUAL LANDFILL AREAS ARE SUBJECT TO CHANGE SINCE THE DATE OF THIS SURVEY.

TABLE OF VERTICAL CONTROL				
T.B.M.	NORTHING	EASTING	ELEVATION	DESCRIPTION
FH-1	10030.4	10143.4	121.99'	NORTH BOLT TOP FLANGE FIRE HYDRANT
FH-2	10000.2	9994.8	131.48'	NORTH BOLT TOP FLANGE FIRE HYDRANT
PP	10022.0	10113.0	131.79'	SPIKE IN UTILITY POLE
PP-2	9687.8	10045.8	101.58'	SPIKE IN UTILITY POLE

TABLE OF HORIZONTAL CONTROL			
POINT	NORTHING	EASTING	DESCRIPTION
C-6	9229.20	9509.52	CORNER 6, U.S. SURVEY 2127
C-9	9763.27	9988.40	CORNER 9, U.S. SURVEY 2127



- LEGEND**
- ⊕ ORIGINAL B.L.M. PRIMARY MONUMENT (RECOVERED)
  - ⊙ SECONDARY MONUMENT BY OTHERS (RECOVERED)
  - R & M CONTROL MONUMENT (ESTABLISHED)

DESIGN	JMP
DRAWN	MLL/KAP
CHECK	JMP
APPROVED	JMP
FILE	

No.	DATE	REVISION	BY	APPRD.

**EXISTING SITE CONDITIONS**

GRAPHIC SCALE

0' 20' 40' 80' 160'

CONTOUR INTERVAL = 1'

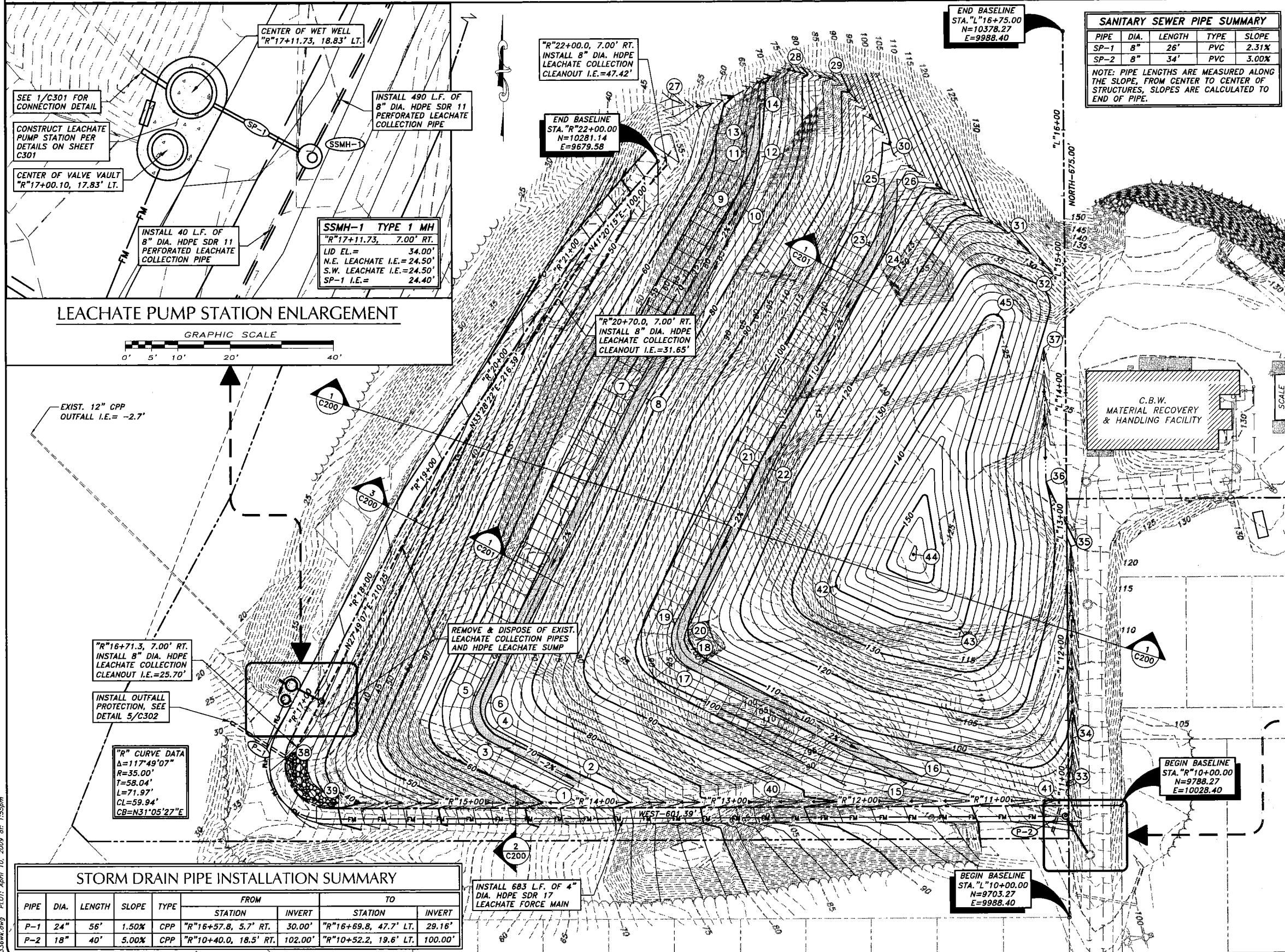


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CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE  
 LANDFILL CLOSURE PLAN**  
 WRANGELL, ALASKA

DATE: MARCH, 2009  
 R & M NO: 081336  
 SHEET: **C100**

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**SANITARY SEWER PIPE SUMMARY**

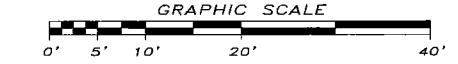
PIPE	DIA.	LENGTH	TYPE	SLOPE
SP-1	8"	26'	PVC	2.31%
SP-2	8"	34'	PVC	3.00%

NOTE: PIPE LENGTHS ARE MEASURED ALONG THE SLOPE, FROM CENTER TO CENTER OF STRUCTURES. SLOPES ARE CALCULATED TO END OF PIPE.

**GRADE POINT SUMMARY**

POINT	STATION	OFFSET		ELEVATION	REMARKS
		LT.	RT.		
1	"L"11+01.62	375.37'		66.62'	DRAINAGE INTERCEPT DITCH
2	"L"11+07.66	365.52'		66.00'	DRAINAGE INTERCEPT DITCH
3	"L"11+36.36	439.68'		68.08'	DRAINAGE INTERCEPT DITCH
4	"L"11+45.28	435.15'		67.58'	DRAINAGE INTERCEPT DITCH
5	"L"11+70.14	450.13'		68.55'	DRAINAGE INTERCEPT DITCH
6	"L"11+65.47	441.28'		68.05'	DRAINAGE INTERCEPT DITCH
7	"L"14+02.05	327.76'		73.65'	DRAINAGE INTERCEPT DITCH
8	"L"13+97.38	318.92'		73.15'	DRAINAGE INTERCEPT DITCH
9	"L"15+45.45	252.09'		70.41'	DRAINAGE INTERCEPT DITCH
10	"L"15+40.79	243.25'		69.91'	DRAINAGE INTERCEPT DITCH
11	"L"15+84.98	241.72'		69.59'	DRAINAGE INTERCEPT DITCH
12	"L"15+84.71	231.73'		68.99'	DRAINAGE INTERCEPT DITCH
13	"L"15+98.21	241.36'		69.32'	DRAINAGE INTERCEPT DITCH
14	"L"16+21.11	230.73'		68.00'	DRAINAGE INTERCEPT DITCH
15	"L"11+02.54	122.19'		98.66'	DRAINAGE INTERCEPT DITCH
16	"L"11+07.54	110.40'		98.00'	DRAINAGE INTERCEPT DITCH
17	"L"11+91.87	287.53'		102.54'	DRAINAGE INTERCEPT DITCH
18	"L"12+00.66	282.77'		102.04'	DRAINAGE INTERCEPT DITCH
19	"L"12+25.53	297.75'		103.12'	DRAINAGE INTERCEPT DITCH
20	"L"12+20.86	288.91'		102.62'	DRAINAGE INTERCEPT DITCH
21	"L"13+48.07	233.10'		106.14'	DRAINAGE INTERCEPT DITCH
22	"L"13+43.40	224.25'		105.64'	DRAINAGE INTERCEPT DITCH
23	"L"15+12.14	146.52'		102.41'	DRAINAGE INTERCEPT DITCH
24	"L"15+07.57	137.63'		101.91'	DRAINAGE INTERCEPT DITCH
25	"L"15+63.89	136.06'		101.10'	DRAINAGE INTERCEPT DITCH
26	"L"15+63.31	126.01'		100.60'	DRAINAGE INTERCEPT DITCH
27	"L"16+25.30	299.26'		48.00'	DRAINAGE DITCH
28	"L"16+46.51	208.06'		74.00'	DRAINAGE DITCH
29	"L"16+39.73	175.55'		86.00'	DRAINAGE DITCH
30	"L"15+82.29	128.69'		100.17'	DRAINAGE DITCH
31	"L"15+21.75	42.26'		124.00'	DRAINAGE DITCH
32	"L"14+89.87	7.90'		128.00'	BEGIN DRAINAGE DITCH
33	"L"11+03.49		0.00'	102.00'	DRAINAGE DITCH
34	"L"11+36.39		3.08'	108.00'	DRAINAGE DITCH
35	"L"12+82.60		2.95'	118.00'	DRAINAGE DITCH
36	"L"13+32.13	15.68'		120.00'	DRAINAGE DITCH
37	"L"14+34.28	16.70'		128.00'	BEGIN DRAINAGE DITCH
38	"L"11+21.16	590.63'		30.00'	DRAINAGE DITCH
39	"L"10+89.00	561.39'		37.23'	DRAINAGE DITCH
40	"L"10+89.00	226.00'		86.00'	DRAINAGE DITCH
41	"L"10+89.00	10.00'		104.00'	DRAINAGE DITCH
42	"L"12+53.39	174.74'		140.00'	FINISH GRADE
43	"L"12+20.64	81.30'		140.00'	FINISH GRADE
44	"L"12+77.25	115.75'		154.25'	FINISH GRADE
45	"L"14+59.60	51.06'		140.00'	FINISH GRADE

**LEACHATE PUMP STATION ENLARGEMENT**



EXIST. 12" CPP  
OUTFALL I.E. = -2.7'

C.B.W.  
MATERIAL RECOVERY  
& HANDLING FACILITY

"R"16+71.3, 7.00' RT.  
INSTALL 8" DIA. HDPE  
LEACHATE COLLECTION  
CLEANOUT I.E.=25.70'

INSTALL OUTFALL  
PROTECTION, SEE  
DETAIL 5/C302

"R" CURVE DATA  
Δ=117°49'07"  
R=35.00'  
T=58.04'  
L=71.97'  
CL=59.94'  
CB=N31°05'27"E

"R"22+00.0, 7.00' RT.  
INSTALL 8" DIA. HDPE  
LEACHATE COLLECTION  
CLEANOUT I.E.=47.42'

END BASELINE  
STA. "R"22+00.00  
N=10281.14  
E=9679.58

"R"20+70.0, 7.00' RT.  
INSTALL 8" DIA. HDPE  
LEACHATE COLLECTION  
CLEANOUT I.E.=31.65'

END BASELINE  
STA. "L"16+75.00  
N=10378.27  
E=9988.40

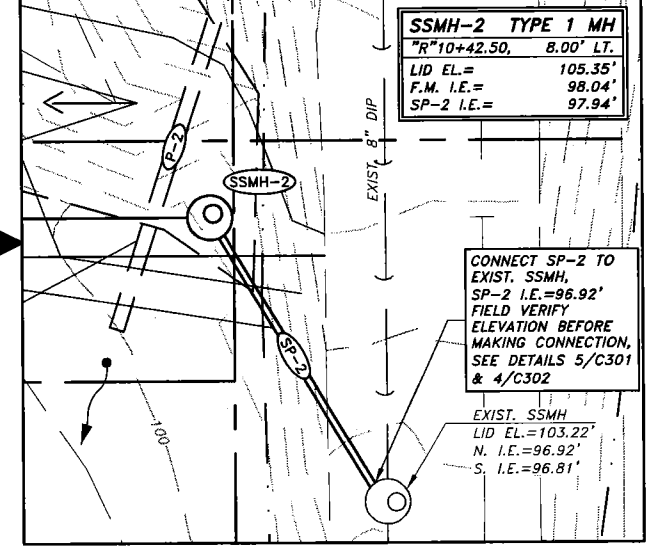
BEGIN BASELINE  
STA. "R"10+00.00  
N=9788.27  
E=10028.40

BEGIN BASELINE  
STA. "L"10+00.00  
N=9703.27  
E=9988.40

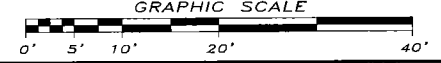
**STORM DRAIN PIPE INSTALLATION SUMMARY**

PIPE	DIA.	LENGTH	SLOPE	TYPE	FROM		TO	
					STATION	INVERT	STATION	INVERT
P-1	24"	56'	1.50%	CPP	"R"16+57.8, 5.7' RT.	30.00'	"R"16+69.8, 47.7' LT.	29.16'
P-2	18"	40'	5.00%	CPP	"R"10+40.0, 18.5' RT.	102.00'	"R"10+52.2, 19.6' LT.	100.00'

INSTALL 683 L.F. OF 4"  
DIA. HDPE SDR 17  
LEACHATE FORCE MAIN



**LEACHATE CONNECTION ENLARGEMENT**



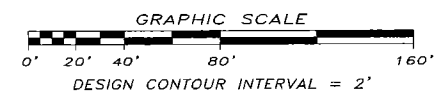
SSMH-2 TYPE 1 MH  
"R"10+42.50, 8.00' LT.  
LID EL.= 105.35'  
F.M. I.E.= 98.04'  
SP-2 I.E.= 97.94'

CONNECT SP-2 TO  
EXIST. SSMH.  
SP-2 I.E.=96.92'  
FIELD VERIFY  
ELEVATION BEFORE  
MAKING CONNECTION.  
SEE DETAILS 5/C301  
& 4/C302

EXIST. SSMH  
LID EL.=103.22'  
N. I.E.=96.92'  
S. I.E.=96.81'

DESIGN	JMP
DRAWN	MLL/KAP
CHECK	JMP
APPROVED	JMP
FILE	

**GRADING & DRAINAGE PLAN**



**R & M ENGINEERING, INC.**  
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CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE  
LANDFILL CLOSURE PLAN**  
WRANGELL, ALASKA

DATE: MARCH, 2009  
R & M NO. 081331  
SHEET  
**C101**

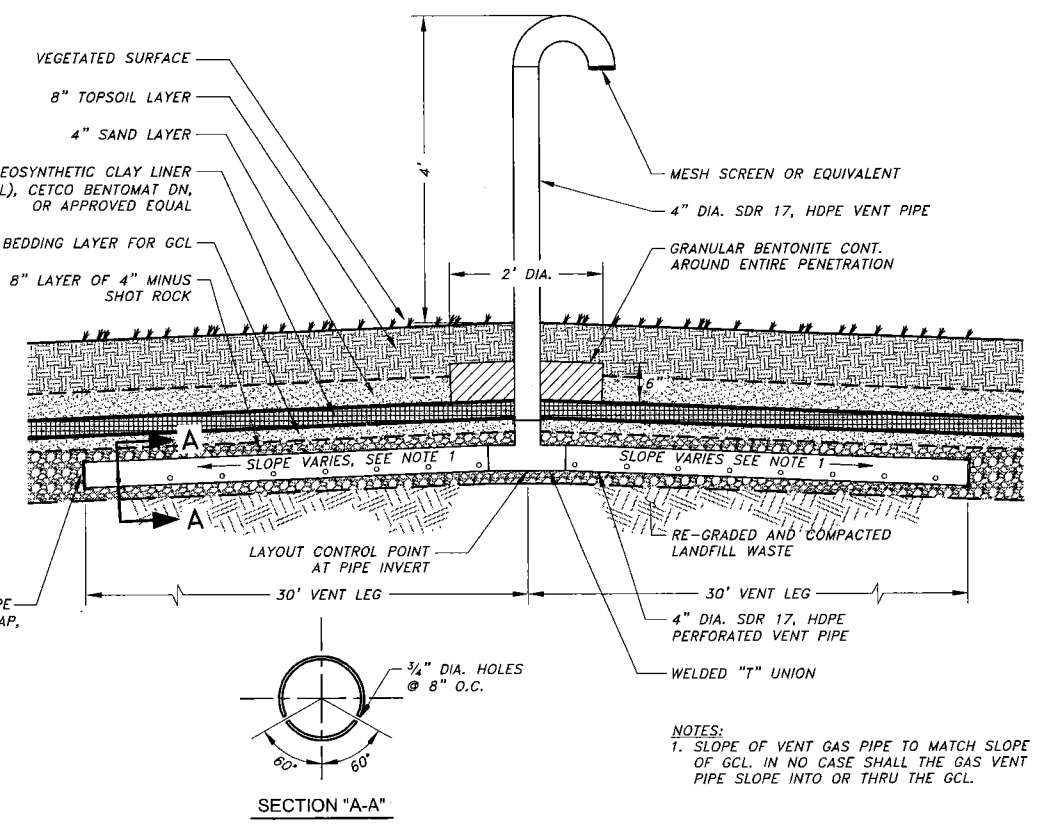
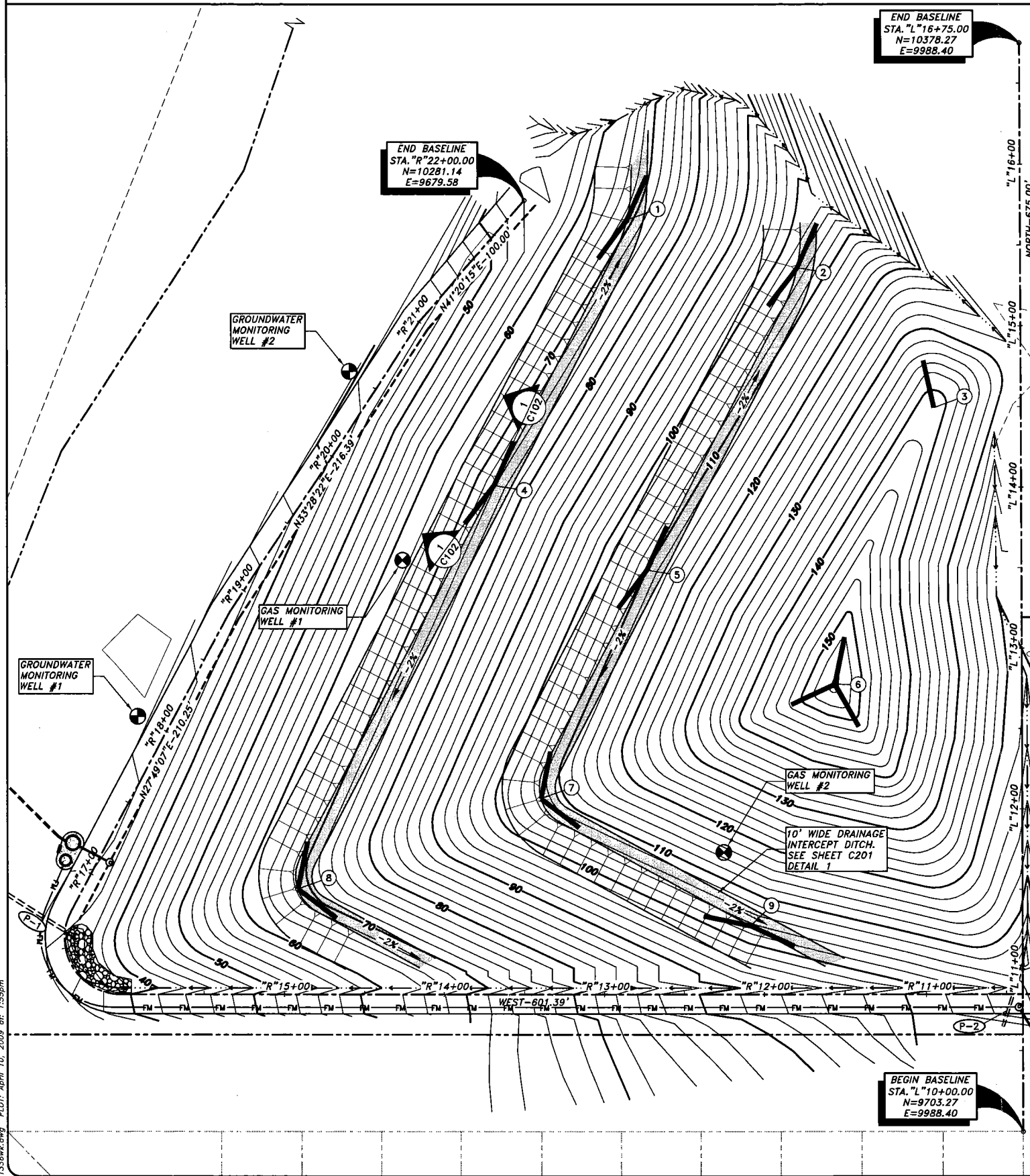
END BASELINE  
STA. "L"16+75.00  
N=10378.27  
E=9988.40

END BASELINE  
STA. "R"22+00.00  
N=10281.14  
E=9679.58

POINT	STATION	OFFSET		ELEVATION	REMARKS	VENT CONFIGURATION
		LT.	RT.			
1	"L"15+65.73	244.35'		67.31'	LANDFILL DRAIN VENT	DOUBLE LEG VENT
2	"L"15+36.26	138.07'		102.60'	LANDFILL DRAIN VENT	DOUBLE LEG VENT
3	"L"14+49.37	54.15'		138.97'	LANDFILL DRAIN VENT	SINGLE LEG VENT
4	"L"14+01.35	328.13'		72.12'	LANDFILL DRAIN VENT	DOUBLE LEG VENT
5	"L"13+48.68	232.65'		108.32'	LANDFILL DRAIN VENT	DOUBLE LEG VENT
6	"L"12+77.56	115.68'		152.50'	LANDFILL DRAIN VENT	TRIPLE LEG VENT
7	"L"12+06.59	299.56'		105.03'	LANDFILL DRAIN VENT	DOUBLE LEG VENT
8	"L"11+50.39	451.67'		66.64'	LANDFILL DRAIN VENT	DOUBLE LEG VENT
9	"L"11+27.49	168.38'		101.80'	LANDFILL DRAIN VENT	DOUBLE LEG VENT

**SYMBOLS**

- VENT PIPE LEG
- ⊗ GAS MONITORING WELL LOCATION
- ⊕ GROUNDWATER MONITORING WELL LOCATION



NOTES:  
1. SLOPE OF VENT GAS PIPE TO MATCH SLOPE OF GCL. IN NO CASE SHALL THE GAS VENT PIPE SLOPE INTO OR THRU THE GCL.

1 LANDFILL GAS COLLECTION AND VENT DETAIL  
N.T.S.

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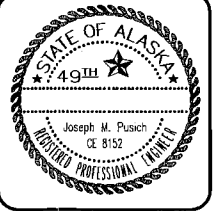
  

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**LANDFILL VENT PIPE LAYOUT AND DETAILS**

GRAPHIC SCALE

DESIGN CONTOUR INTERVAL = 2'



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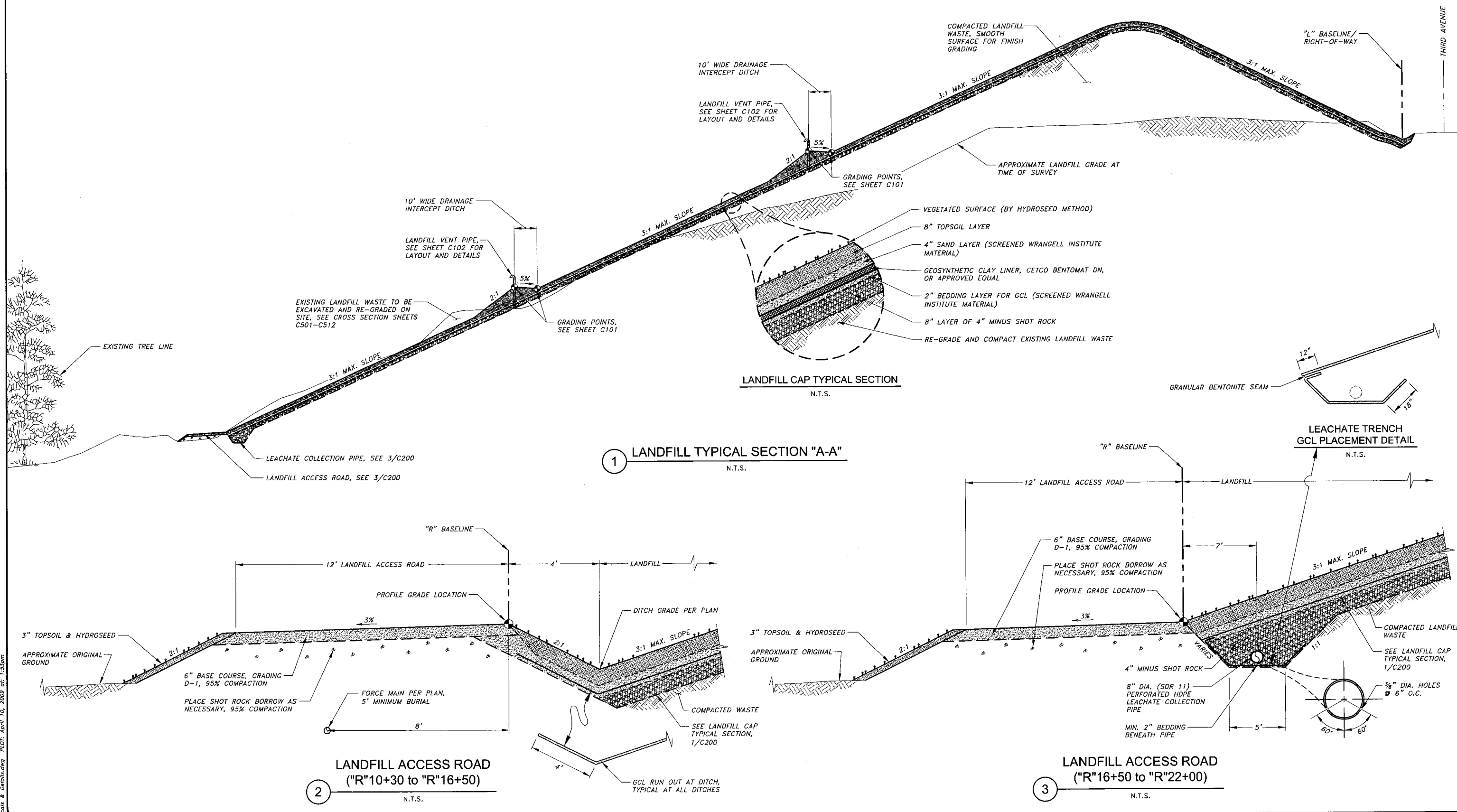
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CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE  
LANDFILL CLOSURE PLAN**

WRANGELL, ALASKA

DATE: MARCH, 2009  
R & M NO. 081336

SHEET  
**C102**



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## TYPICAL SECTIONS



**RAM**

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CITY AND BOROUGH OF WRANGELL

**MUNICIPAL SOLID WASTE  
LANDFILL CLOSURE PLAN**

WRANGELL, ALASKA

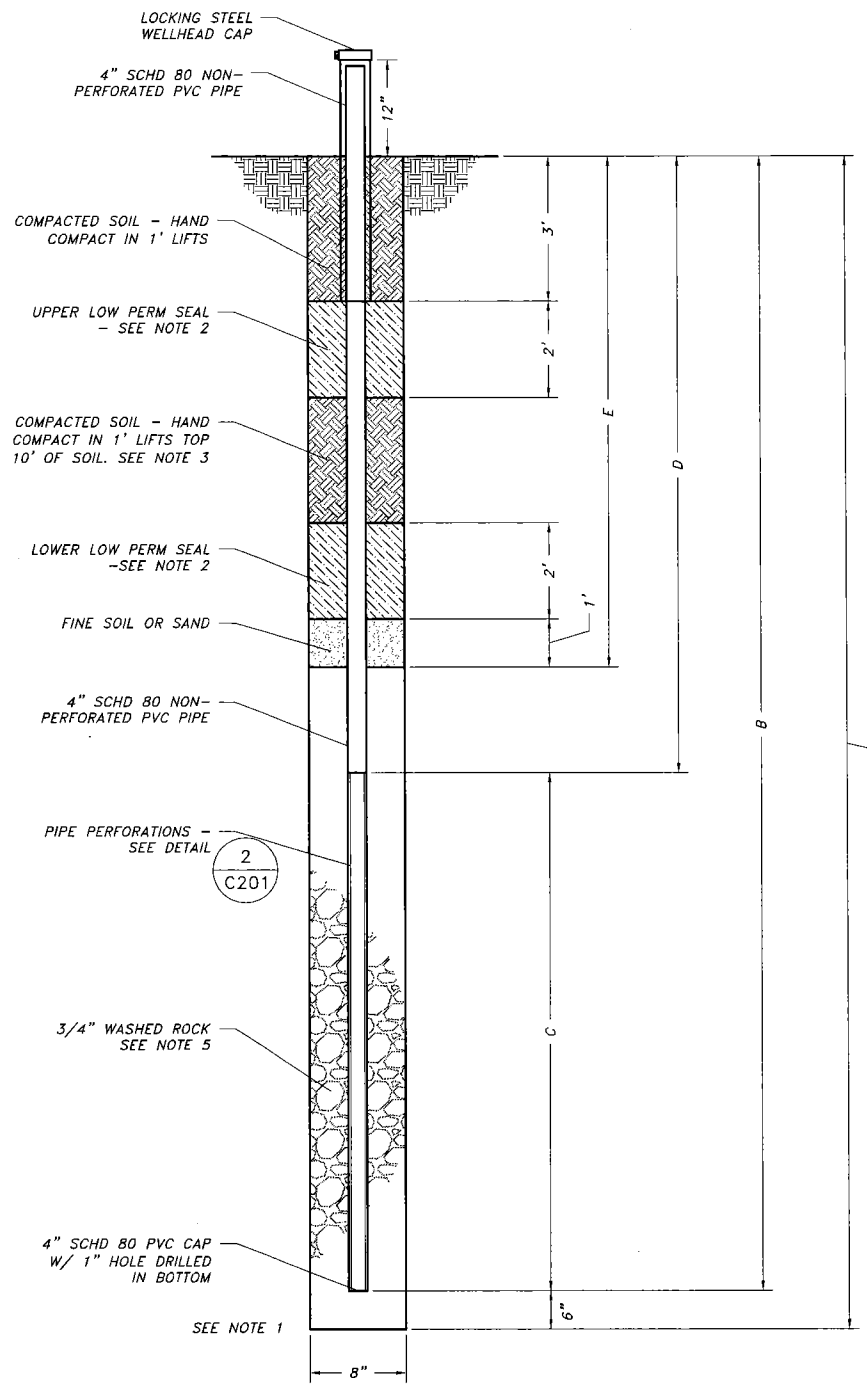


CITY AND BOROUGH OF WRANGELL LANDFILL GROUNDWATER MONITORING WELL TABLE									
WELL NUMBER	NORTHING (FT)	EASTING (FT)	APPROXIMATE SURFACE ELEVATION (FT)	WELL BOTTOM ELEVATION (FT)	BORE DEPTH A (FT)	DEPTH TO BOTTOM OF WELL PIPE B (FT)	LENGTH OF WELL SCREEN C (FT)	DEPTH TO TOP OF WELL SCREEN D (FT)	DEPTH TO TOP OF ROCK PACK E (FT)
GW-1									
GW-2									
GW-3									

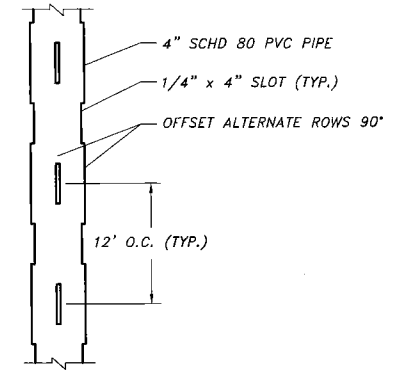
(TO BE COMPLETED BY CONTRACTOR)

**GENERAL NOTES**

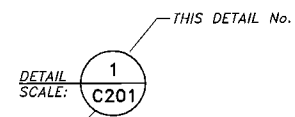
1. THE CONTRACTOR SHALL VERIFY LOCATIONS OF UNDERGROUND APPURTENANCES AND UTILITIES WITH CITY AND BOROUGH OF WRANGELL AND THE SITE COORDINATOR TO VERIFY LOCATIONS PRIOR TO DIGGING OR CONSTRUCTION. HEADER LOCATION WILL BE ADJUSTED TO AVOID UTILITIES & APPURTENANCES, AND THE ADJUSTED ALIGNMENT SHALL BE CHECKED AND APPROVED BY THE ENGINEER PRIOR TO EXCAVATION.
2. ALL NECESSARY PERMITS FROM REGULATORY AGENCIES, INCLUDING FEDERAL, STATE, REGIONAL, AND LOCAL, MUST BE OBTAINED PRIOR TO START OF ANY CONSTRUCTION WORK.
3. CONTRACTOR WILL EXECUTE THE WORK SAFELY, CONSISTENT WITH EXCAVATION AND WORKING IN A POTENTIALLY EXPLOSIVE ENVIRONMENT. COMPLY WITH CITY AND BOROUGH OF WRANGELL SAFETY PLAN.
4. ANY DRILLING, TRENCHING, EXCAVATION, OR OTHER WORK BELOW GRADE IS SUBJECT TO METHANE GAS INFILTRATION FROM THE SOIL WHICH COULD CREATE A POTENTIAL HAZARD TO PERSONNEL. SPECIAL SAFETY PRECAUTIONS SHALL BE INCLUDED IN THE CONTRACTORS HEALTH AND SAFETY PLAN TO ADDRESS THIS ISSUE.
5. NO REFUSE SHALL BE ALLOWED TO REMAIN ON THE GROUND FOLLOWING ANY EXCAVATION UNLESS THE WORK IS ACTIVELY BEING WORKED ON. EXCAVATED WASTE SHALL BE PLACED IN A ROLL OFF BIN OR DUMP TRUCK SHORTLY AFTER EXCAVATION, AND DISPOSED OF AT THE OPEN FACE OF THE LANDFILL 1/2 HOUR BEFORE THE END OF THE LANDFILL NORMAL OPERATING HOURS.
6. EXCEPT WHEN BEING ACTIVELY WORKED ON, EXCAVATIONS OR HOLES SHALL BE COVERED TO PREVENT UNAUTHORIZED ENTRY.
7. ALL CONSTRUCTION SHALL BE CONDUCTED IN LATEST ALASKA BUILDING CODE.
8. LANDFILL GAS SYSTEM CONSTRUCTION SHALL NOT INTERFERE WITH LANDFILL OPERATIONS.



**2 PIPE PERFORATIONS**  
SCALE: NONE



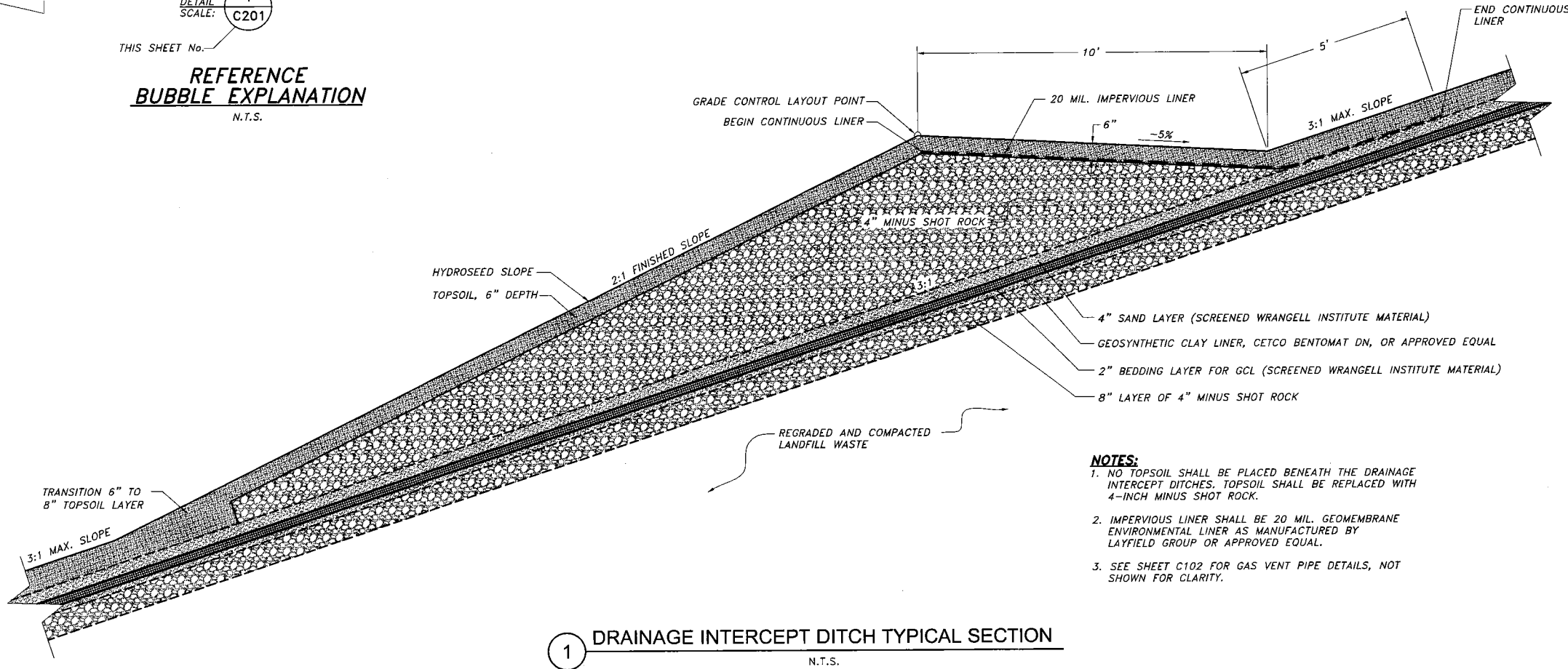
**1 REFERENCE BUBBLE EXPLANATION**  
N.T.S.



**1 GROUNDWATER MONITORING WELL**  
SCALE: NONE

**GENERAL NOTES**

1. IF PERCHED WATER IS ENCOUNTERED IN WELL, STOP DRILLING AND NOTIFY ENGINEER.
2. LOW PERM SEALS: SEE SPECIFICATIONS SECTION 13901.
3. SUGGESTED APPROACH IS TO USE A POWDER PUFF PNEUMATIC TAMPER WITH PIPE EXTENSION TO REACH INTO WELL BORE.
4. CONTRACTOR TO LOCATE PROPOSED WELLS IN THE FIELD AND PROVIDE SURVEY DATA (NORTHING, EASTING, ELEVATION) TO THE ENGINEER PRIOR TO DRILLING ANY WELLS.
5. PLACE ROCK SLOWLY TO AVOID BRIDGING.



**1 DRAINAGE INTERCEPT DITCH TYPICAL SECTION**  
N.T.S.

**NOTES:**

1. NO TOPSOIL SHALL BE PLACED BENEATH THE DRAINAGE INTERCEPT DITCHES. TOPSOIL SHALL BE REPLACED WITH 4-INCH MINUS SHOT ROCK.
2. IMPERVIOUS LINER SHALL BE 20 MIL. GEOMEMBRANE ENVIRONMENTAL LINER AS MANUFACTURED BY LAYFIELD GROUP OR APPROVED EQUAL.
3. SEE SHEET C102 FOR GAS VENT PIPE DETAILS, NOT SHOWN FOR CLARITY.

P:\2008\081336\Design Drawings\DRAINAGE INTERCEPT DITCH DETAIL.dwg PLOT: April 10, 2009 at: 1:50pm

DESIGN	JMP
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**TYPICAL SECTION**

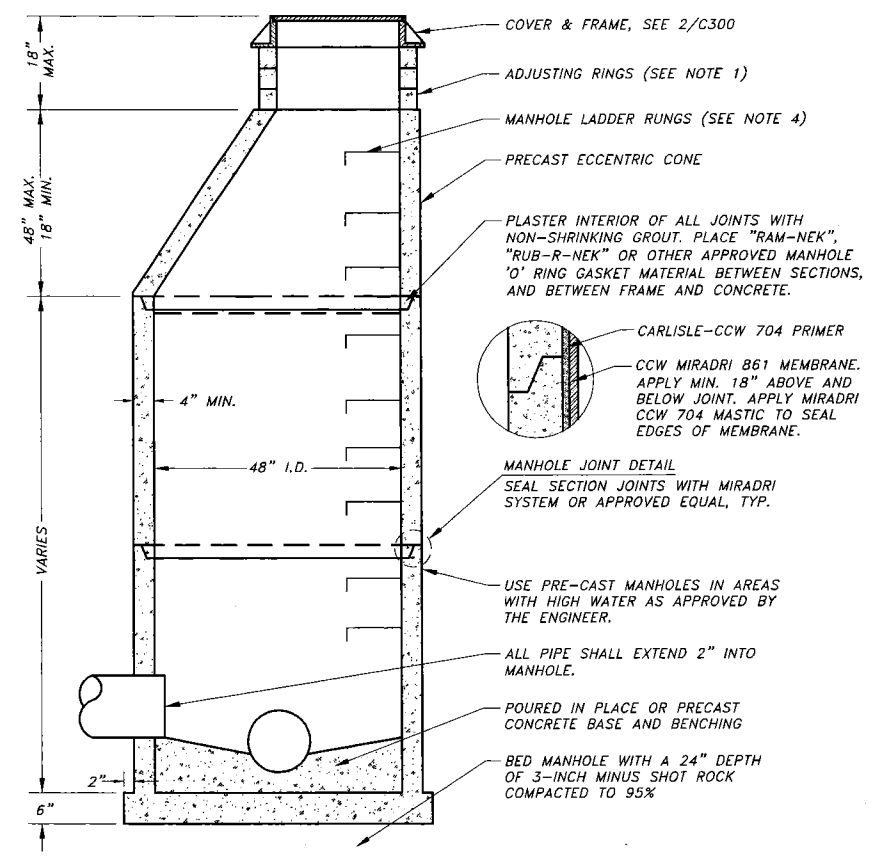


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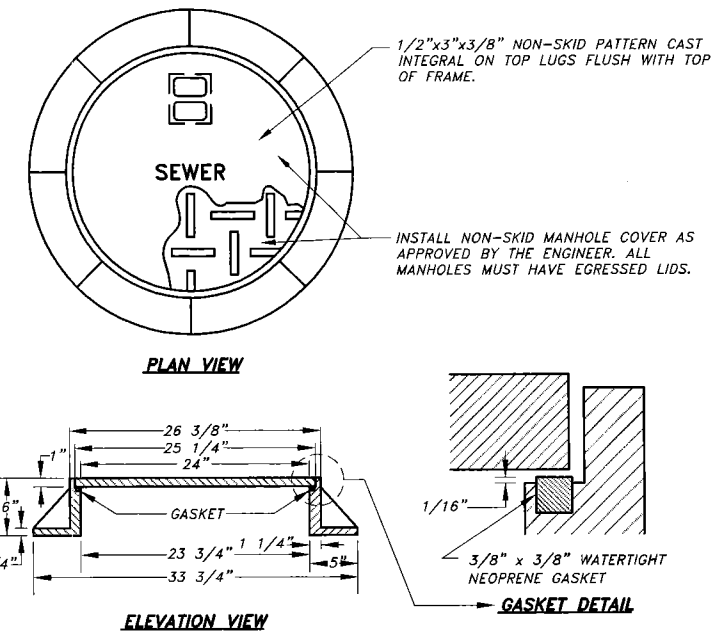
CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE LANDFILL CLOSURE PLAN**  
WRANGELL, ALASKA

DATE: MARCH, 2009  
R & M NO. 081336  
SHEET **C201**

- NOTES:**
1. USE NO MORE THAN ONE 4" ADJUSTING RING ON NEW CONSTRUCTION ON UNPAVED ROADS, AND NO MORE THAN THREE 4" RINGS ON RECONSTRUCTIONS.
  2. REFER TO A.S.T.M. C-478 FOR DESIGN REQUIREMENTS AND C-478-69 FOR MINIMUM STEEL FOR BARREL. FIRST BARREL SECTION SHALL BE IMBEDDED IN BASE. BLOCK OUTS SHALL BE FORMED.
  3. IF MANHOLE IS WITHIN A ROADWAY, COMPACTION TESTS MUST BE TAKEN ON BACKFILL EVERY 3'. DENSITY SHALL BE 95% OF MAXIMUM PROCTOR DENSITY.
  4. RUNGS TO BE PLACED 12" O.C. ON UNOBSTRUCTED SIDE OF MANHOLE. LAST RUNG SHALL BE 18" MAX. FROM BOTTOM OF MANHOLE AND TOP RUNG SHALL BE 6" MAX. FROM TOP OF CONE. IF UNOBSTRUCTED SIDE NOT AVAILABLE, LAST RUNG TO BE PLACED 6" OVER SMALLEST PIPE. RUNGS SHALL BE POLYETHYLENE 14" LADDER STEPS.

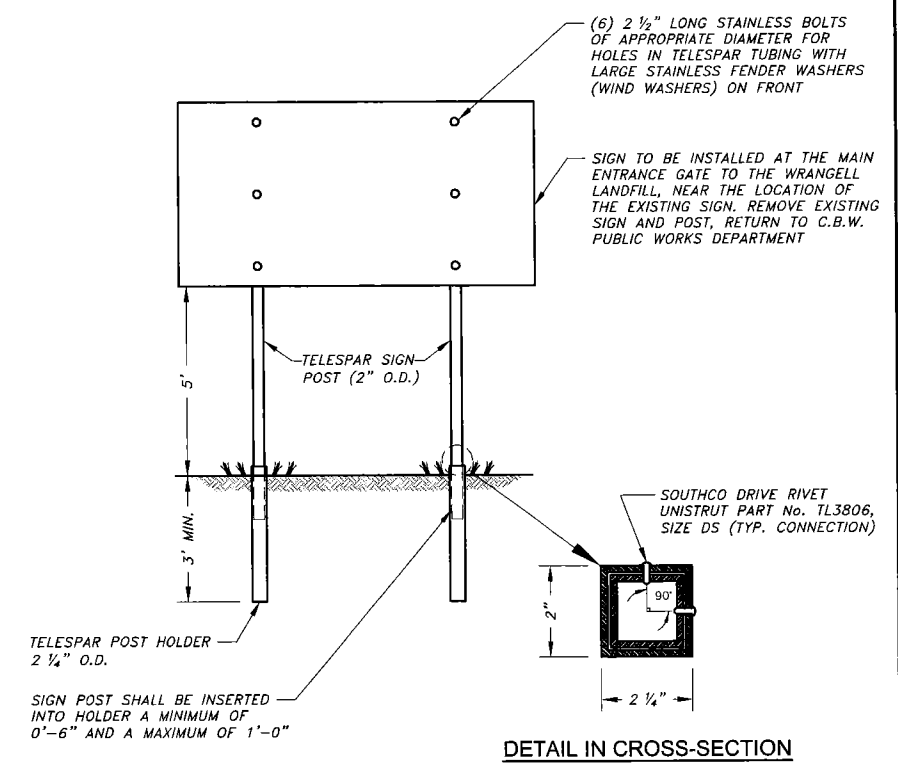


1 SANITARY SEWER MANHOLE DETAIL  
N.T.S.

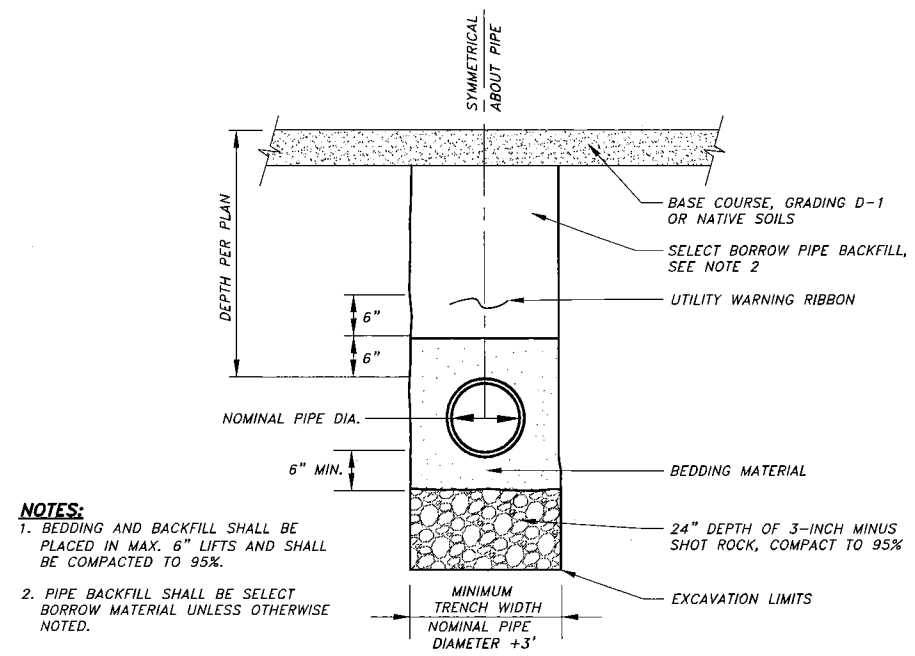


- NOTES:**
1. FRAME MUST BE MACHINED TO FIT WATERTIGHT NEOPRENE GASKET.
  2. COVER SHALL BE WATER TIGHT WITH NO HOLES, SHALL HAVE THE WORD "SEWER" CAST IN AND SHALL BE PROVIDED WITH AN INTEGRAL POCKET LIFT HANDLE.
  3. FRAME AND COVER DIMENSIONS SHALL BE IN ACCORDANCE WITH OLYMPIC CONSTRUCTION CASTINGS No. MH30A WITH EGRESSED LID, OR APPROVED EQUAL.
  4. FRAME AND GRATE SHALL BE DUCTILE IRON.
  5. FRAME AND GRATE SHALL BE OF A TYPE THAT WILL NOT CREATE A HAZARD FOR BICYCLE TRAFFIC.

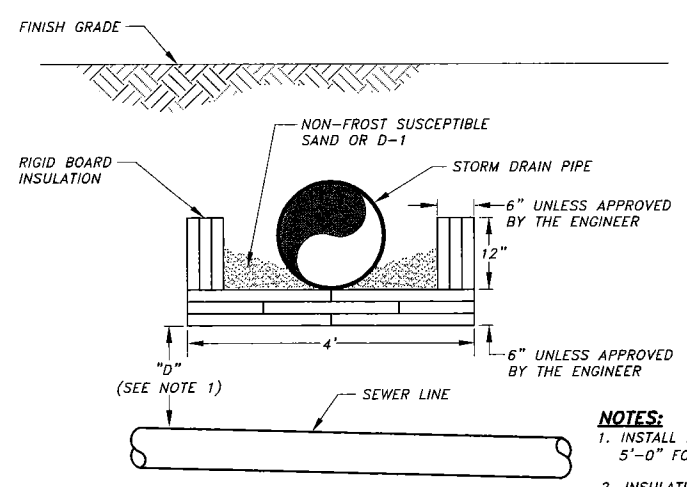
2 SANITARY SEWER MANHOLE COVER & FRAME  
N.T.S.



3 SIGN MOUNTING AND INSTALLATION DETAIL  
N.T.S.

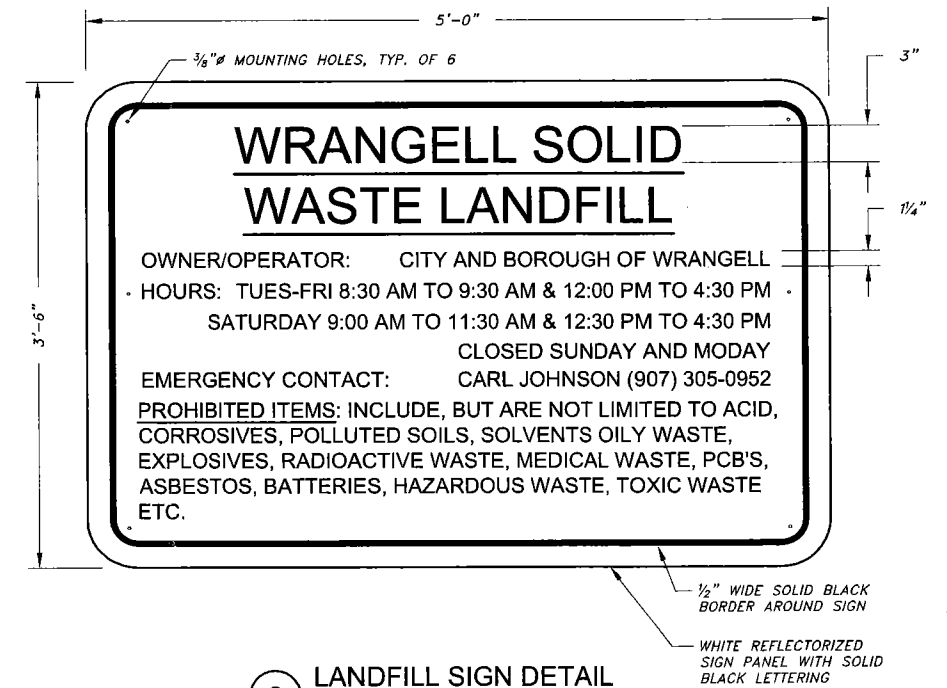


4 PIPE TRENCH DETAIL  
N.T.S.



- NOTES:**
1. INSTALL INSULATION AS SHOWN WHEN "D" IS LESS THAN 5'-0" FOR WATER PIPE OR 3'-8" FOR SEWER PIPE.
  2. INSULATION SHALL CONFORM TO SECTION 02607 OF THE TECHNICAL SPECIFICATIONS.
  3. PIPE INSULATION SHALL BE 8'-0" IN LENGTH, CENTERED OVER EXISTING WATER OR SEWER PIPE.
  4. PIPE INSULATION WITH R-FACTOR EQUAL TO RIGID BOARD MAY BE SUBSTITUTED IF APPROVED BY THE ENGINEER.
  5. INSULATION BOARDS SHALL OVERLAP 12" AS SHOWN.

5 RIGID INSULATION DETAIL  
N.T.S.



6 LANDFILL SIGN DETAIL  
N.T.S.

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No.	DATE	REVISION	BY	APRVD.

## CONSTRUCTION DETAILS

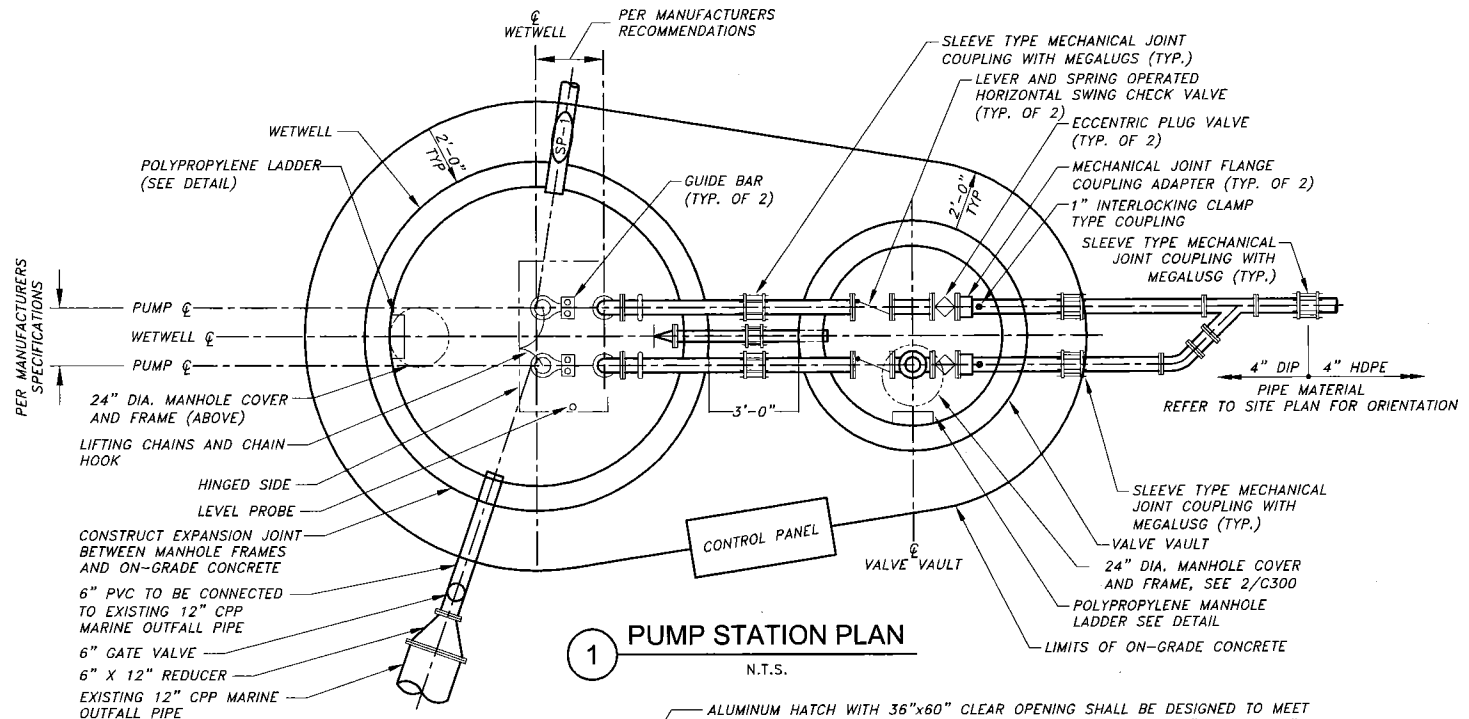


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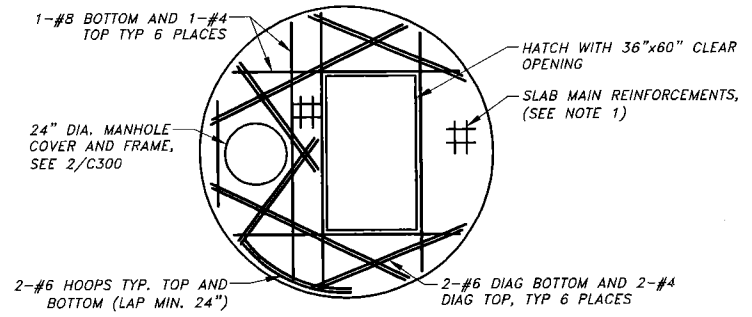
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CITY AND BOROUGH OF WRANGELL  
MUNICIPAL SOLID WASTE  
LANDFILL CLOSURE PLAN  
WRANGELL, ALASKA

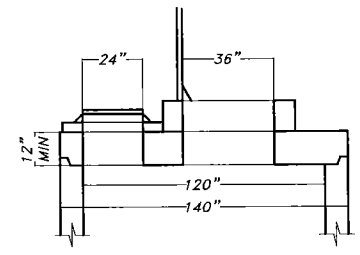
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R & M NO.	081336
SHEET	C300



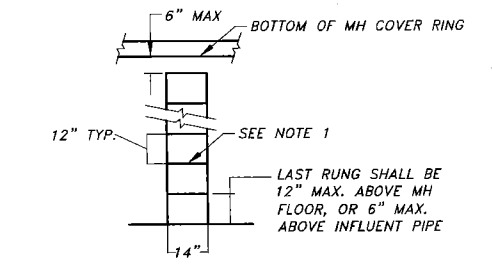
**1 PUMP STATION PLAN**  
N.T.S.



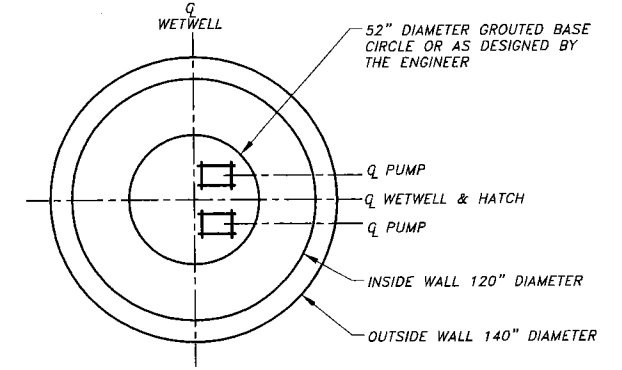
**WETWELL SLAB PLAN VIEW**



**WETWELL SLAB ELEVATION VIEW**



**WETWELL AND VAULT LADDERS ELEVATION VIEW**



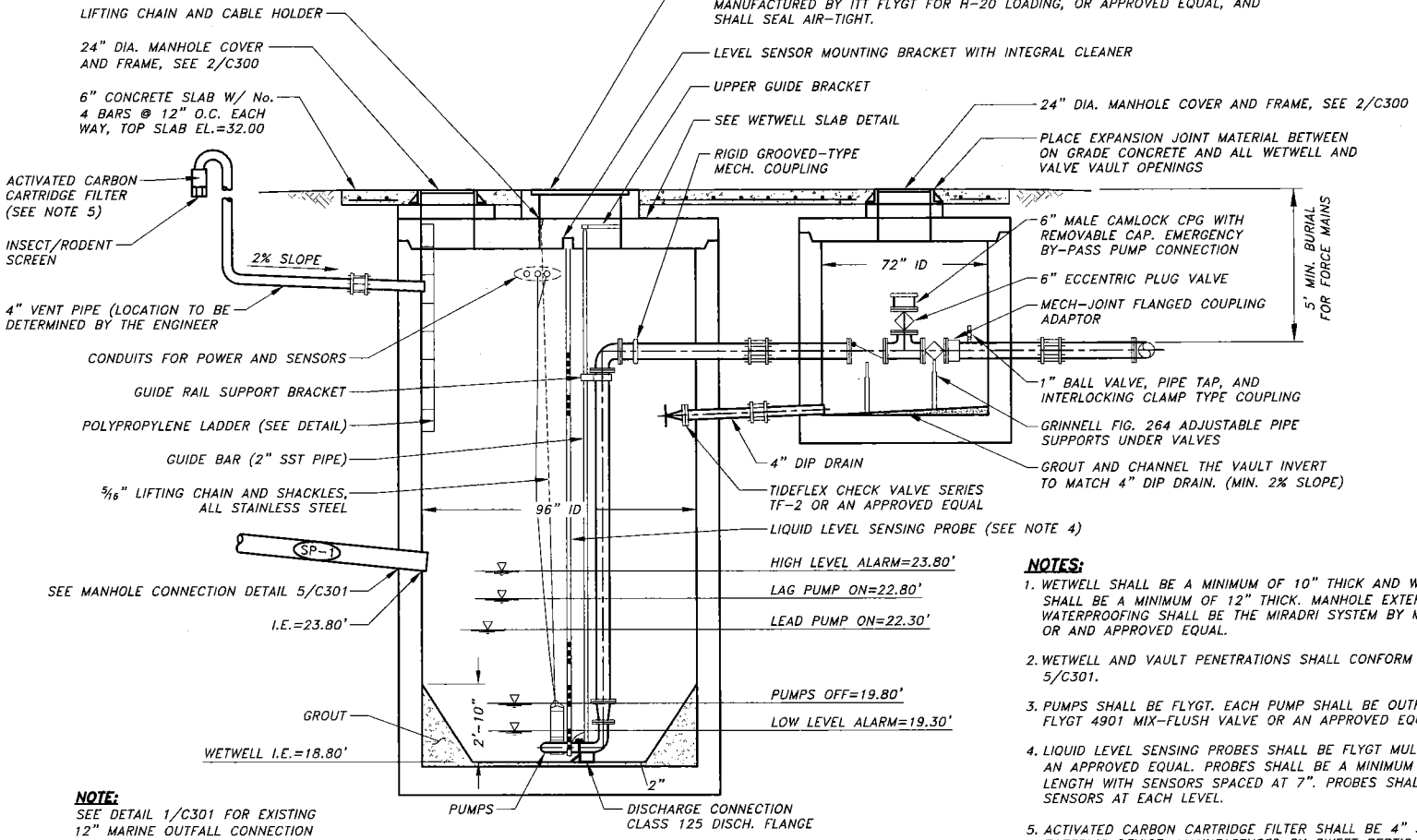
**WETWELL BASE PLAN VIEW**

- NOTES:**
- SLAB WILL BE REINFORCED WITH #6 @ 5" BOTTOM AND #4 @ 7" TOP. PROVIDE A MINIMUM OF #4 @ 12" TOP AND BOTTOM PERPENDICULAR TO MAIN REINFORCEMENT.
  - REINFORCING COVER SHALL BE 2-INCHES CLEAR AT TOP AND BOTTOM SURFACES.

**3 WETWELL SLAB DETAILS**  
N.T.S.

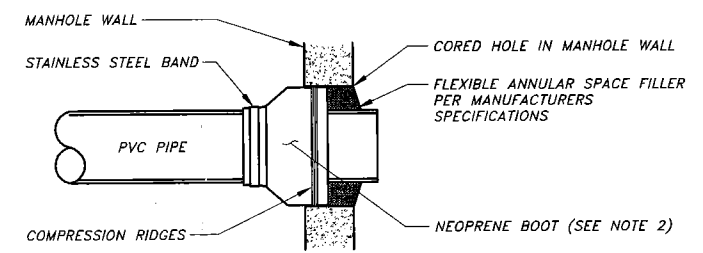
- NOTES:**
- RUNGS AND RAILS OF LADDER SHALL BE CONSTRUCTED OF POLYPROPYLENE CONFORMING TO ASTM D-4101 WITH STEEL 1/2" GRADE 60 REINFORCING BAR CORES IN THE RUNGS AND 3/8" COLD DRAWN STEEL BAR CORES IN THE RAILS.

**4 PUMP STATION DETAILS**  
N.T.S.



**2 PUMP STATION ELEVATION**  
N.T.S.

- NOTES:**
- WETWELL SHALL BE A MINIMUM OF 10" THICK AND WETWELL BASE SHALL BE A MINIMUM OF 12" THICK. MANHOLE EXTERIOR JOINT WATERPROOFING SHALL BE THE MIRADRI SYSTEM BY MIRIFI, INC., OR AND APPROVED EQUAL.
  - WETWELL AND VAULT PENETRATIONS SHALL CONFORM TO DETAIL 5/C301.
  - PUMPS SHALL BE FLYGT. EACH PUMP SHALL BE OUTFITTED WITH A FLYGT 4901 MIX-FLUSH VALVE OR AN APPROVED EQUAL.
  - LIQUID LEVEL SENSING PROBES SHALL BE FLYGT MULTIRODE OR AN APPROVED EQUAL. PROBES SHALL BE A MINIMUM OF 80" IN LENGTH WITH SENSORS SPACED AT 7". PROBES SHALL HAVE 3 SENSORS AT EACH LEVEL.
  - ACTIVATED CARBON CARTRIDGE FILTER SHALL BE 4" SWEET AIR FILTERING DEVICE, MANUFACTURED BY SWEET SEPTIC SYSTEMS OR APPROVED EQUAL. INSTALL PIPING SO THAT FILTER AND SCREEN ASSEMBLY ARE APPROXIMATELY 3' ABOVE FINISH GRADE.



**FLEXIBLE SEAL ADAPTER**

- NOTES:**
- ALL MANHOLE CONNECTIONS SHALL BE 100% WATERTIGHT.
  - NEOPRENE BOOT ON THE FLEXIBLE SEAL ADAPTER SHALL BE A MINIMUM OF 3/8" THICK PER ASTM C-443, AND SHALL BE HELD IN PLACE WITH AN INTERNAL EXPANDING BAND SUCH AS "KOR-N-SEAL" OR APPROVED EQUAL.
  - ALL PIPE SHALL EXTEND 2" INTO MANHOLE.

**5 SANITARY SEWER MANHOLE CONNECTION DETAIL**  
N.T.S.

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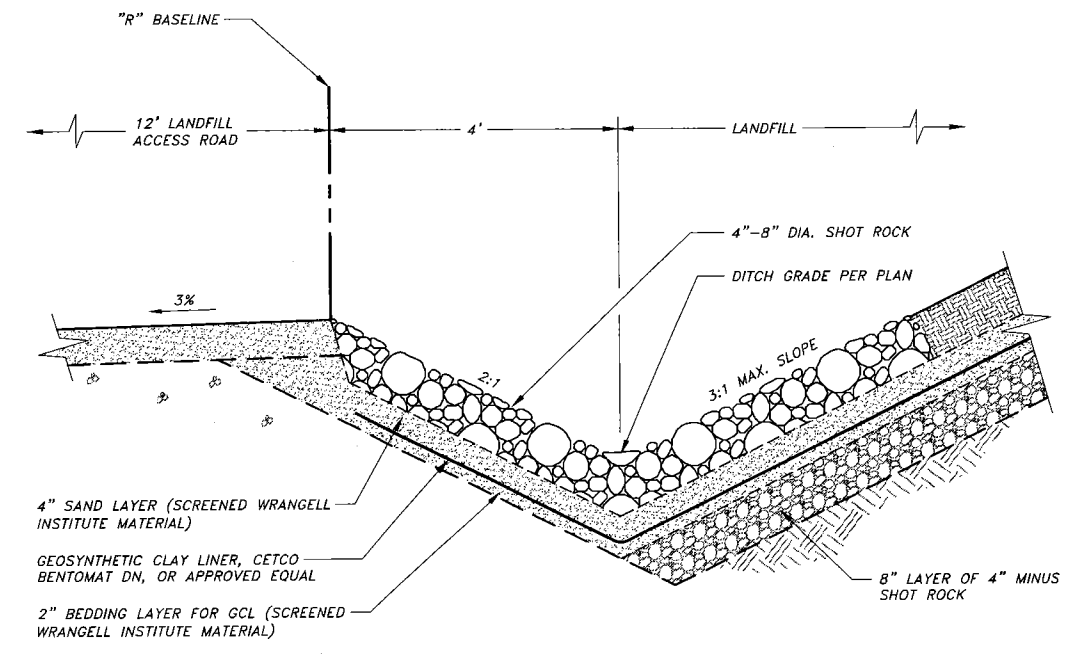
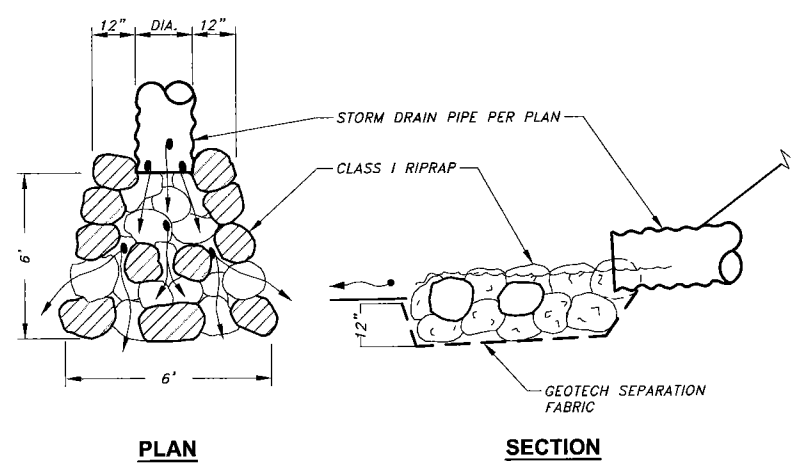
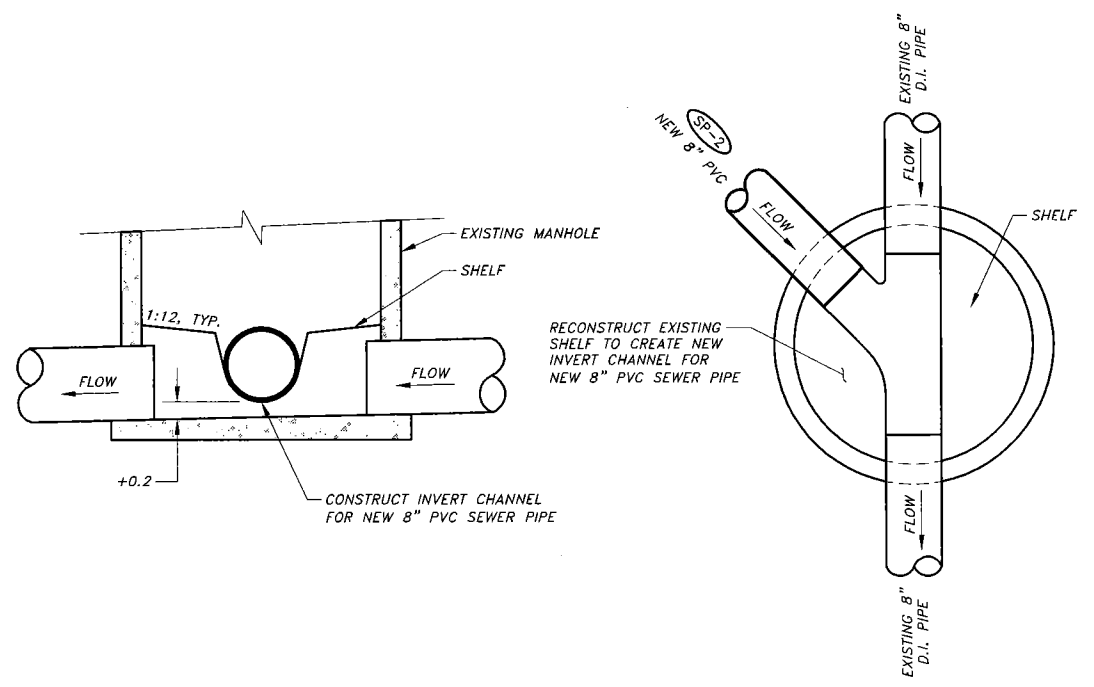
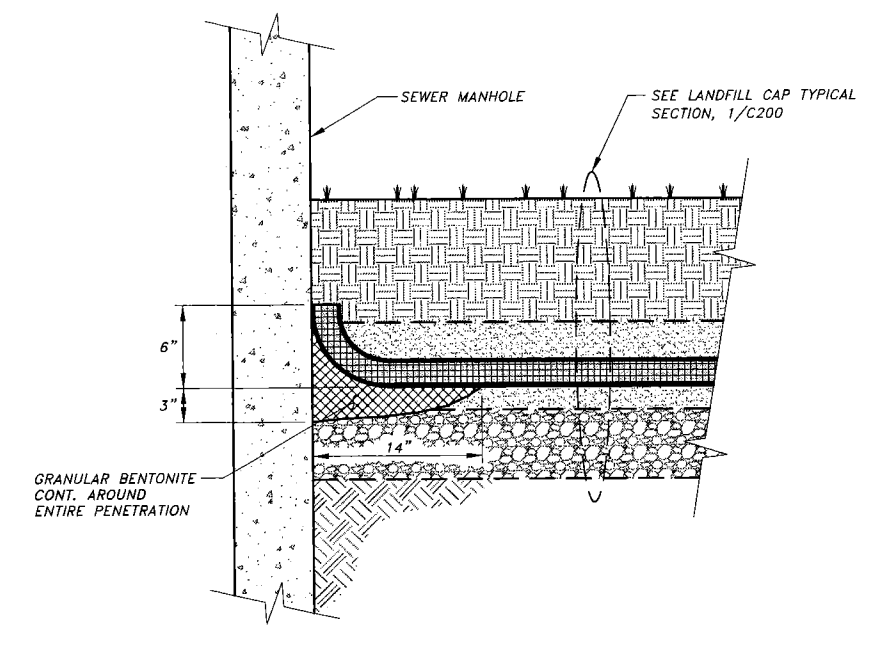
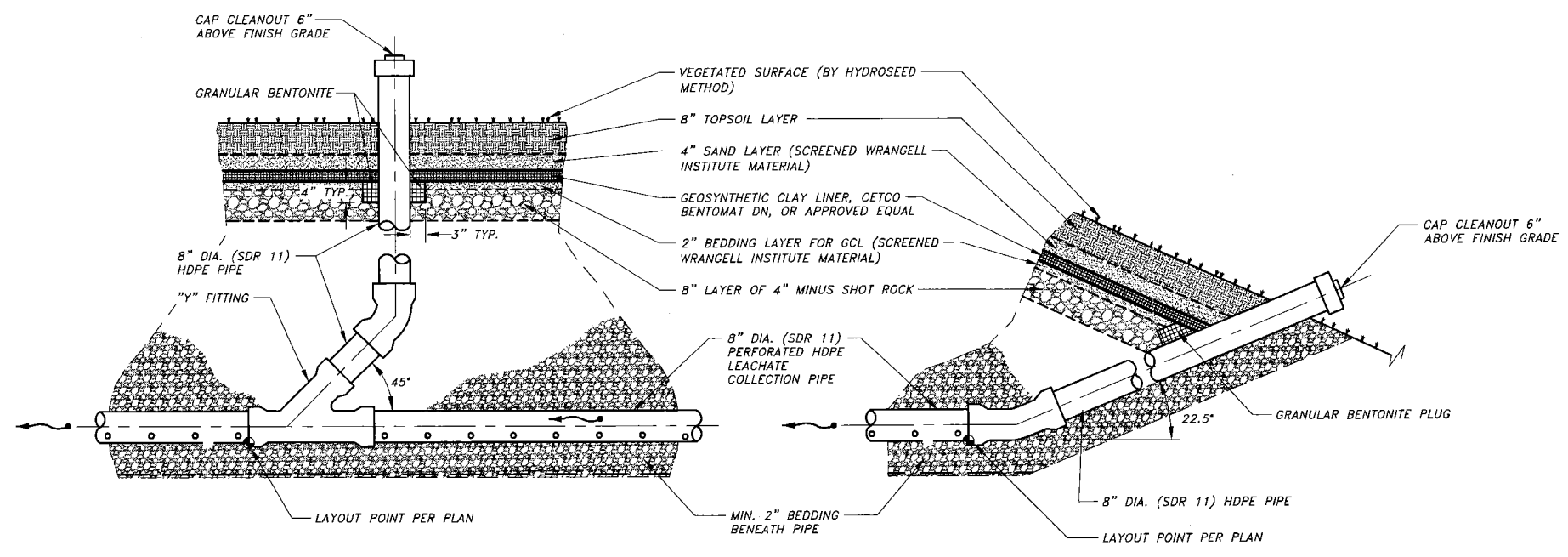
**LEACHATE COLLECTION AND PUMPING DETAILS**



**RAM**  
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CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE LANDFILL CLOSURE PLAN**  
 WRANGELL, ALASKA

DATE: MARCH, 2009  
 R & M NO.: 081336  
 SHEET: **C301**



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No.	DATE	REVISION	BY	APRVD.

**CONSTRUCTION DETAILS**



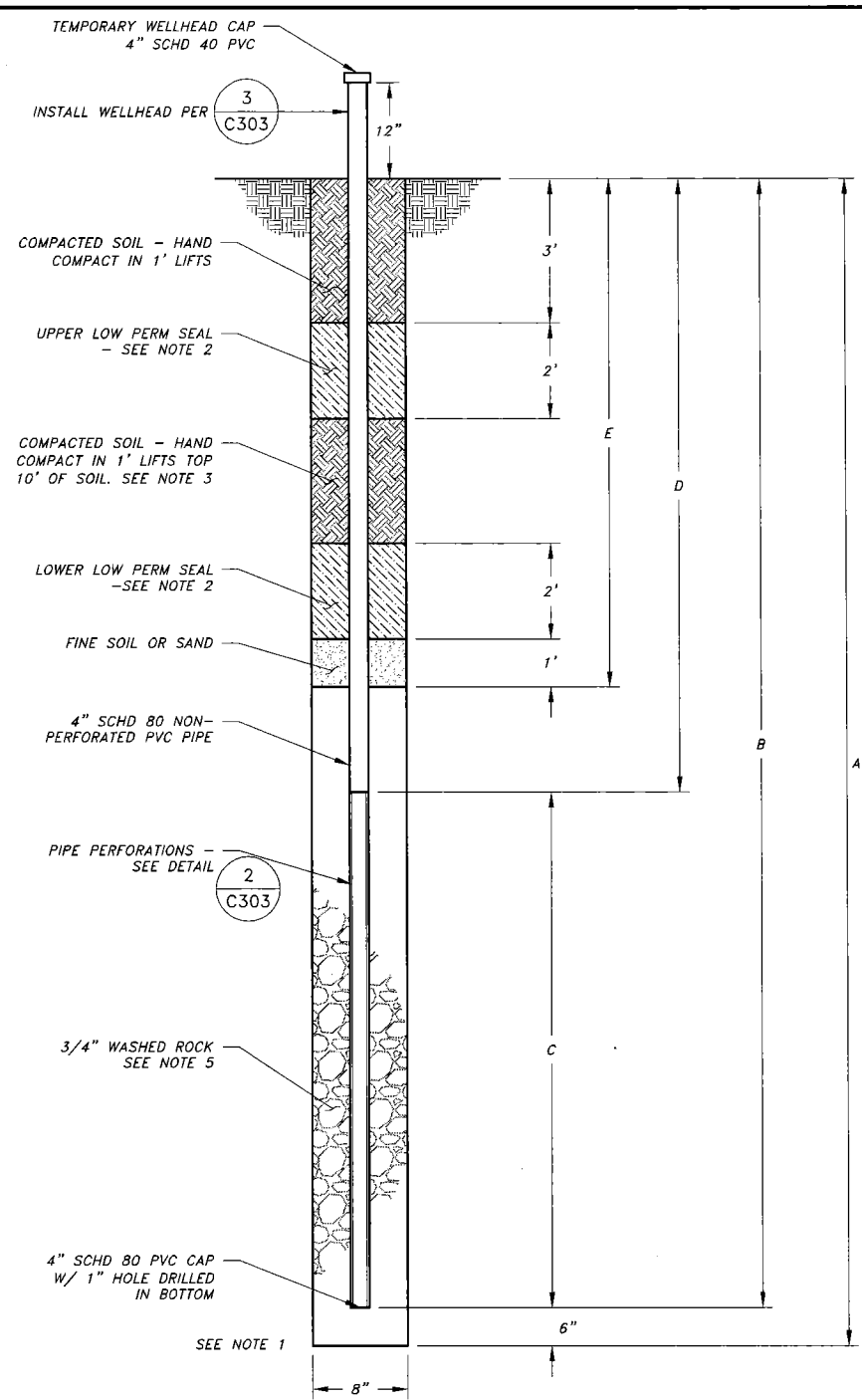
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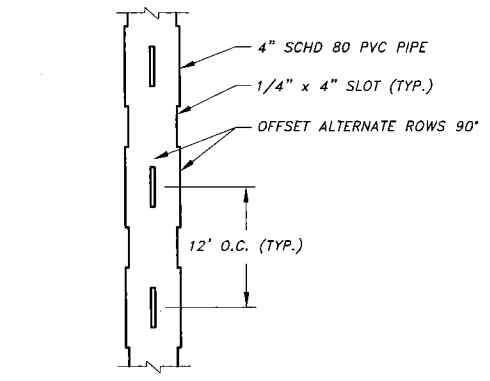
DATE: MARCH, 2009  
 R & M NO. 081336  
 SHEET **C302**

CITY AND BOROUGH OF WRANGELL LANDFILL GAS EXTRACTION WELL TABLE									
WELL NUMBER	NORTHING (FT)	EASTING (FT)	APPROXIMATE SURFACE ELEVATION (FT)	WELL BOTTOM ELEVATION (FT)	BORE DEPTH A (FT)	DEPTH TO BOTTOM OF WELL PIPE B (FT)	LENGTH OF WELL SCREEN C (FT)	DEPTH TO TOP OF WELL SCREEN D (FT)	DEPTH TO TOP OF ROCK PACK E (FT)
GW-1									
GW-2									

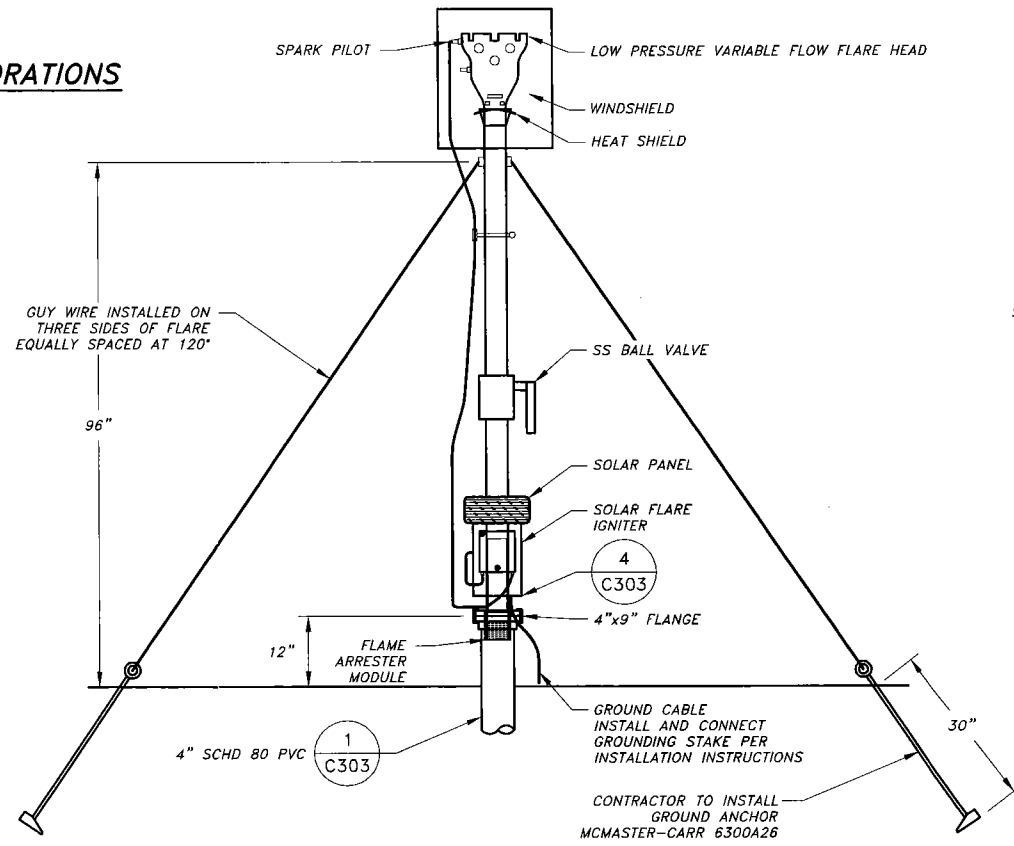
(TO BE COMPLETED BY CONTRACTOR)



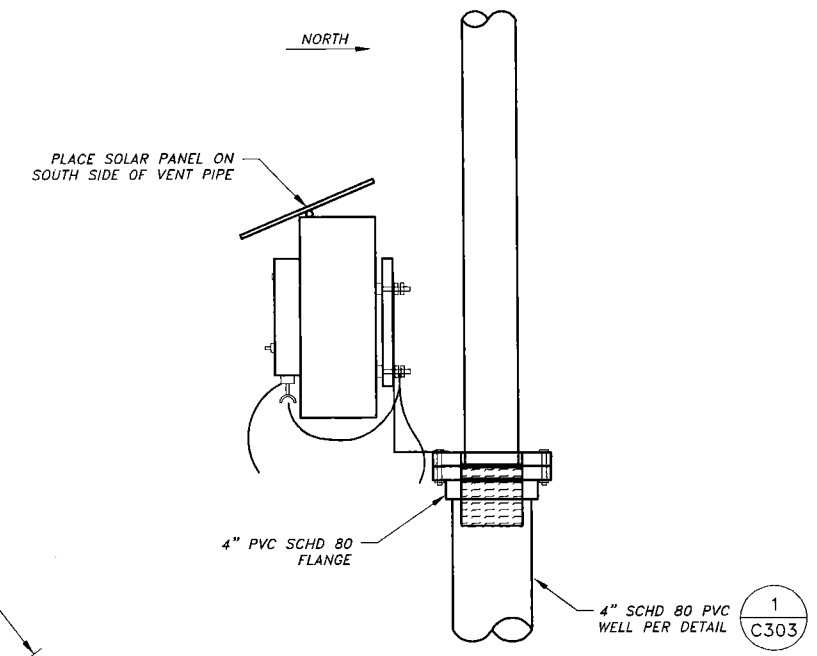
**1 VERTICAL LANDFILL GAS EXTRACTION WELL**  
C303 SCALE: NONE



**2 PIPE PERFORATIONS**  
C303 SCALE: NONE



**3 GAS EXTRACTION WELL HEAD DETAIL**  
C303 SCALE: NONE



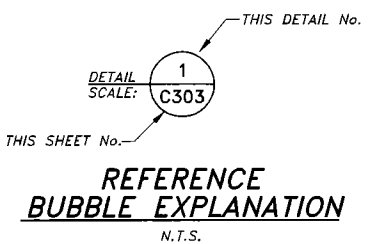
**4 VENT MOUNT DETAIL**  
C303 SCALE: NONE

**GENERAL NOTES**

- IF PERCHED WATER IS ENCOUNTERED IN WELL, STOP DRILLING AND NOTIFY ENGINEER.
- LOW PERM SEALS: SEE SPECIFICATIONS.
- SUGGESTED APPROACH IS TO USE A POWDER PUFF PNEUMATIC TAMPER WITH PIPE EXTENSION TO REACH INTO WELL BORE.
- CONTRACTOR TO LOCATE PROPOSED WELLS IN THE FIELD AND PROVIDE SURVEY DATA (NORTHING, EASTING, ELEVATION) TO THE ENGINEER PRIOR TO DRILLING ANY WELLS.
- PLACE ROCK SLOWLY TO AVOID BRIDGING.

**GENERAL NOTES**

- THE CONTRACTOR SHALL VERIFY LOCATIONS OF UNDERGROUND APPURTENANCES AND UTILITIES WITH CITY AND BOROUGH OF WRANGELL AND THE SITE COORDINATOR TO VERIFY LOCATIONS PRIOR TO DIGGING OR CONSTRUCTION. HEADER LOCATION WILL BE ADJUSTED TO AVOID UTILITIES & APPURTENANCES, AND THE ADJUSTED ALIGNMENT SHALL BE CHECKED AND APPROVED BY THE ENGINEER PRIOR TO EXCAVATION.
- ALL NECESSARY PERMITS FROM REGULATORY AGENCIES, INCLUDING FEDERAL, STATE, REGIONAL, AND LOCAL, MUST BE OBTAINED PRIOR TO START OF ANY CONSTRUCTION WORK.
- CONTRACTOR WILL EXECUTE THE WORK SAFELY, CONSISTENT WITH EXCAVATION AND WORKING IN A POTENTIALLY EXPLOSIVE ENVIRONMENT. COMPLY WITH CITY AND BOROUGH OF WRANGELL SAFETY PLAN.
- ANY DRILLING, TRENCHING, EXCAVATION, OR OTHER WORK BELOW GRADE IS SUBJECT TO METHANE GAS INFILTRATION FROM THE SOIL WHICH COULD CREATE A POTENTIAL HAZARD TO PERSONNEL. SPECIAL SAFETY PRECAUTIONS SHALL BE INCLUDED IN THE CONTRACTORS HEALTH AND SAFETY PLAN TO ADDRESS THIS ISSUE.
- NO REFUSE SHALL BE ALLOWED TO REMAIN ON THE GROUND FOLLOWING ANY EXCAVATION UNLESS THE WORK IS ACTIVELY BEING WORKED ON. EXCAVATED WASTE SHALL BE PLACED IN A ROLL OFF BIN OR DUMP TRUCK SHORTLY AFTER EXCAVATION, AND DISPOSED OF AT THE OPEN FACE OF THE LANDFILL 1/2 HOUR BEFORE THE END OF THE LANDFILL NORMAL OPERATING HOURS.
- EXCEPT WHEN BEING ACTIVELY WORKED ON, EXCAVATIONS OR HOLES SHALL BE COVERED TO PREVENT UNAUTHORIZED ENTRY.
- ALL CONSTRUCTION SHALL BE CONDUCTED IN ACCORDANCE WITH THE LATEST ALASKA BUILDING CODE.
- LANDFILL GAS SYSTEM CONSTRUCTION SHALL NOT INTERFERE WITH LANDFILL OPERATIONS.



**REFERENCE BUBBLE EXPLANATION**  
N.T.S.

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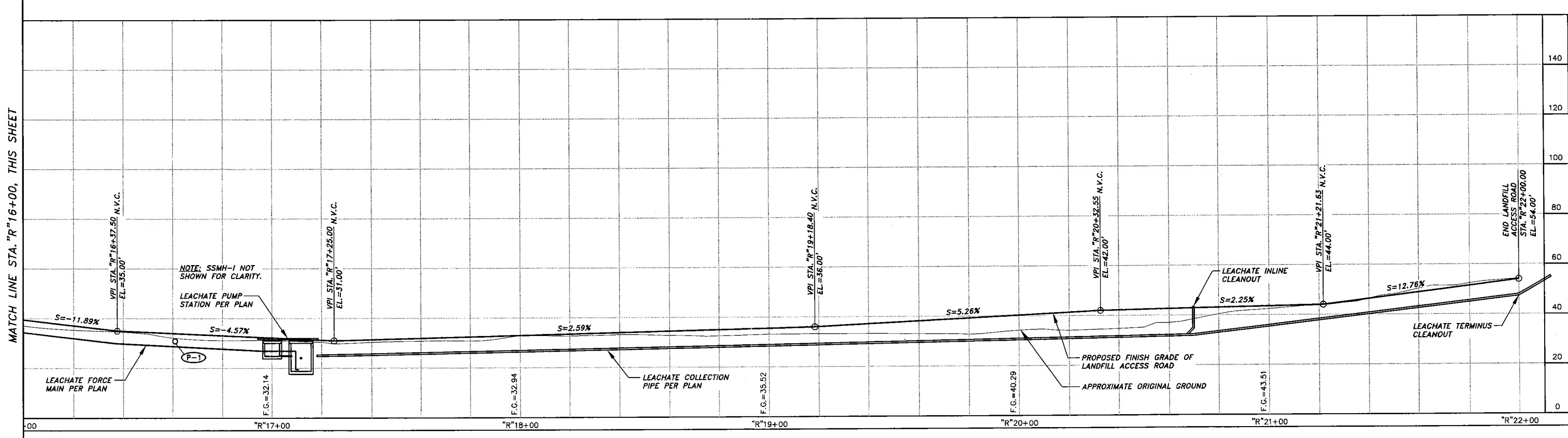
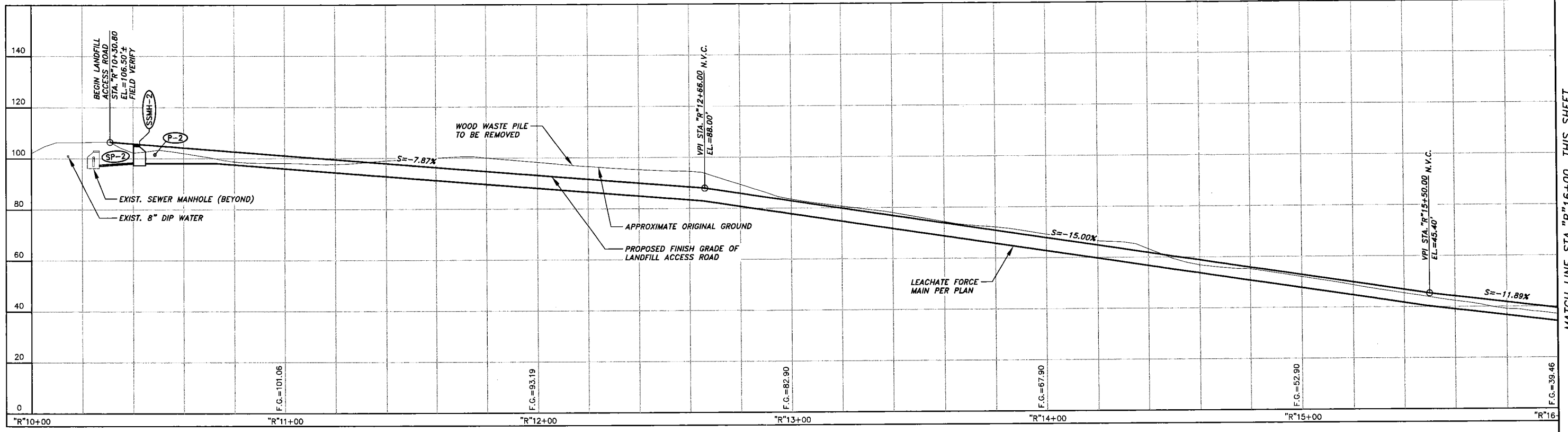
**LANDFILL GAS EXTRACTION WELL DETAILS**



**R&M ENGINEERING, INC.**  
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CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE LANDFILL CLOSURE PLAN**  
WRANGELL, ALASKA

DATE: MARCH, 2009  
R & M NO. 081336  
SHEET **C303**



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### LANDFILL ACCESS ROAD PROFILE

GRAPHIC SCALE



**RAM**

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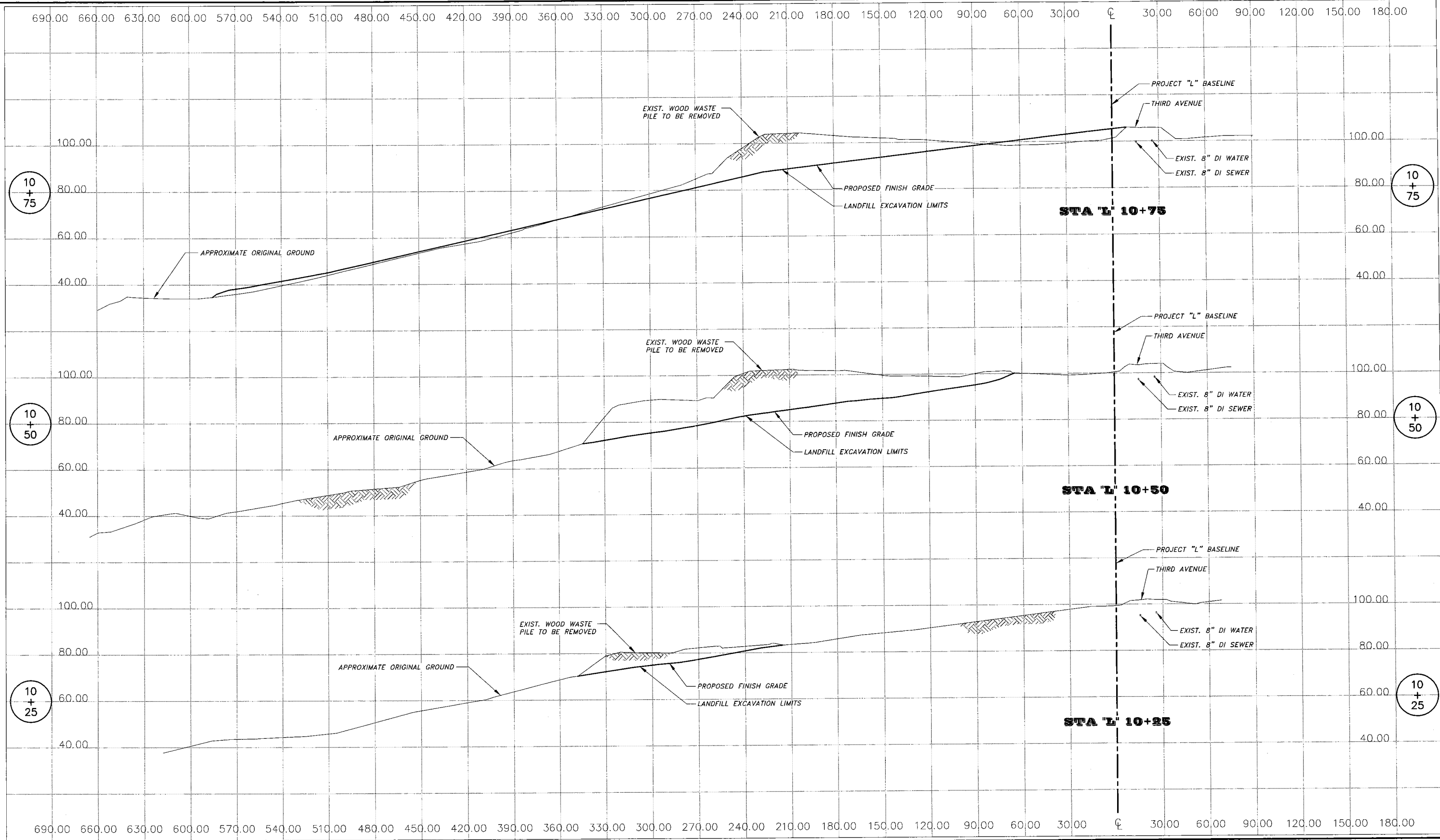
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CITY AND BOROUGH OF WRANGELL  
 MUNICIPAL SOLID WASTE  
 LANDFILL CLOSURE PLAN

WRANGELL, ALASKA

DATE: MARCH, 2009  
 R & M NO. 081336

SHEET  
**C400**



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### LANDFILL CROSS SECTIONS

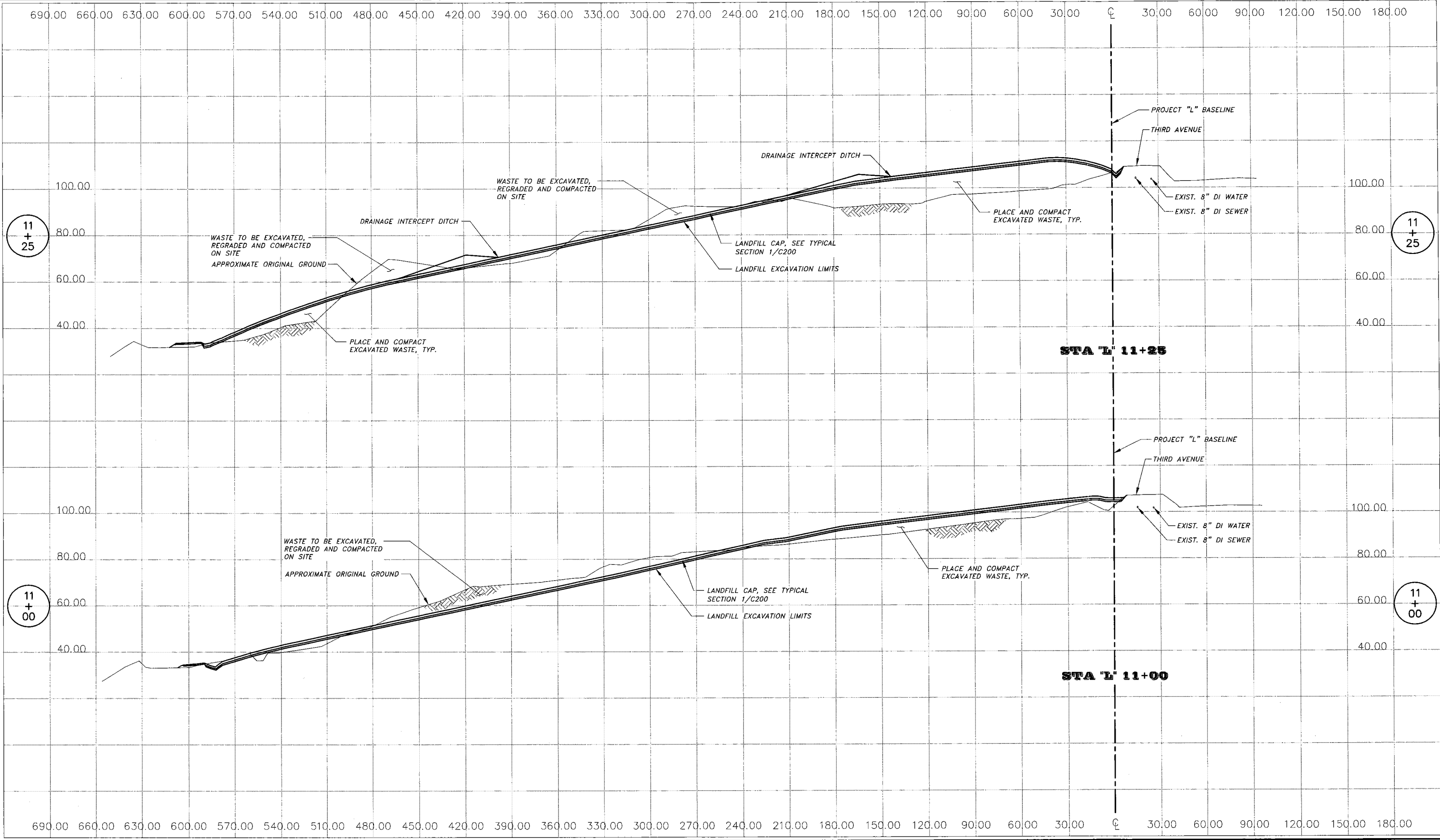
SCALES:  
 HORIZONTAL 1" = 30' @ FULL SIZE  
 VERTICAL 1" = 20' @ FULL SIZE



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CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE  
 LANDFILL CLOSURE PLAN**  
 WRANGELL, ALASKA

DATE: MARCH, 2005  
 R & M NO. 081336  
 SHEET **C501**



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## LANDFILL CROSS SECTIONS

**SCALES:**  
 HORIZONTAL 1" = 30' @ FULL SIZE  
 VERTICAL 1" = 20' @ FULL SIZE

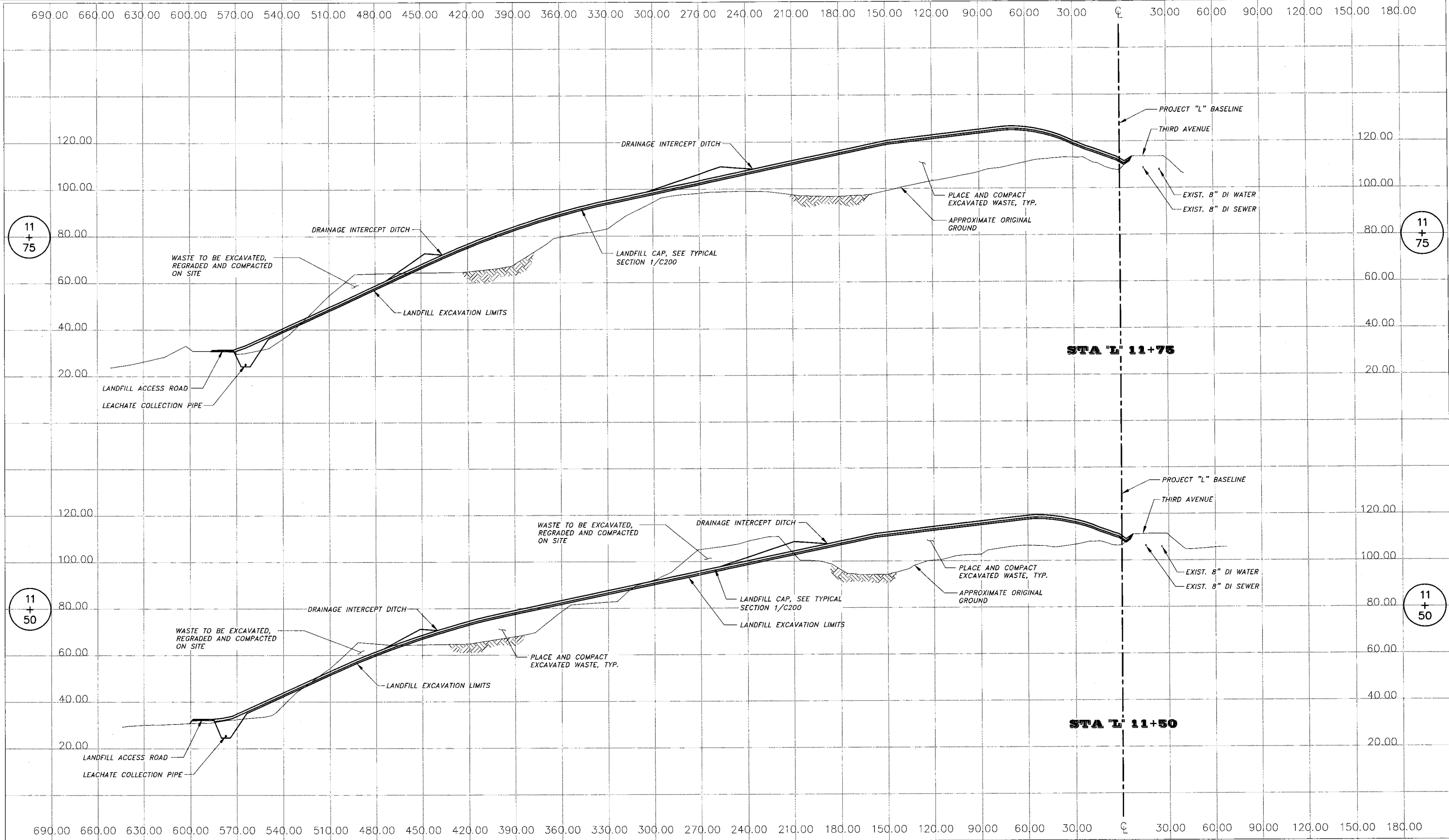


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 LANDFILL CLOSURE PLAN**  
 WRANGELL, ALASKA

DATE: MARCH, 2009  
 R & M NO. 081336  
 SHEET **C502**





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## LANDFILL CROSS SECTIONS

SCALES:  
 HORIZONTAL 1" = 30' @ FULL SIZE  
 VERTICAL 1" = 20' @ FULL SIZE



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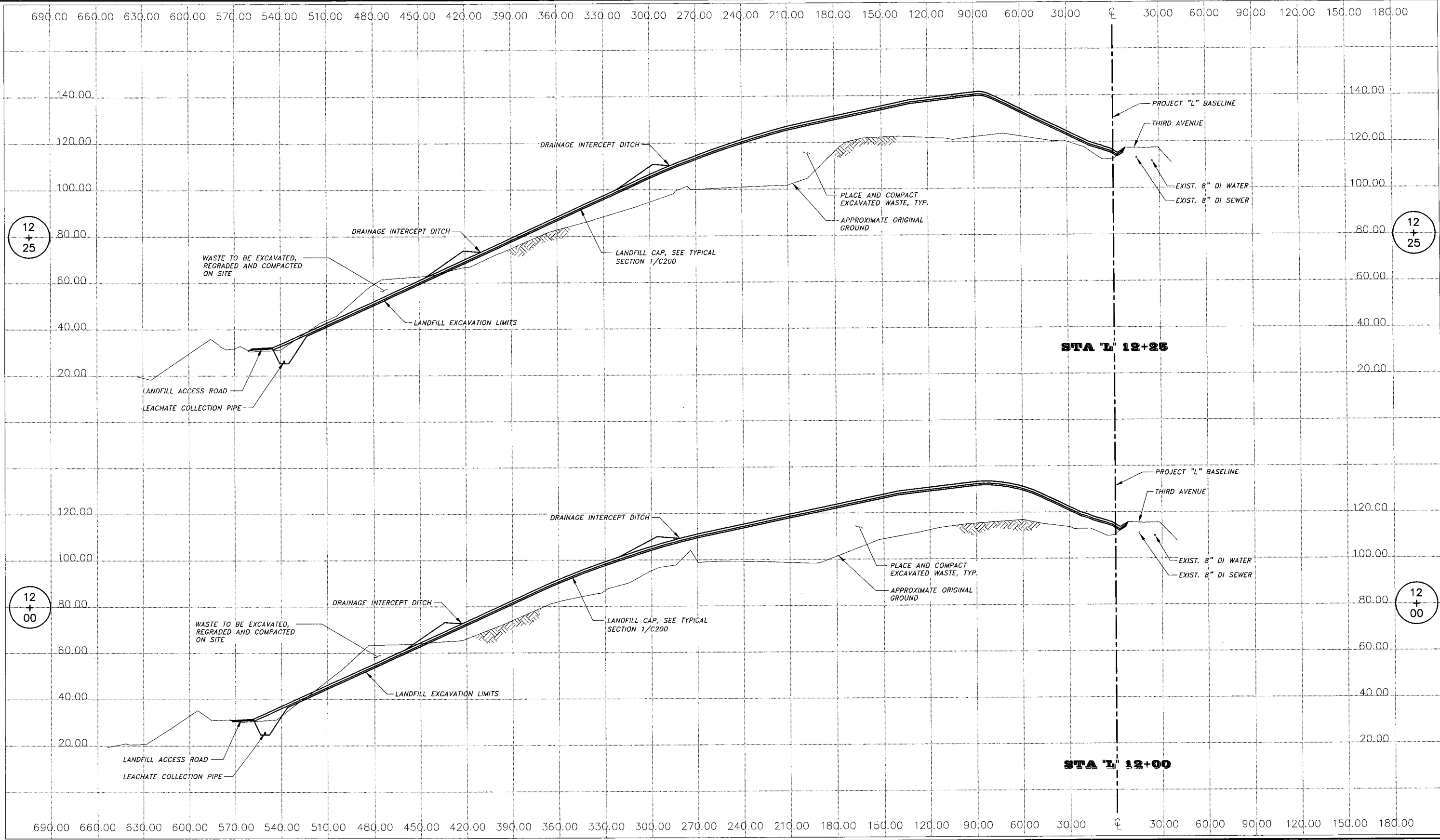
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 LANDFILL CLOSURE PLAN**  
 WRANGELL, ALASKA

DATE: MARCH, 2009  
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 SHEET **C503**



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**LANDFILL CROSS SECTIONS**

SCALES:  
 HORIZONTAL 1" = 30' @ FULL SIZE  
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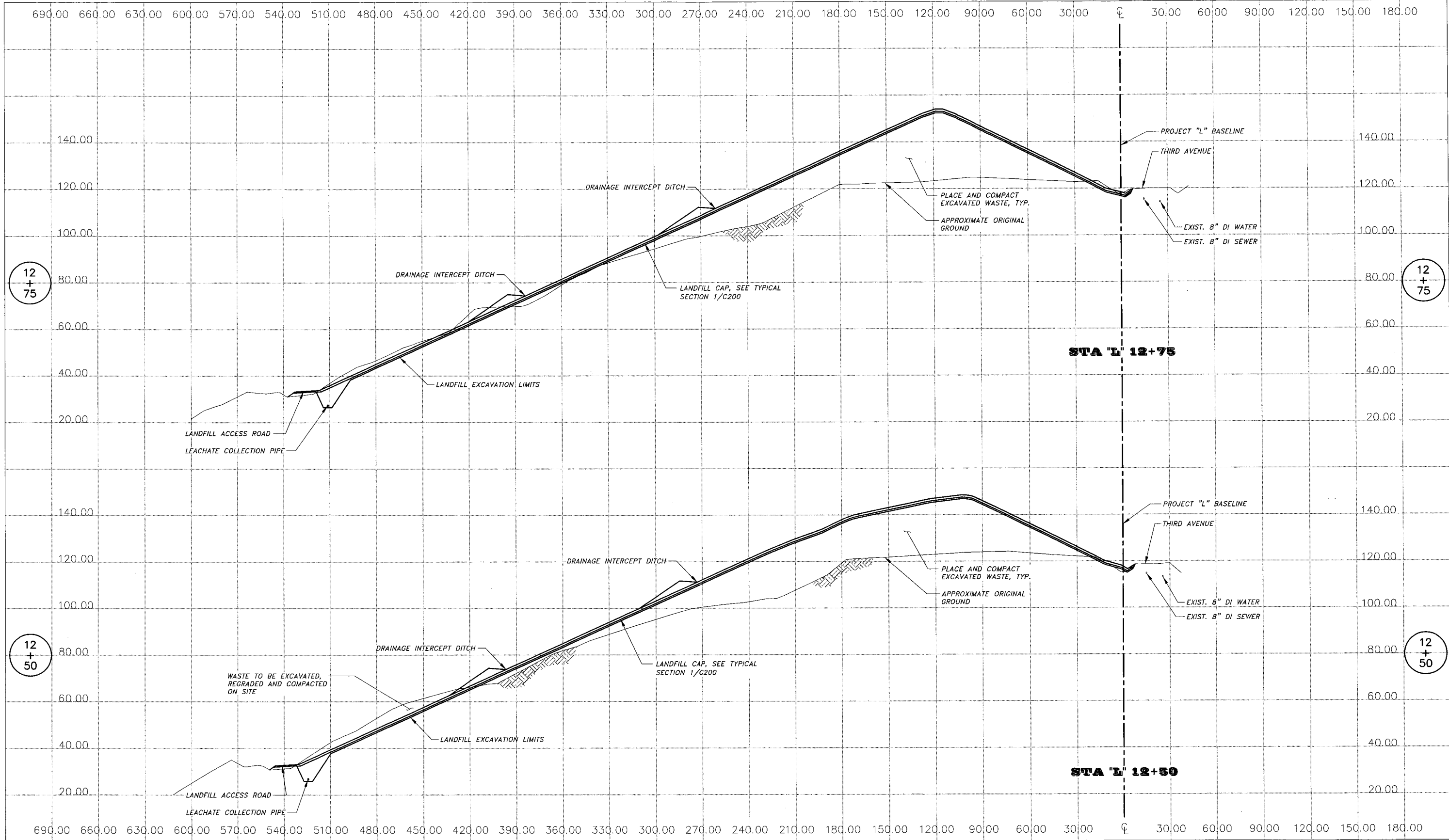
**RAM**

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CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE  
 LANDFILL CLOSURE PLAN**  
 WRANGELL, ALASKA

DATE: MARCH, 2009  
 R & M NO. 081336  
 SHEET **C504**



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No.	DATE	REVISION	BY	APPRVD.

### LANDFILL CROSS SECTIONS

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 VERTICAL 1" = 20' @ FULL SIZE



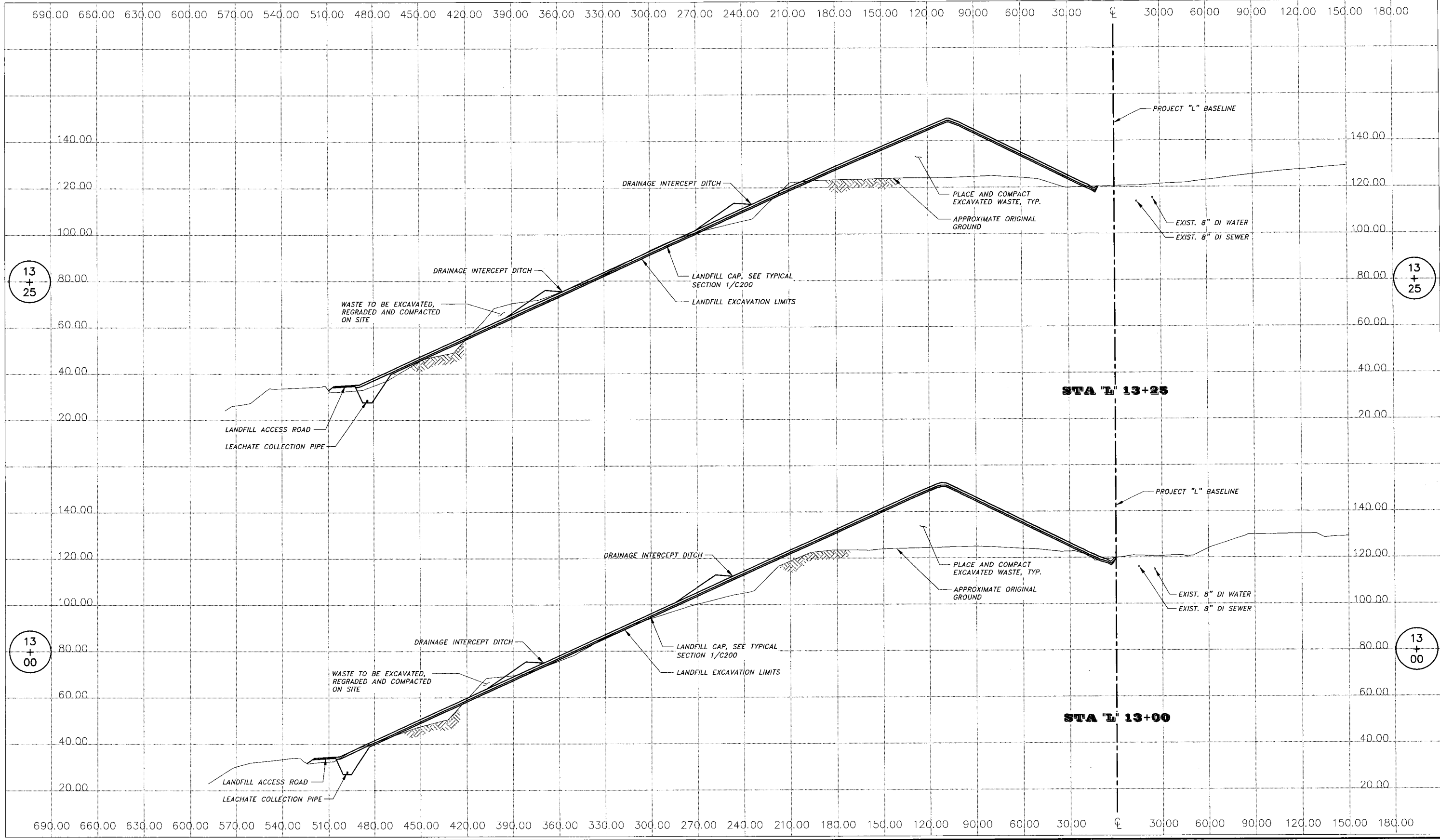
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 WRANGELL, ALASKA

DATE: MARCH, 2009  
 R & M NO. 081336  
 SHEET **C505**



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**LANDFILL CROSS SECTIONS**

SCALES:  
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 VERTICAL 1" = 20' @ FULL SIZE



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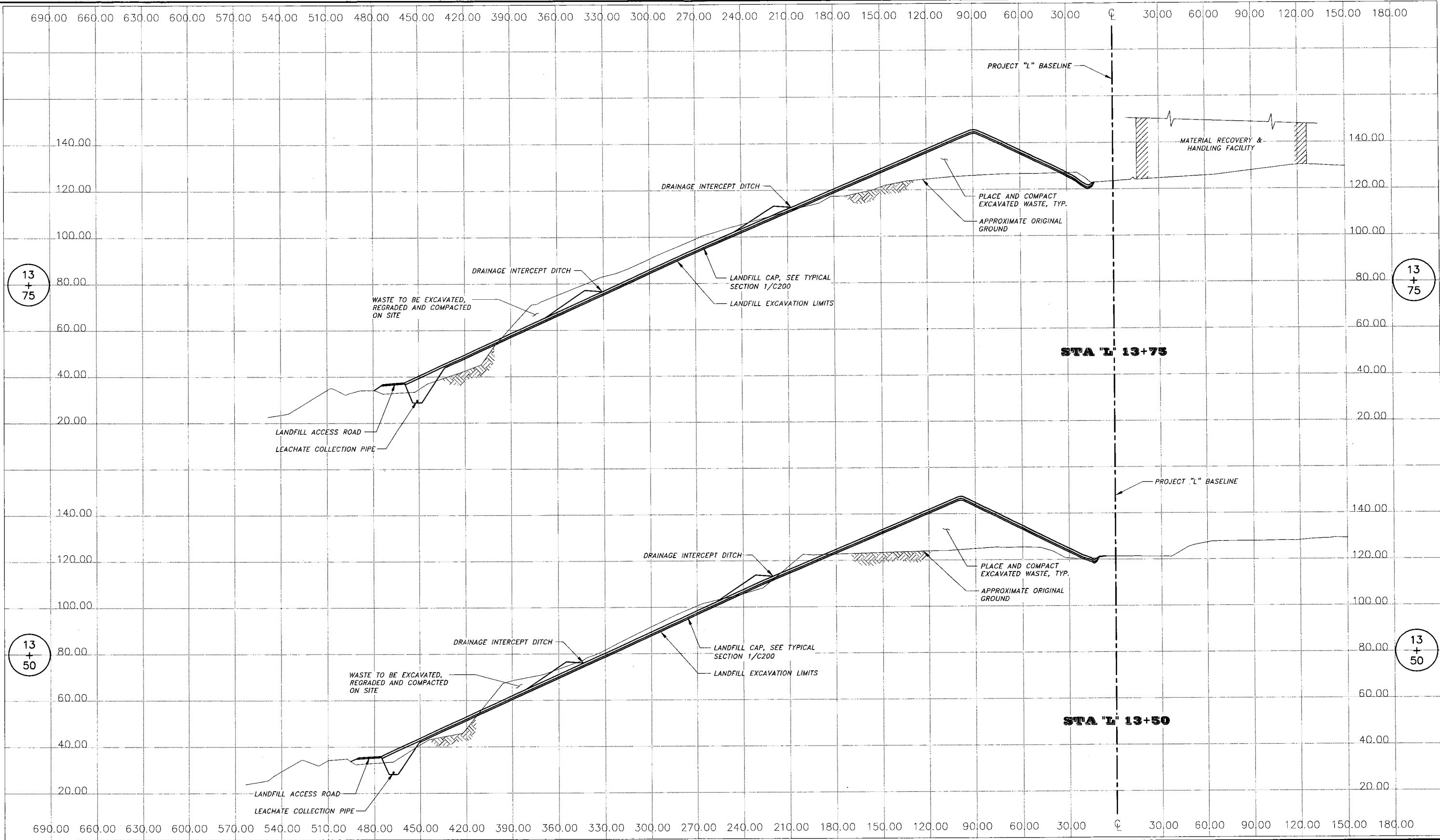
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DATE: MARCH, 2009  
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SHEET **C506**



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No.	DATE	REVISION	BY	APRVD.

**LANDFILL CROSS SECTIONS**

SCALES:  
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**RAM**

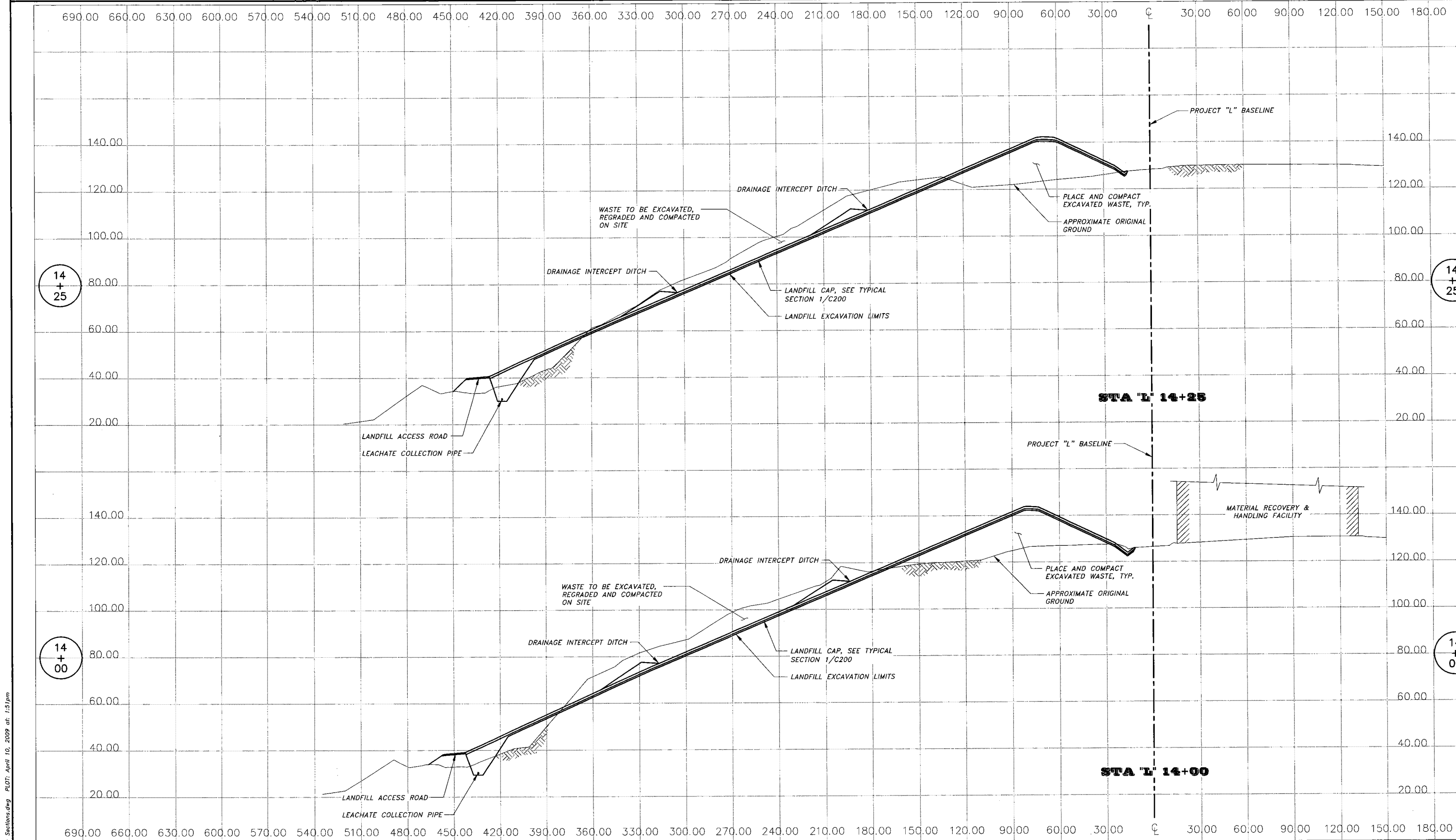
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 LANDFILL CLOSURE PLAN**  
 WRANGELL, ALASKA

DATE: MARCH, 2009  
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**C507**



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## LANDFILL CROSS SECTIONS

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 VERTICAL 1" = 20' @ FULL SIZE



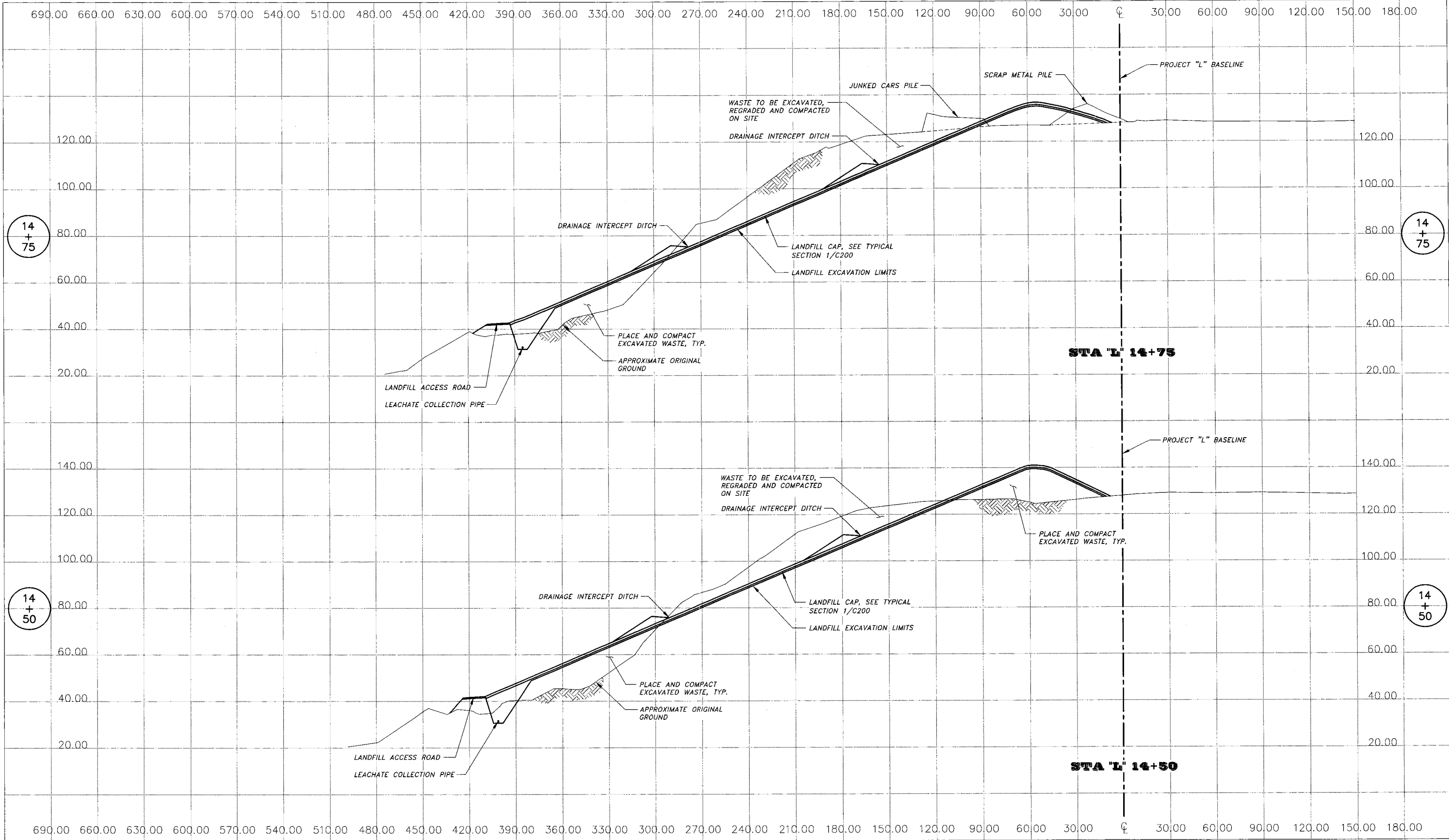
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CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE  
 LANDFILL CLOSURE PLAN**  
 WRANGELL, ALASKA

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 SHEET **C508**



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**LANDFILL CROSS SECTIONS**

SCALES:  
 HORIZONTAL 1" = 30' @ FULL SIZE  
 VERTICAL 1" = 20' @ FULL SIZE



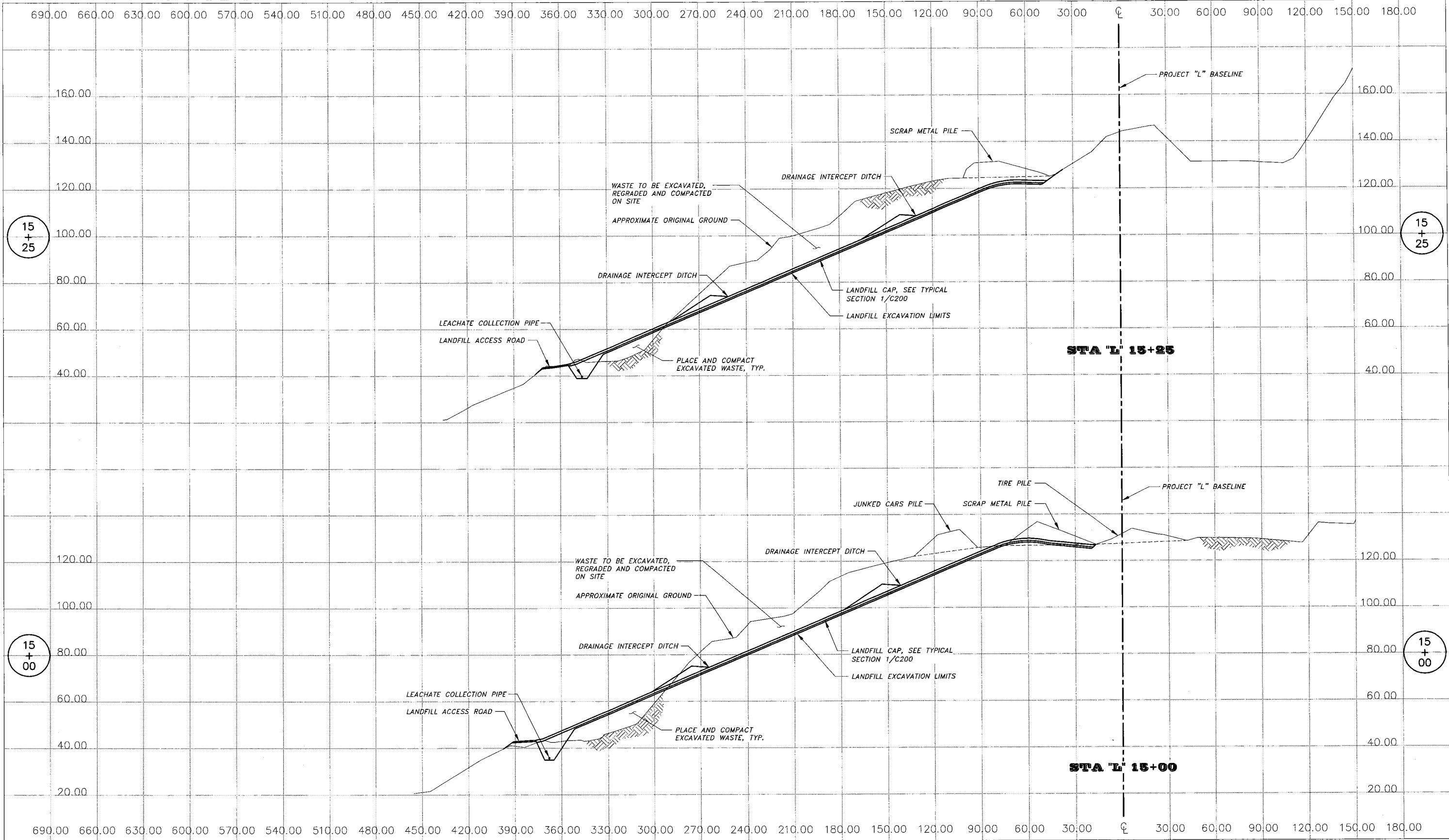
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 LANDFILL CLOSURE PLAN**  
 WRANGELL, ALASKA

DATE: MARCH, 2009  
 R & M NO: 081336  
 SHEET: **C509**



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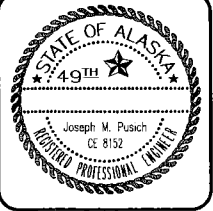
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No.	DATE	REVISION	BY	APPRVD.

**LANDFILL CROSS SECTIONS**

SCALES:  
 HORIZONTAL 1" = 30' @ FULL SIZE  
 VERTICAL 1" = 20' @ FULL SIZE

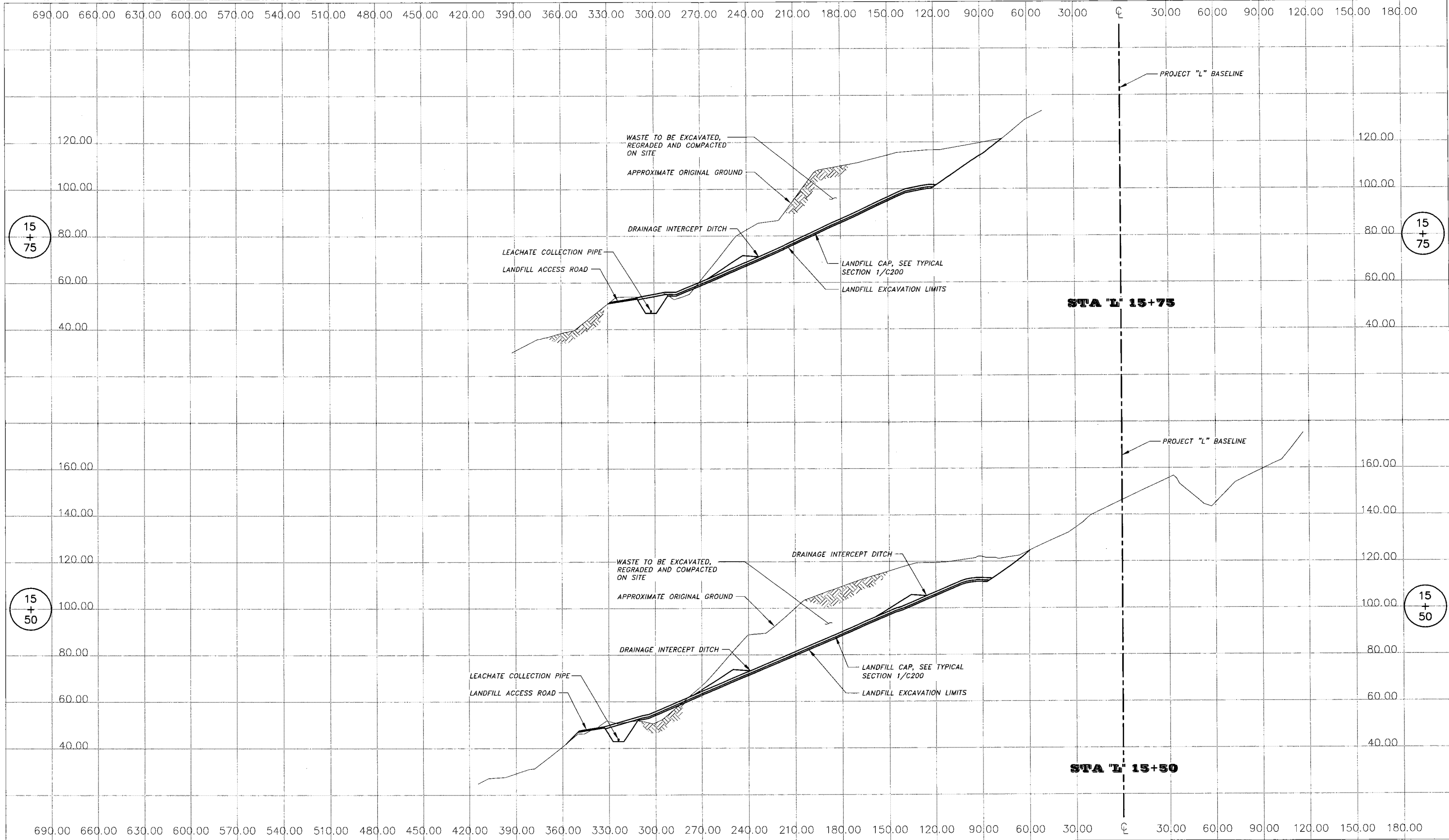


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CITY AND BOROUGH OF WRANGELL  
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 LANDFILL CLOSURE PLAN**  
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DATE: MARCH, 2009  
 R & M NO. 081336  
 SHEET **C510**





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**LANDFILL CROSS SECTIONS**

SCALES:  
 HORIZONTAL 1" = 30' @ FULL SIZE  
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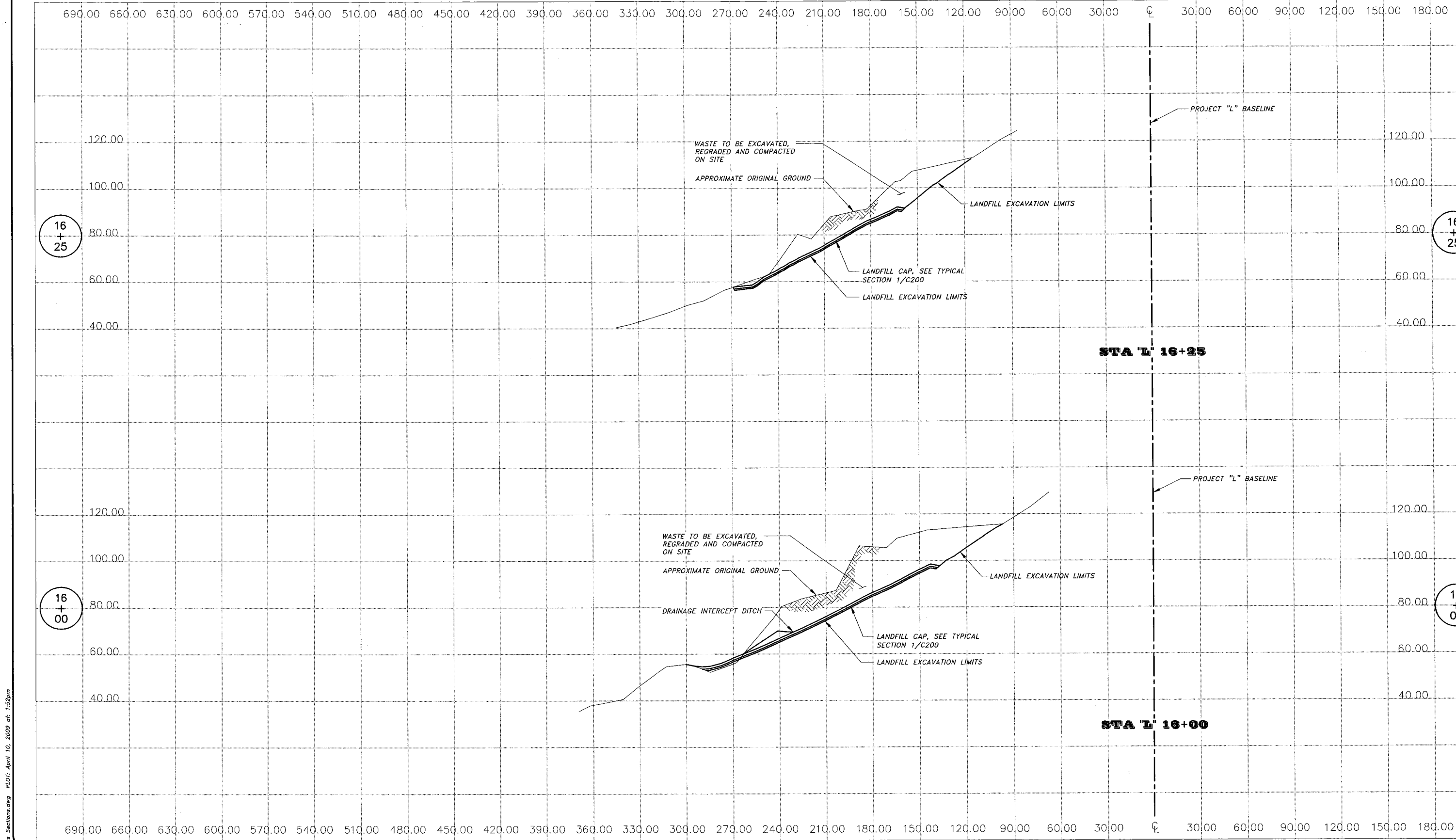


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CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE  
 LANDFILL CLOSURE PLAN**  
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 SHEET **C511**



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**LANDFILL CROSS SECTIONS**

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 HORIZONTAL 1" = 30' @ FULL SIZE  
 VERTICAL 1" = 20' @ FULL SIZE

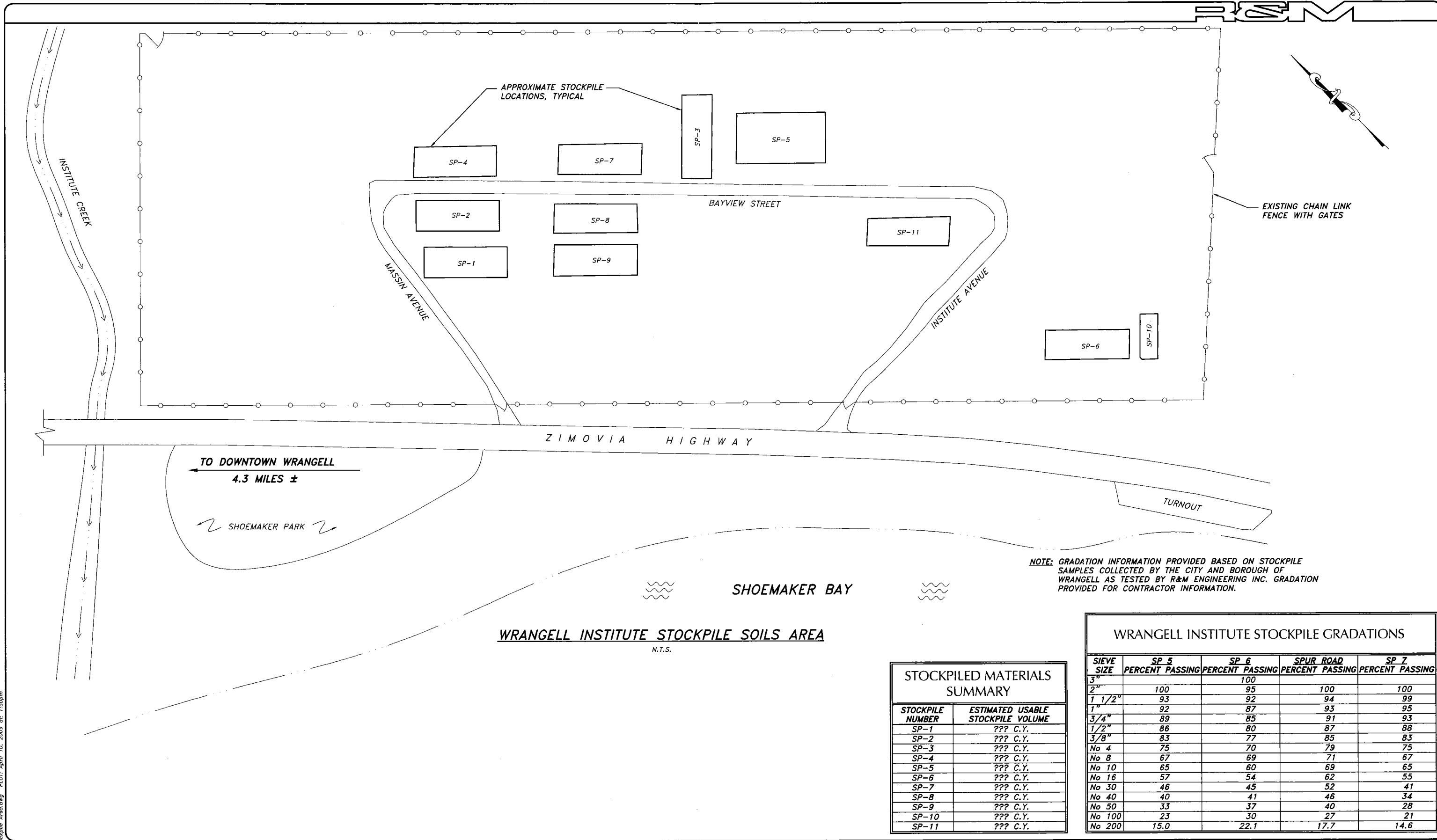


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DATE: MARCH, 2005  
 R & M NO. 081336  
 SHEET **C512**



**STOCKPILED MATERIALS SUMMARY**

STOCKPILE NUMBER	ESTIMATED USABLE STOCKPILE VOLUME
SP-1	??? C.Y.
SP-2	??? C.Y.
SP-3	??? C.Y.
SP-4	??? C.Y.
SP-5	??? C.Y.
SP-6	??? C.Y.
SP-7	??? C.Y.
SP-8	??? C.Y.
SP-9	??? C.Y.
SP-10	??? C.Y.
SP-11	??? C.Y.

**WRANGELL INSTITUTE STOCKPILE GRADATIONS**

SIEVE SIZE	SP 5 PERCENT PASSING	SP 6 PERCENT PASSING	SPUR ROAD PERCENT PASSING	SP 7 PERCENT PASSING
3"		100		
2"	100	95	100	100
1 1/2"	93	92	94	99
1"	92	87	93	95
3/4"	89	85	91	93
1/2"	86	80	87	88
3/8"	83	77	85	83
No 4	75	70	79	75
No 8	67	69	71	67
No 10	65	60	69	65
No 16	57	54	62	55
No 30	46	45	52	41
No 40	40	41	46	34
No 50	33	37	40	28
No 100	23	30	27	21
No 200	15.0	22.1	17.7	14.6

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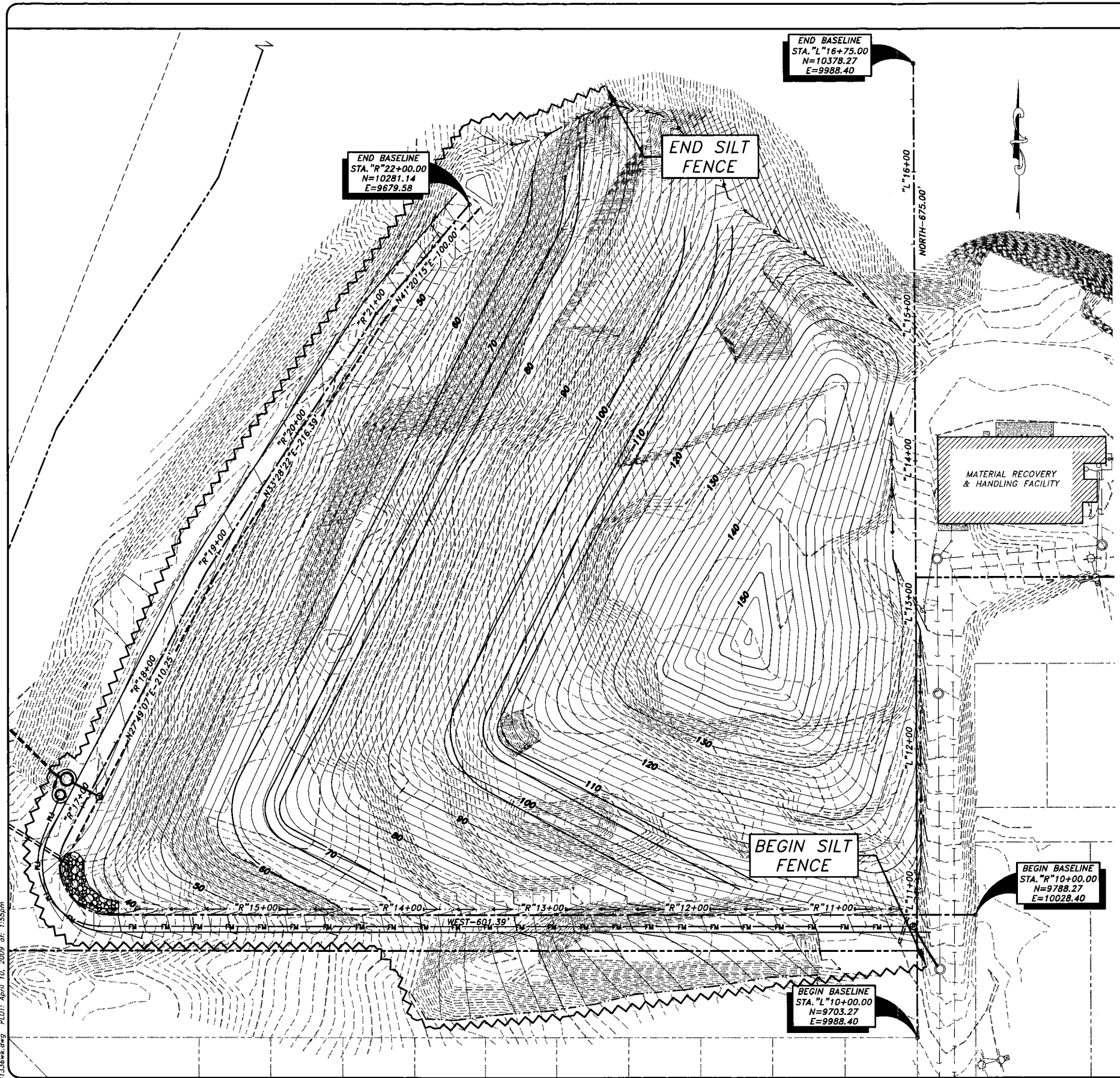
**WRANGELL INSTITUTE STOCKPILED MATERIALS**



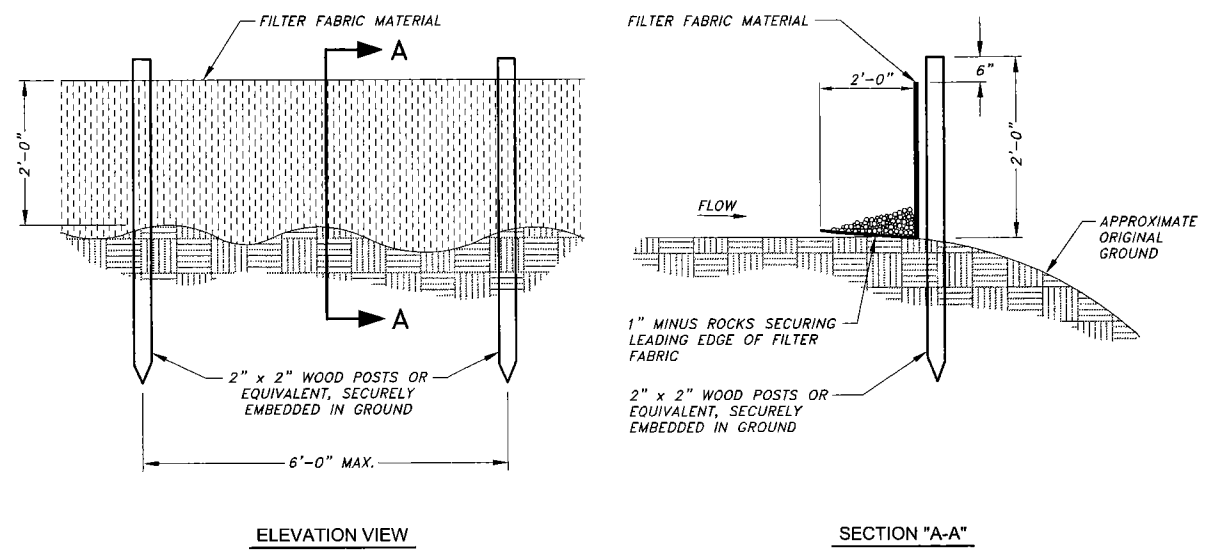
**RAM**  
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CITY AND BOROUGH OF WRANGELL  
**MUNICIPAL SOLID WASTE LANDFILL CLOSURE PLAN**  
 WRANGELL, ALASKA

DATE: MARCH, 2009  
 R & M NO. 081336  
 SHEET **C600**



- EROSION AND SEDIMENT CONTROL NOTES:**
1. EROSION AND SEDIMENT CONTROL PLANS (E.S.C.P.) SHOWN ARE INTENDED AS A MINIMUM LEVEL OF EROSION CONTROL ONLY. THE E.S.C.P. IS TO BE USED BY THE CONTRACTOR TO DEVELOP A SITE SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP). ALL SEDIMENTATION FROM ON SITE DRAINAGE AND GRADING SHALL BE CONTAINED ON SITE. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DAMAGE TO ADJACENT PROPERTIES AND WATER BODIES FROM CONSTRUCTION RELATED EROSION AND SILTATION DURING THE COURSE OF WORK. ANY DAMAGE RESULTING FROM SUCH EROSION AND SILTATION SHALL BE CORRECTED AT THE EXPENSE OF THE CONTRACTOR.
  2. ALL EROSION CONTROL/SEDIMENTATION CONTROL BARRIERS SHALL BE IN PLACE PRIOR TO COMMENCING EXCAVATION OR FILLING OPERATIONS ON THE LANDFILL.
  3. TEMPORARY EROSION CONTROL SYSTEM WILL NOT BE REMOVED UNTIL GERMINATION OF SEEDING AND NO EROSION/SEDIMENT PROBLEMS EXIST.
  4. COLLECTED SEDIMENT WILL BE DISPOSED OF OFF SITE AT AN EXISTING APPROVED DUMPSITE. COLLECTED SEDIMENT MAY NOT BE USED AS EMBANKMENT.
  5. DEWATERING OF WORK AREAS BY PUMPING SHALL BE IMPLEMENTED WHENEVER POSSIBLE TO REDUCE THE PROJECTS' WATER QUALITY IMPACTS. THE PUMP DISCHARGE MUST BE FILTERED THROUGH A SEDIMENT CONTROL DEVICE SUCH AS A "DIRTBAG" OR OTHER APPROVED SEDIMENT CONTROL STRUCTURE BEFORE IT CAN ENTER FISH HABITATS AT ANY POINT.
  6. CONTRACTOR SHALL KEEP CLEAN AND DISPOSE OF ALL EARTHEN MATERIAL TRACKED ONTO EVERGREEN STREET/AIRPORT ROAD. THIS SHALL INCLUDE SWEEPING WITH POWER BROOM AND WATERING ON A DAILY BASIS DURING HAULING ACTIVITY OR MORE FREQUENTLY AS DIRECTED BY THE ENGINEER.
  7. DUST AND LITTER/DEBRIS CONTROL SHALL BE IMPLEMENTED BY THE CONTRACTOR AT ALL TIMES DURING CONSTRUCTION.



1 SILT FENCE DETAIL  
N.T.S.

I:\2008\081336\Design Drawings\081336.mxd PLOT: April 10, 2009 at: 1:55pm

DESIGN	JMP				
DRAWN	MLL/KAP				
CHECK	JMP				
APPROVED	JMP				
FILE:					

No.	DATE	REVISION	BY	APPRD.

**EROSION AND SEDIMENT CONTROL PLAN**

GRAPHIC SCALE

DESIGN CONTOUR INTERVAL = 2'



**RAM**  
R & M ENGINEERING, INC.  
ENGINEERS      GEOLOGISTS      SURVEYORS

6205 GLACIER HIGHWAY      Phone 907-780-6060  
JUNEAU, AK. 99801      Fax 907-780-4611

rmengineering@rmjuneau.com

CITY AND BOROUGH OF WRANGELL  
MUNICIPAL SOLID WASTE  
LANDFILL CLOSURE PLAN

WRANGELL, ALASKA

DATE: MARCH, 2009  
R & M NO. 081336

SHEET  
**C700**

# Appendix B

# PROJECT MANUAL

## 90% SUBMITTAL

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### CITY AND BOROUGH OF WRANGELL LANDFILL CLOSURE

Wrangell, Alaska

Project No. 2009-10

March 5, 2009

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**R&M ENGINEERING, INC.**

6205 Glacier Highway  
Juneau, Alaska 99801  
Phone (907) 780-6060  
Fax (907) -780-4611  
[mpusich@rmjuneau.com](mailto:mpusich@rmjuneau.com)

**BIDDING and CONTRACT REQUIREMENTS**

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00800	Supplementary General Conditions .....	4
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**PROJECT NO. 2009-10**

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**LIST OF DRAWINGS – 26 SHEETS**

<b><u>Sheet No.</u></b>	<b><u>Description</u></b>
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C002	General Notes, Abbreviations and Symbols
C003	Survey Control Diagram
C100	Existing Site Conditions
C101	Grading & Drainage Plan
C200	Typical Sections
C201	Typical Section
C300	Construction Details
C301	Leachate Collection and Pumping Details
C302	Construction Details
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C400	Landfill Access Road Profile
C501	Landfill Cross Sections
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C503	Landfill Cross Sections
C504	Landfill Cross Sections
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C509	Landfill Cross Sections
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C511	Landfill Cross Sections
C512	Landfill Cross Sections
C600	Wrangell Institute Stockpiled Materials
C700	Erosion and Sediment Control Plan

**END OF SECTION**



PROJECT NO. 2009-10

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**OBTAINING CONTRACT DOCUMENTS.** The Contract Documents are entitled:

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE  
Project No. 2009-10**

The Contract Documents may be obtained at the City and Borough of Wrangell, upon payment of \$55.00 (non-refundable) for each set of Contract Documents (including Technical Specifications and Drawings).

**PRE-BID CONFERENCE.** Prospective Bidders are encouraged to attend a Pre-Bid conference of the proposed WORK, which will be conducted by the OWNER, at 10:00 a.m. on March 19, 2009 in the City and Borough of Wrangell office conference room. The object of the conference is to acquaint Bidders with the project and bid documents.

**OPENING OF BIDS.** The Bids will be publicly opened and read at 2:00 p.m. on March 26, 2009, in the City and Borough of Wrangell office conference room.

**RECEIPT OF BIDS.** Sealed Bids will be received at the office of the City and Borough of Wrangell, OWNER of the WORK, located at 205 Bruegar Street, Wrangell, Alaska 99929 until 2:00 p.m. on March 26, 2009, for **City and Borough of Wrangell Landfill Closure, Project No. 2009-10**. Opening date and time may be changed to a later date or time as announced by Addendum.

Bids may be accepted by United States Post Office mail delivery or delivered in person or by courier service to:

**PHYSICAL LOCATION:**

**City and Borough of Wrangell  
205 Bruegar Street  
Wrangell, AK 99929**

**DESCRIPTION OF WORK.** The Project consists of clearing and grubbing, erosion control, excavation, base course grading D-1, 18-inch CPP storm drain pipe, regrading and compacting existing landfill materials, 4-inch minus drainage/gas rock, ditch grading, 8-inch PVC sewer, 4-inch force main sewer pipe, sanitary sewer pipe, topsoil/erosion vegetative layer, seeding, geosynthetic clay liner, leachate collection system, leachate pump system, reconstruct landfill perimeter road, landfill gas vent system, electrical work, construction surveying and miscellaneous related work for construction of the City and Borough of Wrangell Landfill Closure, Wrangell, Alaska.

**SITE OF WORK.** The site of the WORK is located off of 1-1/4 miles north of downtown Wrangell, Alaska, along Evergreen Avenue and turning left on Third Avenue.

**COMPLETION OF WORK.** The WORK shall be completed within one hundred twenty (120) calendar days from the date of the notice to proceed issued to the CONTRACTOR.

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**DIVISION 0 – BIDDING AND CONTRACT  
REQUIREMENTS, CONTRACT FORMS  
AND CONDITIONS OF THE CONTRACT  
SECTION 00030  
NOTICE INVITING BIDS**

**PROJECT NO. 2009-10**

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**BIDDING, CONTRACT, or TECHNICAL QUESTIONS.** All communications relative to this WORK, prior to opening Bids, shall be directed to the following:

J. Mark Pusich, P.E.  
R&M ENGINEERING, INC.  
6205 Glacier Highway  
Juneau, Alaska 99801  
Telephone: (907) 780-6060  
Fax: (907) 780-4611

**BID SECURITY.** Each Bid shall be accompanied by a certified or cashier's check or Bid Bond, in the amount of 5% percent of the Bid, payable to the City and Borough of Wrangell, Alaska, as a guarantee that the Bidder, if its Bid is accepted, will promptly execute the Agreement. A Bid shall not be considered unless one of the forms of Bidder's security is enclosed with it.

**CONTRACTOR'S LICENSE.** All contractors are required to have a current Alaska Contractor's License, prior to submitting a Bid, and a current Alaska Business License prior to award.

**BID TO REMAIN OPEN.** The Bidder shall guarantee the Bid for a period of 120 Days from the date of Bid opening. Any component of the Bid may be awarded anytime during the 120 Days.

**OWNER'S RIGHTS RESERVED.** The OWNER reserves the right to reject any or all Bids, to waive any informality in a Bid, and to make award to the lowest responsive, responsible Bidder as it may best serve the interests of the OWNER.

**OWNER: City and Borough of Wrangell**

By: \_\_\_\_\_ Date  
Bob Prunella  
Borough Manager

**END OF SECTION**

PROJECT NO. 2009-10

**1.0 DEFINED TERMS.** Terms used in these “Instructions to Bidders” and the “Notice Inviting Bids” which are defined in the General Conditions have the meanings assigned to them in the General Conditions. The term "Bidder" means one who submits a Bid directly to the OWNER, as distinct from a sub-bidder, who submits a Bid to a Bidder.

**2.0 INTERPRETATIONS AND ADDENDA.**

A. **INTERPRETATIONS.** All questions about the meaning or intent of the Contract Documents are to be directed to the Engineering Contracts Administrator. Interpretations or clarifications considered necessary by the Engineering Contracts Administrator in response to such questions will be issued by Addendum, mailed, faxed, or delivered to all parties recorded by the Engineering Contracts Administrator, or OWNER, as having received the Contract Documents. Questions received less than 7 Days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect.

B. **ADDENDA.** Addenda may be issued to modify the Contract Documents as deemed advisable by the OWNER. The OWNER may issue addenda by fax, with a follow-up addendum copy issued by regular mail. Addenda may be faxed and mailed less than seven Days prior to the anticipated Bid opening. The OWNER will make all reasonable attempts to ensure that all planholders receive faxed addenda, however, it is strongly recommended by the OWNER that Bidders independently confirm the contents, number, and dates of each Addenda prior to submitting a Bid.

**3.0 FAIR COMPETITION.** More than one Bid from an individual, firm, partnership, corporation, or association under the same or different names will not be considered. If the OWNER believes that any Bidder is interested in more than one Bid for the WORK contemplated, all Bids in which such Bidder is interested will be rejected. If the OWNER believes that collusion exists among the Bidders, all Bids will be rejected.

**4.0 RESPONSIBLE BIDDER.** Only responsive Bids from responsible Bidders will be considered. A Bid submitted by a Bidder determined to be not responsible may be rejected. A responsible Bidder is one who is considered to be capable of performing the WORK.

A. The general standards for responsibility are to determine the CONTRACTOR’s ability to perform WORK adequately, considering the CONTRACTOR’s

1. Financial Resources
2. Ability to Meet Delivery Standards
3. Past Performance Record
  - a. References from others on CONTRACTOR’s performance
  - b. Record of performance on prior OWNER contracts
4. Record of Integrity
5. Obligations to OWNER

- 
- a. Bidders must be registered as required by law and in good standing for all amounts owed to the OWNER within ten Days of Owner's Notice of Intent to Award.
  - b. City and Borough of Wrangell Finance Department, administers the registration and assessment of sales, business personal property and business real property taxes.
- B. Before a Bid is considered for award, a Bidder may be requested to submit information documenting its ability and competency to perform the WORK, according to general standards of responsibility and any special standards which may apply. It is Bidder's responsibility to submit sufficient, relevant, and adequate information. OWNER will make its determination of responsibility and has no obligation to request clarification or supplementary information.

**5.0 RESPONSIVE BIDS.** Only responsive Bids will be considered. Bids may be considered non-responsive and may be rejected. Some of the reasons a Bid may be rejected for being non-responsive are:

- A. If the Bid is on a form other than that furnished by the OWNER, or legible copies thereof; or if the form is altered or any part thereof is detached; or if the Bid is improperly signed.
- B. If there are unauthorized additions, conditional or alternate bids, or irregularities of any kind which may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.
- C. If the Bidder adds any unauthorized conditions, limitations, or provisions reserving the right to accept or reject any award, or to enter into a contract pursuant to an award. This does not exclude a Bid limiting the maximum gross amount of awards acceptable to any one Bidder at any one bid opening, provided that any selection of awards will be made by the OWNER.
- D. If the Bid does not contain a unit price for each pay item listed, except in the case of authorized alternate pay items.
- E. If the Bidder has not acknowledged receipt of each Addendum.
- F. If the Bidder fails to furnish an acceptable Bid guaranty with the Bid.
- G. If any of the unit prices Bid are excessively unbalanced (either above or below the amount of a reasonable Bid) to the potential detriment of the OWNER.
- H. If a bid modification does not conform to Article 15.0 of this Section.

**6.0 BIDDER'S EXAMINATION OF CONTRACT DOCUMENTS AND SITE.** It is the responsibility of each Bidder before submitting a Bid:

- A. To examine thoroughly the Contract Documents, and other related data identified in the bidding documents (including "technical data" referred to below):

1. To visit the site to become familiar with and to satisfy the Bidder as to the general and local conditions that may affect cost, progress, or performance, of the WORK,
2. To consider federal, state and local laws and regulations that may affect cost, progress, or performance of the WORK,
3. To study and carefully correlate the Bidder's observations with the Contract Documents, and other related data; and
4. To notify the ENGINEER of all conflicts, errors, or discrepancies in or between the Contract Documents and such other related data.

**7.0 REFERENCE IS MADE TO THE SUPPLEMENTARY GENERAL CONDITIONS FOR IDENTIFICATION OF:**

- A. Those reports of explorations and tests of subsurface conditions at the site which have been utilized by the Engineer of Record in the preparation of the Contract Documents. The Bidder may rely upon the accuracy of the technical data contained in such reports, however, the interpretation of such technical data, including any interpolation or extrapolation thereof, together with non-technical data, interpretations, and opinions contained therein or the completeness thereof is the responsibility of the Bidder.
- B. Those drawings of physical conditions in or relating to existing surface and subsurface conditions (except underground utilities) which are at or contiguous to the site have been utilized by the Engineer of Record in the preparation of the Contract Documents. The Bidder may rely upon the accuracy of the technical data contained in such drawings, however, the interpretation of such technical data, including any interpolation or extrapolation thereof, together with nontechnical data, interpretations, and opinions contained in such drawings or the completeness thereof is the responsibility of the Bidder.
- C. Copies of such reports and drawings will be made available by the OWNER to any Bidder on request if said reports and drawings are not bound herein. Those reports and drawings are not part of the Contract Documents, but the technical data contained therein upon which the Bidder is entitled to rely, as provided in Paragraph SGC-4.2 of the Supplementary General Conditions, are incorporated herein by reference.
- D. Information and data reflected in the Contract Documents with respect to underground utilities at or contiguous to the site is based upon information and data furnished to the OWNER and the Engineer of Record by the owners of such underground utilities or others, and the OWNER does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary General Conditions, or in Section 01530 - Protection and Restoration of Existing Facilities.
- E. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, underground utilities and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraphs 4.2, 4.3, and 4.4 of the General Conditions.
- F. Before submitting a Bid, each Bidder will, at its own expense, make or obtain any additional examinations, investigations, explorations, tests, and studies and obtain any additional

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information and data which pertain to the physical conditions (surface, subsurface, and underground utilities) at or contiguous to the site or otherwise which may affect cost, progress, or performance of the WORK and which the Bidder deems necessary to determine its Bid for performing the WORK in accordance with the time, price, and other terms and conditions of the Contract Documents.

- G. On request in advance, the OWNER will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and shall clean up and restore the site to its former condition upon completion of such explorations.
- H. The lands upon which the WORK is to be performed, rights-of-way and easements for access thereto and the lands designated for use by the CONTRACTOR in performing the WORK are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by the CONTRACTOR. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by the OWNER unless otherwise provided in the Contract Documents.
- I. The submission of a Bid will constitute an incontrovertible representation by the Bidder that the Bidder has complied with every requirement of Article 6, "Bidder's Examination of Contract Documents and Site" herein, that without exception the Bid is premised upon performing the WORK required by the Contract Documents and such means, methods, techniques, sequences, or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the WORK.

#### 8.0 BID FORM.

- A. The Bid shall be made on the Bid Schedule(s) bound herein, or on the yellow bid packet provided, or on legible and complete copies thereof, and shall contain the following: Sections 00300, 00310, and the required Bid Security. The envelope enclosing the sealed Bids shall be plainly marked in the upper left-hand corner with the name and address of the Bidder and shall bear the words "BID FOR," followed by the title of the Contract Documents for the WORK, the name of the OWNER, the address where Bids are to be delivered or mailed to, and the date and hour of opening of Bids. The Bid Security shall be enclosed in the same envelope with the Bid.
- B. All blanks on the Bid Form and Bid Schedule must be completed in ink or typed.
- C. Bids by corporations must be executed in the corporate name by the president, a vice-president (or other corporate officer). The corporate address and state of incorporation must appear below the signature.
- D. Bids by partnerships must be executed in the partnership name and be signed by a managing partner, and the official address of the partnership must appear below the signature.

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- E. The Bidder's Bid must be signed with ink. All names must be printed or typed below the signature.
- F. The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form. Failure to acknowledge Addenda shall render Bid non-responsive and shall cause its rejection.
- G. The address to which communications regarding the Bid are to be directed must be shown.
- H. All Bidders must provide evidence of authority to conduct business in Alaska to the extent required by law.
- I. On Projects including Federal funding any contractor otherwise qualified to perform the WORK, is not required to be licensed nor to submit application for license in advance of submitting a Bid or having such Bid considered; provided, however, that such exemption does not constitute a waiver of the OWNER's right under existing license laws to require a contractor, determined to be a successful Bidder, to be licensed to do business as a contractor in the State of Alaska in connection with the award of a contract to the successful Bidder.
- J. On Projects not including Federal funding, a Bid for the WORK will not be accepted from a contractor who does not hold a valid Alaska Business License and a valid Contractor's License in Alaska (applicable to the type of work bid upon) at the time of opening Bids.
- 9.0 QUANTITIES OF WORK.** The quantities of WORK, or material, stated in unit price items of the Bid are supplied only to give an indication of the general scope of the WORK; the OWNER does not expressly or by implication agree that the actual amount of WORK, or material, will correspond therewith, and reserves the right after award to increase or decrease the amount of any unit price item of the WORK by an amount up to and including 25 percent of any Bid item, without a change in the unit price, and shall include the right to delete any Bid item in its entirety, or to add additional Bid items up to and including an aggregate total amount not to exceed 25 percent of the Contract Price (see General Conditions, Article 10 Changes In the Work).
- 10.0 SUBSTITUTE OR "OR-EQUAL" ITEMS.** The procedure for the submittal of substitute or "or-equal" products is specified in Section 01300 - CONTRACTOR Submittals.
- 11.0 SUBMISSION OF BIDS.** The Bid shall be delivered by the time and to the place stipulated in the Notice Inviting Bids. It is the Bidder's sole responsibility to see that its Bid is received in proper time. Oral, telegraphic, telephonic or faxed Bids will not be considered.

Bids sent by United States Post Office mail delivery and bids delivered in person or by courier service to must be addressed to:

**PHYSICAL LOCATION:**

City and Borough of Wrangell  
205 Bruegar Street  
Wrangell, Alaska 99929

- 
- 12.0 BID SECURITY, BONDS, AND INSURANCE.** Each Bid shall be accompanied by a certified, or cashier's check, or approved Bid Bond in an amount of at least 5 percent of the total Bid price. The "total Bid price" is the amount of the base bid, plus the amount of alternate bids, if any, which total to the maximum amount for which the contract could be awarded. Said check or Bond shall be made payable to the OWNER and shall be given as a guarantee that the Bidder, if offered the WORK, will enter into an Agreement with the OWNER, and will furnish the necessary insurance certificates, Payment Bond, and Performance Bond; each of said Bonds, if required, and insurance amounts shall be as stated in the Supplementary General Conditions. In case of refusal or failure to enter into said Agreement, the check or Bid Bond, as the case may be, shall be forfeited to the OWNER. If the Bidder elects to furnish a Bid Bond as its Bid security, the Bidder shall use the Bid Bond form bound herein, or one conforming substantially to it in form. Bid Bonds must be accompanied by a legible power of attorney.
- 13.0 RETURN OF BID SECURITY.** Within 14 Days after award of the contract, the OWNER will return the Bid securities accompanying such of the Bids as are not considered in making the award. All other Bid securities will be held until the Agreement has been executed. They will then be returned to the respective Bidders whose Bids they accompanied.
- 14.0 DISCREPANCIES IN BIDS.** In the event there is more than one pay item in a Bid Schedule, the Bidder shall furnish a price for all pay items in the schedule, and failure to do so may render the Bid non-responsive and cause its rejection. In the event there are unit price pay items in a Bid Schedule and the "amount" indicated for a unit price pay item does not equal the product of the unit price and quantity, the unit price shall govern and the amount will be corrected accordingly, and the Bidder shall be bound by said correction. In the event there is more than one pay item in the Bid Schedule and the total indicated for the schedule does not agree with the sum of the prices bid on the individual items, the prices bid on the individual items shall govern and the total for the schedule will be corrected accordingly, and the Bidder shall be bound by said correction.
- 15.0 BID MODIFICATIONS AND UNAUTHORIZED ALTERNATIVE BIDS.**
- A. Any Bidder may modify a Bid by mail, telegram, or fax (**Fax: 907-874-3952**) at any time prior to the scheduled closing time for receipt of Bids, provided that such modification is received by the City and Borough of Wrangell City Manager prior to the time set for opening of Bids. Bidders are strongly advised to telephone the City Manager (**Telephone: 907-874-2381**), prior to the time set for opening Bids, to confirm the successful and timely transmission of their fax Bid modification.
- A telegram or fax modification should not reveal the Bid price but should provide the addition or subtraction or other modification so that the final prices will not be known by the City and Borough of Wrangell until the sealed Bid is opened. Submitted Modification forms shall include the modification to the unit price or lump sum amount of each pay item modified. The Bid modifications shall be provided on the Bid Modification Form located at the end of this Section. Submittal of any other form by the vendor may deem the modification unacceptable by the OWNER. The City and Borough of Wrangell shall not be responsible for its failure to receive fax modifications whether such failure is caused by transmission line problems, fax device problems, operator error or otherwise.



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- B. Unauthorized conditions, limitations, or provisos attached to the Bid will render it informal and cause its rejection as being non-responsive. The completed bid forms shall be without interlineation, alterations, or erasures in the printed text. All changes shall be initiated by the person signing the Bid. Alternative bids will not be considered unless called for.

**16.0 WITHDRAWAL OF BID.** The Bid may be withdrawn by the Bidder by means of a written request, signed by the Bidder or its properly authorized representative. Such written request must be delivered to the place stipulated in the Notice Inviting Bids for receipt of Bids prior to the scheduled closing time for receipt of Bids.

**17.0 AWARD OF CONTRACT.**

- A. Award of a contract, if it is awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Technical Specifications and will be made to the lowest responsive, responsible Bidder whose Bid complies with all the requirements prescribed. Unless otherwise specified, any such award will be made within the period stated in the Notice Inviting Bids that the Bids are to remain open. Unless otherwise indicated, a single award will be made for all the bid items in an individual Bid Schedule.
- B. In the event the WORK is contained in more than one Bid Schedule, the OWNER may award schedules individually or in combination. In the case of two Bid Schedules which are alternative to each other, only one of such alternative schedules will be awarded.
- C. If the OWNER has elected to advertise this Project with a Base Bid and Additive or Deductive Alternates, the OWNER may elect to award the contract for the Base Bid, or the Base Bid plus one or more Alternates selected by the OWNER. In either case, award shall be made to the responsive, responsible Bidder offering the lowest total Bid for the WORK to be awarded.

**18.0 EXECUTION OF AGREEMENT.**

- A. After the City and Borough of Wrangell Assembly has approved the award, the OWNER will issue a Notice of Intent to Award to the approved Bidder. The Bidder to whom award is made shall execute a written agreement with the OWNER on the AGREEMENT form, Section 00500, and shall secure all insurance and furnish all certificates and bonds required by the Contract Documents within five (5) calendar days from the date stated in the Notice of Intent to Award letter. Failure or refusal to enter into an agreement as herein provided or to conform to any of the stipulated requirements in connection therewith shall be just cause for annulment of the award and forfeiture of the bid security. If the lowest responsive, responsible Bidder refuses or fails to execute the AGREEMENT, the OWNER may award the Contract to the second lowest responsive, responsible Bidder. If the second lowest responsive, responsible Bidder refuses, or fails to execute the AGREEMENT, the OWNER may award the Contract to the third lowest Bidder to execute the AGREEMENT, each such Bidder's bid securities shall be likewise forfeited to the OWNER.

PROJECT NO. 2009-10

**19.0 LIQUIDATED DAMAGES.** Provisions for liquidated damages if any, are set forth in Section 00500 - Agreement.

**20.0 FILING A PROTEST.** A party may protest the proposed award of a competitive sealed bid by the City and Borough of Wrangell.

- A. The party shall provide oral or written notice of intent to protest. The notice of intent to protest shall be delivered to the City and Borough of Wrangell by the close of the business day following posting by the City and Borough of Wrangell of a notice of the low bidder. Late notices of intent to protest shall not be considered by the City and Borough of Wrangell. The notice of intent to protest shall include the name and address of the protestor and a brief description of the grounds for the protest.
- B. After the party has filed a timely notice of intent to protest, a written protest shall be filed within five working days after posting the notice of low bidder. Late protests shall not be considered by the City and Borough of Wrangell. The written protest shall, at a minimum, contain the following:
1. the name, address and telephone number of the interested party filing the protest;
  2. the signature of the interested party, or the interested party's representative;
  3. identification of the proposed award at issue;
  4. copies of all relevant documents;
  5. filing fee.

**21.0 CITY AND BOROUGH OF WRANGELL SALES AND PERSONAL PROPERTY TAX:**

Vendors/merchants conducting business within the City and Borough of Wrangell are required by law to register with the City and Borough of Wrangell for sales and property taxes. Vendors/merchants must be in good standing with the City and Borough of Wrangell prior to award, and prior to any contract renewals, and in any event no later than *five (5) (calendar)* days following notification by the City and Borough of Wrangell of intent to award. Failure to meet these requirements, if so subject, shall be cause for rejection of your bid. To determine if your business is in good standing, or for further information, contact the City and Borough of Wrangell at (907) 874-2381.

**22.0 PERMITS.** The CONTRACTOR is responsible for all WORK associated with meeting any local, state, and/or federal permit requirements.

PROJECT NO. 2009-10

City and Borough of Wrangell  
FAX NO. 907-874-3952

### BID MODIFICATION FORM

Modification Number: \_\_\_\_\_

Note: All modifications shall be made to the original bid amount(s). If more than one Modification form is submitted by any one bidder, changes from all Modification forms submitted will be combined and applied to the original bid. Changes to the modified Bid amounts will be calculated by the OWNER.

PAY ITEM NO.	PAY ITEM DESCRIPTION	MODIFICATIONS TO UNIT PRICE OR LUMP SUM <i>(indicate +/-)</i>

**DO NOT REVEAL TOTAL BID**

\_\_\_\_\_  
Name of Bidding Firm

\_\_\_\_\_  
Responsible Party Signature  
(Must be same signature as on Bid Schedule)

\_\_\_\_\_  
Date

END OF SECTION

**BID TO: THE CITY AND BOROUGH OF WRANGELL**

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with the OWNER on the form included in the Contract Documents (as defined in Article 7 of Section 00500 - Agreement) to perform the WORK as specified or indicated in said Contract Documents entitled

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE  
Project No. 2009-10**

2. Bidder accepts all of the terms and conditions of the Contract Documents, including without limitation those in the "Notice Inviting Bids" and "Instructions to Bidders," dealing with the disposition of the Bid Security.
3. This Bid will remain open for the period stated in the "Notice Inviting Bids" unless otherwise required by law. Bidder will enter into an Agreement within the time and in the manner required in the "Notice Inviting Bids" and the "Instructions to Bidders," and will furnish insurance certificates, Payment Bond, Performance Bond, and any other documents as may be required by the Contract Documents.
4. Bidder has familiarized itself with the nature and extent of the Contract Documents, WORK, site, locality where the WORK is to be performed, the legal requirements (federal, state and local laws, ordinances, rules, and regulations), and the conditions affecting cost, progress or performance of the WORK and has made such independent investigations as Bidder deems necessary.
5. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.
6. To all the foregoing, and including all Bid Schedule and information required of Bidder contained in this Bid Form, said Bidder further agrees to complete the WORK required under the Contract Documents within the Contract Time stipulated in said Contract Documents, and to accept in full payment therefor the Contract Price based on the total bid price(s) named in the aforementioned Bid Schedule.
7. Bidder has examined copies of all the Contract Documents including the following Addenda (receipt of all of which is hereby acknowledged by the Undersigned):

Addenda No.	Date Issued

Addenda No.	Date Issued

PROJECT NO. 2009-10

Dated: _____	Bidder: _____ (Company Name)
Alaska CONTRACTOR's Business License No: _____	By: _____ (Signature in Ink)
Alaska CONTRACTOR's License No: _____	Printed Name: _____
Telephone No: _____	Title: _____
Fax No: _____	Address: _____ (Street or P.O. Box)
	(City, State, Zip)

**Give number and date of each Addenda above. Failure to acknowledge receipt of all Addenda will cause the Bid to be non-responsive and shall cause its rejection.**

8. The Bidder has read this Bid and agrees to the conditions as stated herein by signing its signature in the space provided below.
9. **TO BE CONSIDERED, ALL BIDDERS MUST COMPLETE AND INCLUDE THE FOLLOWING AT THE TIME OF THE BID OPENING:**
  - Signed Bid, Section 00300 (includes Addenda receipt statement)
  - Completed Bid Schedule, Section 00310
  - Bid Security (Bid Bond, Section 00320, or by a certified or cashier's check as stipulated in the Notice Inviting Bids, Section 00030)
10. The apparent low Bidder is required to complete and submit the following documents by 4:30 p.m. on the **fifth business day** following the date of the Posting Notice.
  - Subcontractor Report, Section 00360The apparent low Bidder who fails to submit a completed Subcontractor Report within the time specified in Section 00360 – Subcontractor Report will be found to be not a responsible Bidder and may be required to forfeit the Bid security. The OWNER will then consider the next lowest Bidder for award of the contract.
11. The successful Bidder will be required to submit, **within ten Days (calendar)** after the date of the "Notice of Intent to Award" letter, the following executed documents:
  - Agreement Forms, Section 00500
  - Performance Bond, Section 00610
  - Payment Bond, Section 00620
  - Certificates of Insurance, (CONTRACTOR and Subcontractors) Section 00700 and Section 00800
  - Verification that Subcontractors are current with City and Borough of Wrangell Sales and Property Taxes, Section 00360
  - One executed copy of each subcontract for WORK that exceeds one half of one percent of the intended contract award amount.

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**DIVISION 0 – BIDDING AND CONTRACT  
REQUIREMENTS, CONTRACT FORMS  
AND CONDITIONS OF THE CONTRACT  
SECTION 00300  
BID**

**PROJECT NO. 2009-10**

---

**END OF SECTION**

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**PROJECT NO. 2009-10**

**BID SCHEDULE**

**BID**

Pay Item No.	Pay Item Description	Pay Unit	Approximate Quantity	Unit Price		Amount	
				Dollars	Cents	Dollars	Cents
1505.1	Mobilization	Lump Sum	All Req'd				
1570.1	Erosion and Sediment Control	Lump Sum	All Req'd				
2201.1	Clearing and Grubbing	Lump Sum	All Req'd				
2202.1	Regrade Existing Landfill Material	CY	30,665				
2202.2	Screened Wrangell Institute Material	CY	4,800				
2202.3	4-Inch Minus Drainage/Gas Rock	CY	10,100				
2202.4	Ditch Grading	Lump Sum	All Req'd				
2204.1	Base Course, Grading D-1	CY	300				
2401.1	Sanitary Sewer Pipe, 8-Inch PVC	LF	60				
2401.2	Sanitary Sewer Pipe, 4-Inch HDPE Force Main	LF	683				
2402.1	Sanitary Sewer Manhole, Type I	Each	2				
2501.1	18-Inch Pipe Culvert	LF	96				
2607.1	Pipe Insulation	Boards	100				
2702.1	Construction Surveying	Lump Sum	All Req'd				
2709.1	Topsoil/Erosion Vegetative Layer	CY	6,835				
2710.1	Seeding, Hydraulic Method	SU	30				
2717.1	Storm Pipe and Structure Removal	Lump Sum	All Req'd				
2718.1	Sign Assembly	Each	1				
2730.1	Geosynthetic Clay Liner	SF	270,000				
2740.1	Leachate Collection System	Lump Sum	All Req'd				
2750.1	Leachate Pump System	Lump Sum	All Req'd				
2760.1	Reconstruct Landfill Perimeter Road	Lump Sum	All Req'd				
2770.1	Landfill Gas Vent System	Lump Sum	All Req'd				
16000.1	Electrical	Lump Sum	All Req'd				

TOTAL BID AMOUNT:

\$ \_\_\_\_\_

COMPANY NAME:

\_\_\_\_\_

PROJECT NO. 2009-10

KNOW ALL PERSONS BY THESE PRESENTS, that \_\_\_\_\_  
\_\_\_\_\_ as Principal, and \_\_\_\_\_  
as Surety, are held and firmly bound unto City and Borough of Wrangell hereinafter called  
"OWNER," in the sum of \_\_\_\_\_  
\_\_\_\_\_ dollars, (not less than five percent of the total amount of the Bid) for the  
payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators,  
successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal has submitted a Bid to said OWNER to perform the WORK required under  
the Bid Schedule of the OWNER's Contract Documents entitled

**City and Borough of Wrangell  
Landfill Closure  
Project No. 2009-10**

NOW THEREFORE, if said Principal is awarded a contract by said OWNER and, within the time and  
in the manner required in the "Notice Inviting Bids" and the "Instructions to Bidders" enters into a written  
Agreement on the form of Agreement bound with said Contract Documents, furnishes the required certificates  
of insurance, and furnishes the required Performance Bond and Payment Bond, then this obligation shall be  
null and void, otherwise it shall remain in full force and effect. In the event suit is brought upon this bond by  
said OWNER and OWNER prevails, said Surety shall pay all costs incurred by said OWNER in such suit,  
including a reasonable attorney's fee to be fixed by the court.

SIGNED AND SEALED, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_

(SEAL) \_\_\_\_\_  
(Principal)

(SEAL) \_\_\_\_\_  
(Surety)

By: \_\_\_\_\_  
(Signature)

By: \_\_\_\_\_  
(Signature)

**END OF SECTION**



PROJECT NO. 2009-10

**LIST OF SUBCONTRACTORS (AS 36.30.115)**

The apparent low Bidder must submit a list of Subcontractors that the Bidder proposes to use in the performance of this contract *on the fifth business day* following the Posting Notice of Bids, and all Subcontractor Sales Tax Forms by close of business on the *tenth Day (calendar)* following the Notice of Intent to Award. If the fifth day or tenth Day falls on a weekend or holiday, the report is due by close of business on the next business Day following the weekend or holiday. The Subcontractor Report list must include each Subcontractor's name, address, location, evidence of valid Alaska Business License, and valid Alaska Contractor's Registration under AS 08.18. *If no Subcontractors are to be utilized in the performance of the WORK, write in ink or type "NONE" on line (1) below.*

<u>SUBCONTRACTOR</u>	<sup>1</sup> AK Contractor <u>License No.</u>	<sup>1</sup> <u>Contact Name</u>	<u>Type of</u>	<u>Contract</u>	
<u>ADDRESS</u>	<sup>2</sup> AK Business <u>License No.</u>	<sup>2</sup> <u>Phone No.</u>	<u>Work</u>	<u>Amount</u>	X if DBE
1. _____ _____	1 _____ 2 _____	_____	_____	\$ _____	<input type="checkbox"/>
2. _____ _____	1 _____ 2 _____	_____	_____	\$ _____	<input type="checkbox"/>
3. _____ _____	1 _____ 2 _____	_____	_____	\$ _____	<input type="checkbox"/>
4. _____ _____	1 _____ 2 _____	_____	_____	\$ _____	<input type="checkbox"/>

I certify that the above listed Alaska Business License(s) and CONTRACTOR Registration(s), if applicable, were valid at the time Bids were opened for this Project.

\_\_\_\_\_  
 CONTRACTOR, Authorized Signature

\_\_\_\_\_  
 CONTRACTOR, Printed Name

PROJECT NO. 2009-10

- 
- A. A Bidder may replace a listed Subcontractor if the Subcontractor:
1. fails to comply with AS 08.18;
  2. files for bankruptcy or becomes insolvent;
  3. fails to execute a contract with the Bidder involving performance of the WORK for which the Subcontractor was listed and the Bidder acted in good faith;
  4. fails to obtain bonding;
  5. fails to obtain insurance acceptable to the OWNER;
  6. fails to perform the contract with the Bidder involving work for which the Subcontractor was listed;
  7. must be substituted in order for the CONTRACTOR to satisfy required state and federal affirmative action requirements;
  8. refuses to agree or abide with the Bidder's labor agreement; or
  9. is determined by the OWNER not to be responsible.
- B. If a Bidder fails to list a Subcontractor or lists more than one Subcontractor for the same portion of WORK, the Bidder shall be considered to have agreed to perform that portion of WORK without the use of a Subcontractor and to have represented the Bidder to be qualified to perform that WORK.
- C. A Bidder who attempts to circumvent the requirements of this section by listing as a Subcontractor another contractor who, in turn, sublets the majority of the WORK required under the contract violates this section.
- D. If a contract is awarded to a Bidder who violates this section, the OWNER may:
1. cancel the contract; or
  2. after notice and a hearing, assess a penalty on the Bidder in an amount that does not exceed 10 percent of the value of the subcontract at issue.
- E. For contract award, the apparent low Bidder must submit one copy of each subcontract, to the City Engineer, for WORK with a value of greater than one half of one percent of the intended award amount.
- F. An apparent low Bidder who fails to submit a completed Subcontractor Report within the time specified in this section will be found to be not a responsible Bidder and may be required to forfeit the Bid security. The OWNER will then consider the next lowest Bidder for award of the contract.

PROJECT NO. 2009-10

**Subcontractor Tax Status Form**

**Date of Request:** \_\_\_\_\_

**To:**  
City and Borough of Wrangell  
Telephone 874-2381; Fax 874-3952

**From:**  
**Name of Contractor Requesting Information:** \_\_\_\_\_

**Telephone Number:** \_\_\_\_\_

**Fax Number:** \_\_\_\_\_

**Name of Company to be Verified:** \_\_\_\_\_

**City & State:** \_\_\_\_\_

<b>APPROVALS:</b>	<b>CURRENT? (Yes or No)</b>	<b>Initial</b>
<b>Sales Tax</b> _____		
<b>Real Property</b> _____		
<b>BPP Tax</b> _____		
<b>COLLECTIONS: Please fax your response to:</b>		
<b>1. Requesting Contractor</b>		

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**DIVISION 0 – BIDDING AND CONTRACT  
REQUIREMENTS, CONTRACT FORMS  
AND CONDITIONS OF THE CONTRACT  
SECTION 00360  
SUBCONTRACTOR REPORT**

**PROJECT NO. 2009-10**

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**END OF SECTION**

PROJECT NO. 2009-10

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THIS AGREEMENT is between THE CITY AND BOROUGH OF WRANGELL (hereinafter called OWNER) and \_\_\_\_\_ (hereinafter called CONTRACTOR) OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

**ARTICLE 1. WORK.**

CONTRACTOR shall complete the WORK as specified or as indicated under the Bid Schedule of the OWNER's Bid Documents entitled **Project No. 2009-10, City and Borough of Wrangell Landfill Closure.**

The Base Bid WORK covered in the Contract documents generally includes clearing and grubbing, erosion and sediment control, excavation, base course grading D-1, 18-inch CPP storm drain pipe, regarding and compacting existing landfill materials, 4-inch minus drainage/gas rock, ditch grading, 8-inch PVC sewer, 4-inch force main sewer pipe, sanitary sewer pipe, topsoil/erosion vegetation layer, seeding, geosynthetic clay liner, leachate collection system, leachate pump system, reconstruct landfill perimeter road, landfill gas vent system, electrical work, construction surveying and miscellaneous related work for construction of the Landfill Closure, Wrangell, Alaska.

The WORK also may include Additive Alternate work as awarded by the City and Borough of Wrangell.

The WORK to be paid under this Contract shall include Section 00310 - Bid Schedule.

**ARTICLE 2. CONTRACT COMPLETION TIME.**

The Base Bid WORK completion schedule will be one hundred twenty (120) calendar days from the date of notice to proceed to the CONTRACTOR.

If any Additive Alternate WORK is awarded, the CONTRACTOR shall have sixty (60) additional calendar days from the Base Bid completion deadline to complete the WORK.

**ARTICLE 3. DATE OF AGREEMENT**

The date of this Agreement will be the date of the last signature on page three of this section.

**ARTICLE 4. LIQUIDATED DAMAGES.**

OWNER and the CONTRACTOR recognize that time is of the essence of this Agreement and that the OWNER will suffer financial loss if the WORK is not completed within the time specified in Article 2 herein, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense, and difficulties involved in proving in a legal proceeding the actual damages suffered by the OWNER if the WORK is not completed on time. Accordingly, instead of requiring any such proof, the OWNER and the CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) the CONTRACTOR shall pay the OWNER \$900 for each Day that expires after the completion time specified in Article 2 herein. The amount of liquidated damages specified below is agreed to be a reasonable estimate based on all facts known as of the date of this Agreement.

**ARTICLE 5. CONTRACT PRICE.**

OWNER shall pay CONTRACTOR for completion of the WORK in accordance with the Contract Documents in the amount set forth in the Bid Schedule. The CONTRACTOR agrees to accept as full and complete

PROJECT NO. 2009-10

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payment for all WORK to be done in this contract for: **Project No. 2009-10, City and Borough of Wrangell Landfill Closure**, those Unit Price amounts as set forth in the Bid Schedule in the Contract Documents for this Project.

The total amount of this contract shall be \_\_\_\_\_ (\$ \_\_\_\_\_),  
except as adjusted in accordance with the provisions of the Bid Documents.

#### ARTICLE 6. PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by the ENGINEER as provided in the General Conditions.

Progress payments will be paid in full in accordance with Article 14 of the General Conditions until ninety (90) percent of the Contract Price has been paid. The remaining ten (10) percent of the Contract Price may be retained, in accordance with applicable Alaska State Statutes, until final inspection, completion, and acceptance of the Project by the OWNER.

#### ARTICLE 7. CONTRACT DOCUMENTS.

The Contract Documents which comprise the entire Agreement between OWNER and CONTRACTOR concerning the WORK consist of this Agreement (pages 00500-1 to 00500-6, inclusive) and the following sections of the Contract Documents:

- Table of Contents (pages 00005-1 to 00005-2, inclusive)
- Notice Inviting Bids (pages 00030-1 to 00030-2, inclusive).
- Instructions to Bidders (pages 00100-1 to 00100-9, inclusive).
- Bid (pages 00300-1 to 00300-2, inclusive).
- Bid Schedule (pages 00310-1 to 00310-2, inclusive).
- Bid Bond (page 00320-1, inclusive) or Bid Security.
- Subcontractor Report (pages 00360-1 to 00360-4, inclusive).
- Performance Bond (pages 00610-1 to 00610-3, inclusive).
- Payment Bond (pages 00620-1 to 00620-2, inclusive).
- Insurance Certificate(s).
- General Conditions (pages 00700-1 to 00700-50, inclusive).
- Supplementary General Conditions (pages 00800-1 to 00800-4, inclusive).
- Alaska Labor Standards, Reporting, and Prevailing Wage Determination (page 00830-1).
- Permits, (page 00852-1).
- Drawings consisting of 26 sheets, as listed in the Table of Contents.
- Addenda numbers \_\_\_\_ to \_\_\_\_, inclusive.
- Change Orders which may be delivered or issued after the Date of the Agreement and which are not attached hereto.

There are no Contract Documents other than those listed in this Article 7. The Contract Documents may only be amended by Change Order as provided in Paragraph 3.3 of the General Conditions.

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**ARTICLE 8. MISCELLANEOUS.**

Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.

No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents. This Agreement shall be governed by the laws of the State of Alaska. Jurisdiction shall be in the State of Alaska, First Judicial District.

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**DIVISION 0 – BIDDING AND CONTRACT  
REQUIREMENTS, CONTRACT FORMS  
AND CONDITIONS OF THE CONTRACT  
SECTION 00500  
AGREEMENT**

**PROJECT NO. 2009-10**

IN WITNESS WHEREOF, OWNER and CONTRACTOR have caused this Agreement to be executed on the date listed below by OWNER.

**OWNER:**

**CONTRACTOR:**

\_\_\_\_\_  
City and Borough of Wrangell

\_\_\_\_\_  
(Company Name)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Signature)

By: \_\_\_\_\_  
(Printed Name)

By: \_\_\_\_\_  
(Printed Name, Authority or Title)

Date: \_\_\_\_\_

CONTRACTOR Signature Date: \_\_\_\_\_

OWNER's address for giving notices:

CONTRACTOR's address for giving notices:

\_\_\_\_\_  
P.O. BOX 531

\_\_\_\_\_

\_\_\_\_\_  
Wrangell, Alaska 99929

\_\_\_\_\_

\_\_\_\_\_  
907- 874-2381      874-3952  
(Telephone)      (Fax)

\_\_\_\_\_  
(Telephone)      (Fax)

\_\_\_\_\_  
(E-mail address)

Contractor License No. \_\_\_\_\_



PROJECT NO. 2009-10

**CERTIFICATE  
(if Corporation)**

STATE OF                    )  
                                  ) SS:  
COUNTY OF                )

I HEREBY CERTIFY that a meeting of the Board of Directors of the  
\_\_\_\_\_ a corporation existing under the laws of  
the State of \_\_\_\_\_, held on \_\_\_\_\_, 20\_\_\_\_, the following resolution  
was duly passed and adopted:

“RESOLVED, that \_\_\_\_\_, as \_\_\_\_\_ President of  
the Corporation, be and is hereby authorized to **execute the Agreement** with the CITY AND  
BOROUGH OF WRANGELL and this corporation and that the execution thereof, attested by the  
Secretary of the Corporation, and with the Corporate Seal affixed, shall be the official act and deed of  
this Corporation.”

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the  
corporation this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Secretary

(SEAL)

PROJECT NO. 2009-10

**CERTIFICATE  
(if Partnership)**

STATE OF                    )  
                                  ) SS:  
COUNTY OF                )

I HEREBY CERTIFY that a meeting of the Partners of the  
\_\_\_\_\_ a partnership existing under the laws of the State  
of \_\_\_\_\_, held on \_\_\_\_\_, 20\_\_\_\_, the following resolution was duly  
passed and adopted:

"RESOLVED, that \_\_\_\_\_, as \_\_\_\_\_ of the Partnership, be and is  
hereby authorized to **execute the Agreement** with the CITY AND BOROUGH OF WRANGELL  
and this partnership and that the execution thereof, attested by the \_\_\_\_\_ shall  
be the official act and deed of this Partnership."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this \_\_\_\_\_, day of \_\_\_\_\_,  
20\_\_\_\_\_.

\_\_\_\_\_  
Secretary

(SEAL)

PROJECT NO. 2009-10

**CERTIFICATE  
(if Joint Venture)**

STATE OF            )  
                          ) SS:  
COUNTY OF    )

I HEREBY CERTIFY that a meeting of the Principals of the  
\_\_\_\_\_ a joint venture existing under the laws of the

State of \_\_\_\_\_, held on \_\_\_\_\_, 20\_\_\_\_, the following resolution was duly passed and  
adopted:

"RESOLVED, that \_\_\_\_\_, as \_\_\_\_\_ of the Joint  
Venture, be and is hereby authorized to **execute the Agreement** with the CITY AND BOROUGH OF  
WRANGELL and this joint venture and that the execution thereof, attested by the  
\_\_\_\_\_ shall be the official act and deed of this Joint Venture."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this \_\_\_\_\_, day of  
\_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Secretary

(SEAL)

**END OF SECTION**

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**DIVISION 0 – BIDDING AND CONTRACT  
REQUIREMENTS, CONTRACT FORMS  
AND CONDITIONS OF THE CONTRACT  
SECTION 00610  
PERFORMANCE BOND**

**PROJECT NO. 2009-10**

KNOW ALL PERSONS BY THESE PRESENTS: That we \_\_\_\_\_  
(Name of Contractor)  
\_\_\_\_\_ a \_\_\_\_\_  
(Corporation, Partnership, Individual)  
hereinafter called "Principal" and \_\_\_\_\_  
(Surety)  
of \_\_\_\_\_, State of \_\_\_\_\_ hereinafter called the "Surety," are held and  
firmly bound to the CITY AND BOROUGH OF WRANGELL, ALASKA hereinafter called "OWNER,"  
(Owner) (City and State)  
for the penal sum of \_\_\_\_\_  
\_\_\_\_\_ dollars (\$) \_\_\_\_\_) in lawful money of the  
United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors,  
administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the CONTRACTOR has entered into a certain contract with the OWNER, the effective date of which is (CITY AND BOROUGH OF WRANGELL Contract's Office to fill in effective date) \_\_\_\_\_, a copy of which is hereto attached and made a part hereof for the construction of:

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE  
PROJECT NO. 2009-10**

NOW, THEREFORE, if the Principal shall truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof, which may be granted by the OWNER, with or without notice to the Surety, and if it shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the OWNER and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**DIVISION 0 – BIDDING AND CONTRACT  
REQUIREMENTS, CONTRACT FORMS  
AND CONDITIONS OF THE CONTRACT  
SECTION 00610  
PERFORMANCE BOND**

**PROJECT NO. 2009-10**

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**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE  
PROJECT NO. 2009-10**

IN WITNESS WHEREOF, this instrument is issued in two (2) identical counterparts, each one of which shall be deemed an original.

**CONTRACTOR:**

By: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Company Name)

\_\_\_\_\_  
(Street or P.O. Box)

\_\_\_\_\_  
(City, State, Zip Code)

**SURETY:**

By: \_\_\_\_\_  
(Signature of Attorney-in-Fact)

Date Issued: \_\_\_\_\_

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Company Name)

\_\_\_\_\_  
(Street or P.O. Box)

\_\_\_\_\_  
(City, State, Zip Code)

**(Affix SURETY'S SEAL)**

**NOTE: If CONTRACTOR is Partnership, all Partners must execute bond.**

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**DIVISION 0 – BIDDING AND CONTRACT  
REQUIREMENTS, CONTRACT FORMS  
AND CONDITIONS OF THE CONTRACT  
SECTION 00610  
PERFORMANCE BOND**

**PROJECT NO. 2009-10**

---

**END OF SECTION**

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**DIVISION 0 – BIDDING AND CONTRACT  
REQUIREMENTS, CONTRACT FORMS  
AND CONDITIONS OF THE CONTRACT  
SECTION 00620  
PAYMENT BOND**

**PROJECT NO. 2009-10**

KNOW ALL PERSONS BY THESE PRESENTS: That we \_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_ a \_\_\_\_\_  
(Corporation, Partnership, Individual)

hereinafter called "Principal" and \_\_\_\_\_  
(Surety)

of \_\_\_\_\_, State of \_\_\_\_\_ hereinafter called the "Surety," are held and

firmly bound to the City and Borough of Wrangell, Alaska hereinafter called "OWNER,"  
(Owner) (City and State)

for the penal sum of \_\_\_\_\_

\_\_\_\_\_ dollars (\$ \_\_\_\_\_) in lawful money of the  
United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors,  
administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the CONTRACTOR has entered  
into a certain contract with the OWNER, the effective date of which is (CBW Contracts Office to fill in  
effective date) \_\_\_\_\_, a copy of which is hereto attached and made a part hereof for the  
construction of:

**City and Borough of Wrangell  
Landfill Closure  
Project No. 2009-10**

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms,  
Subcontractors, and corporations furnishing materials for, or performing labor in the prosecution of the WORK  
provided for in such contract, and any authorized extension or modification thereof, including all amounts due  
for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or  
used in connection with the construction of such WORK, and all insurance premiums on said work, and for all  
labor performed in such WORK, whether by Subcontractor or otherwise, then this obligation shall be void;  
otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no  
change, extension of time, alteration or addition to the terms of the contract or to the work to be performed  
thereunder or the specifications accompanying the same shall in any wise affect its obligation on this bond, and  
it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the  
contract or to the WORK or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the OWNER and the Principal shall abridge  
the right of any beneficiary hereunder, whose claim may be unsatisfied.

PROJECT NO. 2009-10

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City and Borough of Wrangell  
Landfill Closure  
Project No. 2009-10

IN WITNESS WHEREOF, this instrument is issued in two (2) identical counterparts, each one of which shall be deemed an original.

**CONTRACTOR:**

By: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Company Name)

\_\_\_\_\_  
(Street or P.O. Box)

\_\_\_\_\_  
(City, State, Zip Code)

**SURETY:**

By: \_\_\_\_\_  
(Signature of Attorney-in-Fact)

Date Issued: \_\_\_\_\_

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Company Name)

\_\_\_\_\_  
(Street or P.O. Box)

\_\_\_\_\_  
(City, State, Zip Code)

**(Affix SURETY'S SEAL)**

**NOTE: If CONTRACTOR is Partnership, all Partners must execute bond.**



**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**DIVISION 0 – BIDDING AND CONTRACT  
REQUIREMENTS, CONTRACT FORMS  
AND CONDITIONS OF THE CONTRACT  
SECTION 00620  
PAYMENT BOND**

**PROJECT NO. 2009-10**

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**END OF SECTION**

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**ARTICLE 1 DEFINITIONS**

Wherever used in these General Conditions or in the Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof. Where an entire word is capitalized in the definitions and is found not capitalized in the Contract Documents it has the ordinary dictionary definition.

**Addenda** - Written or graphic instruments issued prior to the opening of Bids which make additions, deletions, or revisions to the Contract Documents.

**Agreement** - The written contract between the OWNER and the CONTRACTOR covering the WORK to be performed; other documents are attached to the Agreement and made a part thereof as provided therein.

**Application for Payment** - The form furnished by the ENGINEER which is to be used by the CONTRACTOR to request progress or final payment and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

**Asbestos** - Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

**Bid** - The offer or proposal of the Bidder submitted on the prescribed form setting forth the price or prices for the WORK.

**Bonds** - Bid, Performance, and Payment Bonds and other instruments which protect against loss due to inability or refusal of the CONTRACTOR to perform its contract.

**CBW Project Manager** - The authorized representative of the City and Borough of Wrangell as OWNER, who is responsible for administration of the contract.

**Change Order** - A document recommended by the ENGINEER, which is signed by the CONTRACTOR and the OWNER and authorizes an addition, deletion, or revision in the WORK, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.

**Contract Documents** - The Table of Contents, Notice Inviting Bids, Instructions to Bidders, Bid Forms (including the Bid, Bid Schedule(s), Information Required of Bidder, Bid Bond, and all required certificates and affidavits), Agreement, Performance Bond, Payment Bond, General Conditions, Supplementary General Conditions, Technical Specifications, Drawings, Permits, and all Addenda, and Change Orders executed pursuant to the provisions of the Contract Documents.

**Contract Price** - The total monies payable by the OWNER to the CONTRACTOR under the terms and conditions of the Contract Documents.

**Contract Time** - The number of successive calendar Days stated in the Contract Documents for the completion of the WORK.

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**CONTRACTOR** - The individual, partnership, corporation, joint-venture or other legal entity with whom the OWNER has executed the Agreement.

**Day** - A calendar day of 24 hours measured from midnight to the next midnight.

**Defective WORK** - WORK that is unsatisfactory, faulty, or deficient; or that does not conform to the Contract Documents; or that does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents; or WORK that has been damaged prior to the ENGINEER's recommendation of final payment.

**Drawings** - The Drawings, plans, maps, profiles, diagrams, and other graphic representations which indicate the character, location, nature, extent, and scope of the WORK and which have been prepared by the ENGINEER and are referred to in the Contract Documents. Shop Drawings are not within the meaning of this paragraph.

**Effective Date of the Agreement** - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

**Engineer of Record** - The individual, partnership, corporation, joint-venture or other legal entity named as such in the Contract Documents.

**ENGINEER** - The ENGINEER is the firm or person(s) selected by the City and Borough of Wrangell (CBW) to perform the duties of project inspection and management. CBW will inform the CONTRACTOR of the identity of the ENGINEER at or before the Notice to Proceed.

**Field Order** - A written order issued by the ENGINEER which may or may not involve a change in the WORK.

**General Requirements** - Division 1 of the Technical Specifications.

**Hazardous Waste** - The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 9603) as amended from time to time.

**Holidays** - The City and Borough of Wrangell legal holidays occur on:

1. New Year's Day - January 1
2. Martin Luther King's Birthday - Third Monday in January
3. President's Day - Third Monday in February
4. Seward's Day - Last Monday in March
5. Memorial Day - Last Monday in May
6. Independence Day - July 4
7. Labor Day - First Monday in September
8. Alaska Day - October 18

9. Veteran's Day - November 11
10. Thanksgiving Day - Fourth Thursday and the following Friday in November
11. Christmas Day – December 25

If any holiday listed above falls on a Saturday, Saturday and the preceding Friday are both legal holidays. If the holiday should fall on a Sunday, Sunday and the following Monday are both legal holidays.

**Inspector** - The authorized representative of the ENGINEER assigned to make detailed inspections for conformance to the Contract Documents. Any reference to the Resident Project Representative in this document shall mean the Inspector.

**Laws and Regulations; Laws or Regulations** - Any and all applicable laws, rules, regulations, ordinances, codes, and/or orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

**Mechanic's Lien** - A form of security, an interest in real property, which is held to secure the payment of an obligation. When referred to in these Contract Documents, "Mechanic's Lien" or "lien" means "Stop Notice".

**Milestone** - A principal event specified in the Contract Documents relating to an intermediate completion date of a portion of the WORK, or a period of time within which the portion of the WORK should be performed prior to Substantial Completion of all the WORK.

**Notice of Award** - The written notice by the OWNER to the apparent successful bidder stating that the apparent successful bidder has complied with all conditions for award of the contract.

**Notice of Completion** - A form signed by the ENGINEER and the CONTRACTOR recommending to the OWNER that the WORK is Substantially Complete and fixing the date of Substantial Completion. After acceptance of the WORK by the OWNER's governing body, the form is signed by the OWNER and filed with the County Recorder. This filing starts the 30-day lien filing period on the WORK.

**Notice to Proceed** - The written notice issued by the OWNER to the CONTRACTOR authorizing the CONTRACTOR to proceed with the WORK and establishing the date of commencement of the Contract Time.

**Notice of Intent to Award** - The written notice by the OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the requirements listed therein, within the time specified, the OWNER will enter into an Agreement.

**OWNER** - The City and Borough of Wrangell acting through its legally designated officials, officers, or employees.

**Partial Utilization** - Use by the OWNER or a substantially completed part of the WORK for the purpose for which it is intended prior to Substantial Completion of all the WORK.

**PCB's** - Polychlorinated biphenyls.



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**PERMITTEE** – See definition for **CONTRACTOR**.

**Petroleum** - Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Wastes and crude oils.

**Project** - The total construction of which the **WORK** to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

**Radioactive Material** - Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

**Shop Drawings** - All Drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the **CONTRACTOR** and submitted by the **CONTRACTOR**, to the **ENGINEER**, to illustrate some portion of **WORK**.

**Specifications** - Same definition as "Technical Specifications" hereinafter.

**Stop Notice** - A legal remedy for Subcontractors and suppliers who contribute to public works, but who are not paid for their **WORK**, which secures payment from construction funds possessed by the **OWNER**. For public property, the Stop Notice remedy is designed to substitute for mechanic's lien rights.

**Sub-Consultant** - The individual, partnership, corporation, joint-venture or other legal entity having a direct contract with **ENGINEER**, or with any of its Consultants to furnish services with respect to the Project.

**Subcontractor** - An individual, partnership, corporation, joint-venture or other legal entity having a direct contract with the **CONTRACTOR**, or with any of its Subcontractors, for the performance of a part of the **WORK** at the site.

**Substantial Completion** - Refers to when the **WORK** has progressed to the point where, in the opinion of the **ENGINEER** as evidenced by Notice of Completion as applicable, it is sufficiently complete, in accordance with the Contract Documents, so that the **WORK** can be utilized for the purposes for which it is intended; or if no such notice is issued, when final payment is due in accordance with Paragraph 14.8. The terms "substantially complete" and "substantially completed" as applied to any **WORK** refer to substantial completion thereof.

**Supplementary General Conditions (SGC)** - The part of the Contract Documents which make additions, deletions, or revisions to these General Conditions.

**Supplier** - A manufacturer, fabricator, supplier, distributor, material man, or vendor.

**Technical Specifications** - Divisions 1 through 16 of the Contract Documents consisting of the General Requirements and written technical descriptions of products and execution of the **WORK**.

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**DIVISION 0 – BIDDING AND CONTRACT  
REQUIREMENTS, CONTRACT FORMS  
AND CONDITIONS OF THE CONTRACT  
SECTION 00700  
GENERAL CONDITIONS**

**PROJECT NO. 2009-10**

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Underground Utilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: water, sewage and drainage removal, electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, traffic, or other control systems.

WORK - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. WORK is the result of performing, or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

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**ARTICLE 2 PRELIMINARY MATTERS**

- 2.1 DELIVERY OF BONDS/INSURANCE CERTIFICATES. When the CONTRACTOR delivers the signed Agreements to the OWNER, the CONTRACTOR shall also deliver to the OWNER such Bonds and Insurance Policies and Certificates as the CONTRACTOR may be required to furnish in accordance with the Contract Documents.
- 2.2 COPIES OF DOCUMENTS. The OWNER shall furnish to the CONTRACTOR the required number of copies of the Contract Documents specified in the Supplementary General Conditions.
- 2.3 COMMENCEMENT OF CONTRACT TIME; NOTICE TO PROCEED. The Contract Time will start to run on the commencement date stated in the Notice to Proceed.
- 2.4 STARTING THE WORK
- A. The CONTRACTOR shall begin to perform the WORK within 10 days after the commencement date stated in the Notice to Proceed, but no WORK shall be done at the site prior to said commencement date.
- B. Before undertaking each part of the WORK, the CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. The CONTRACTOR shall promptly report in writing to the ENGINEER any conflict, error, or discrepancy which the CONTRACTOR may discover and shall obtain a written interpretation or clarification from the ENGINEER before proceeding with any WORK affected thereby.
- C. The CONTRACTOR shall submit to the ENGINEER for review those documents called for under Section 01300 - CONTRACTOR Submittals in the General Requirements.
- 2.5 PRE-CONSTRUCTION CONFERENCE. The CONTRACTOR is required to attend a Pre-Construction Conference. This conference will be attended by the ENGINEER and others as appropriate in order to discuss the WORK in accordance with the applicable procedures specified in the General Requirements, Section 01010 - Summary of WORK in the General Requirements.

**ARTICLE 3 CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE**

- 3.1 INTENT
- A. The Contract Documents comprise the entire Agreement between the OWNER and the CONTRACTOR concerning the WORK. The Contract Documents shall be construed as a whole in accordance with Alaska Law.
- B. It is the intent of the Contract Documents to describe the WORK, functionally complete, to be constructed in accordance with the Contract Documents. Any work, materials, or equipment

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that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe work, materials, or equipment such words or phrases shall be interpreted in accordance with that meaning, unless a definition has been provided in Article 1 of the General Conditions. Reference to standard specifications, manuals, or codes of any technical society, organization, or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual, or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the OWNER, the CONTRACTOR, or the ENGINEER or any of their consultants, agents, or employees from those set forth in the Contract Documents.

- C. If, during the performance of the WORK, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the WORK or of any such standard, specification, manual or code or of any instruction of any Supplier referred to in paragraph 6.5, the CONTRACTOR shall report it to the ENGINEER in writing at once, and the CONTRACTOR shall not proceed with the WORK affected thereby (except in an emergency as authorized by the ENGINEER) until a clarification field order, or Change Order to the Contract Documents has been issued.

### 3.2 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

- A. In resolving conflicts resulting from, errors, or discrepancies in any of the Contract Documents, the order of precedence shall be as follows:
1. Permits from other agencies as may be required by law, excepting the definition of "PERMITEE" in these permits.
  2. Field Orders
  3. Change Orders
  4. ENGINEER's written interpretations and clarifications.
  5. Agreement
  6. Addenda
  7. CONTRACTOR's Bid (Bid Form)
  8. Supplementary General Conditions
  9. Notice Inviting Bids
  10. Instructions to Bidders
  11. General Conditions
  12. Technical Specifications
  13. Drawings
- B. With reference to the Drawings the order of precedence is as follows:

- 
1. Figures govern over scaled dimensions
  2. Detail Drawings govern over general Drawings
  3. Addenda/ Change Order drawings govern over Contract Drawings
  4. Contract Drawings govern over standard drawings
- 3.3 AMENDING AND SUPPLEMENTING CONTRACT DOCUMENTS. The Contract Documents may be amended to provide for additions, deletions, and revisions in the WORK or to modify the terms and conditions thereof by a Change Order (pursuant to Article 10 CHANGES IN THE WORK).
- 3.4 REUSE OF DOCUMENTS. Neither the CONTRACTOR, nor any Subcontractor or Supplier, nor any other person or organization performing any of the WORK under a contract with the OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Technical Specifications, or other documents used on the WORK, and they shall not reuse any of them on the extensions of the Project or any other project without written consent of the OWNER.

**ARTICLE 4 AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS**

- 4.1 AVAILABILITY OF LANDS. The OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the WORK is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the OWNER, unless otherwise provided in the Contract Documents. Nothing contained in the Contract Documents shall be interpreted as giving the CONTRACTOR exclusive occupancy of the lands or rights-of-way provided. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment; provided, that the CONTRACTOR shall not enter upon nor use any property not under the control of the OWNER until a written temporary construction easement, lease or other appropriate agreement has been executed by the CONTRACTOR and the property owner, and a copy of said agreement furnished to the ENGINEER prior to said use; and, neither the OWNER nor the ENGINEER shall be liable for any claims or damages resulting from the CONTRACTOR's unauthorized trespass or use of any such properties.

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4.2 PHYSICAL CONDITIONS - SUBSURFACE AND EXISTING STRUCTURES

- A. Explorations and Reports. Reference is made to SGC 4.2 Physical Conditions of the Supplementary General Conditions for identification of those reports of explorations and tests of sub-surface conditions at the site that have been utilized by the ENGINEER in the preparation of the Contract Documents. The CONTRACTOR may rely upon the accuracy of the technical data contained in such reports, however, reports are not to be considered complete or comprehensive and nontechnical data, interpretations, and opinions contained in such reports are not to be relied on by the CONTRACTOR. The CONTRACTOR is responsible for any further explorations or tests that may be necessary and any interpretation, interpolation, or extrapolation that it makes of any information shown in such reports.
- B. Existing Structures. Reference is made to SGC 4.2 Physical Conditions of the Supplementary General Conditions for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Utilities referred to in Paragraph 4.4 herein) which are at or contiguous to the site that have been utilized by the ENGINEER in the preparation of the Contract Documents. The CONTRACTOR may rely upon the accuracy of the technical data contained in such drawings, however, nontechnical data, interpretations, and opinions contained in such drawings are not to be relied on by the CONTRACTOR. The CONTRACTOR is also responsible for any interpretation, interpolation, or extrapolation that it makes of any information shown in such drawings.

4.3 DIFFERING SITE CONDITIONS

- A. The CONTRACTOR shall promptly upon discovery (but in no event later than 14 days thereafter) and before the following conditions are disturbed, notify the ENGINEER, in writing of any:
  - 1. Material that the CONTRACTOR believes may be material that is hazardous waste, as defined in Article 1 of these General Conditions, or asbestos, PCB's, petroleum or any other substance or material posing a threat to human or to the environment.
  - 2. Subsurface or latent physical conditions at the site differing from those indicated.
  - 3. Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the contract.
- B. The OWNER shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the CONTRACTOR's cost of, or the time required for, performance of any part of the WORK shall issue a Change Order under the procedures described in the contract.
- C. In the event that a dispute arises between the OWNER and the CONTRACTOR whether the conditions materially differ, or involved hazardous waste or other materials listed above, or cause a decrease or increase in the CONTRACTOR's cost of, or time required for, performance of any part of the WORK, the CONTRACTOR shall not be excused from any

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scheduled completion date provided for by the contract, but shall proceed with all WORK to be performed under the contract. The CONTRACTOR shall retain any and all rights provided either by contract or by Law which pertain to the resolution of disputes and protests between the contracting parties.

#### 4.4 PHYSICAL CONDITIONS - UNDERGROUND UTILITIES

- A. Indicated. The information and data indicated in the Contract Documents with respect to existing Underground Utilities at or contiguous to the site are based on information and data furnished to the OWNER or the ENGINEER by the owners of such Underground Utilities or by others. Unless it is expressly provided in the Supplementary General Conditions and/or Section 01530 - Protection and Restoration of Existing Facilities of the General Requirements, the OWNER and the ENGINEER shall not be responsible for the accuracy or completeness of any such information or data, and the CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Utilities indicated in the Contract Documents, for coordination of the WORK with the owners of such Underground Utilities during construction, for the safety and protection thereof and repairing any damage thereto resulting from the WORK, the cost of which will be considered as having been included in the Contract Price.
- B. Not Indicated. If an Underground Utility is uncovered or revealed at or contiguous to the site which was not indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall identify the owner of such Underground Utility and give written notice thereof to that owner and shall notify the ENGINEER in accordance with the requirements of the Supplementary General Conditions and Section 01530 - Protection and Restoration of Existing Facilities of the General Requirements.

#### 4.5 REFERENCE POINTS

- A. The ENGINEER will provide one bench mark, near or on the site of the WORK, and will provide two points near or on the site to establish a base line for use by the CONTRACTOR for alignment control. Unless otherwise specified in the General Requirements, the CONTRACTOR shall furnish all other lines, grades, and bench marks required for proper execution of the WORK.
- B. The CONTRACTOR shall preserve all bench marks, stakes, and other survey marks, and in case of their removal or destruction by its own employees or by its Subcontractor's employees, the CONTRACTOR shall be responsible for the accurate replacement of such reference points by personnel qualified under the Alaska Statute governing the licensing of Architects, Engineers, and Land Surveyors.

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**ARTICLE 5 BONDS AND INSURANCE**

**5.1 PERFORMANCE, PAYMENT, AND OTHER BONDS**

- A. The CONTRACTOR shall furnish, when required, Performance and Payment Bonds on forms provided by the City and Borough of Wrangell for the penal sums of 100% of the amount of the Bid award. The surety on each bond may be any corporation or partnership authorized to do business in the State of Alaska as an insurer under AS 21.09. These bonds shall remain in effect for 12 months after the date of final payment and until all obligations and liens under this contract have been satisfied. The CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary General Conditions. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.
- B. If the surety on any Bond furnished by the CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the WORK is located, the CONTRACTOR shall within 7 days thereafter substitute another Bond and Surety, which must be acceptable to the OWNER.
- C. All Bonds required by the Contract Documents to be purchased and maintained by CONTRACTOR shall be obtained from surety companies that are duly licensed or authorized in the State of Alaska to issue Bonds for the limits so required. Such surety companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions. The City Engineer may, on behalf of the OWNER, notify the surety of any potential default or liability.

**5.2 INSURANCE**

- A. The CONTRACTOR shall purchase and maintain the insurance required under this paragraph. Such insurance shall include the specific coverages set out herein and be written for not less than the limits of liability and coverages provided in the Supplementary General Conditions, or required by law, whichever are greater. All insurance shall be maintained continuously during the life of the Agreement up to the date of Final Completion and at all times thereafter when the CONTRACTOR may be correcting, removing, or replacing Defective WORK in accordance with Paragraph 13.6, but the CONTRACTOR's liabilities under this Agreement shall not be deemed limited in any way to the insurance coverage required.
- B. All insurance required by the Contract Documents to be purchased and maintained by the CONTRACTOR shall be obtained from insurance companies that are duly licensed or authorized in the State of Alaska to issue insurance policies for the limits and coverages so



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required. Such insurance companies shall have a current Best's Rating of at least an "A" (Excellent) general policy holder's rating and a Class VII financial size category and shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions.

- C. The CONTRACTOR shall furnish the OWNER with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be cancelled, reduced in coverage, or renewal refused until at least 30 days' prior written notice has been given to the OWNER by certified mail. All such insurance required herein (except for Workers' Compensation and Employer's Liability) shall name the OWNER, its Consultants and subconsultants and their officers, directors, agents, and employees as "additional insureds" under the policies. The CONTRACTOR shall purchase and maintain the following insurance:
1. Workers' Compensation and Employer's Liability. This insurance shall protect the CONTRACTOR against all claims under applicable state workers' compensation laws. The CONTRACTOR shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a Workers' Compensation law. This policy shall include an "all states" endorsement. The CONTRACTOR shall require each Subcontractor similarly to provide Workers' Compensation Insurance for all of the latter's employees to be engaged in such WORK unless such employees are covered by the protection afforded by the CONTRACTOR's Workers' Compensation Insurance. In case any class of employees is not protected, under the Workers' Compensation Statute, the CONTRACTOR shall provide and shall cause each Subcontractor to provide adequate employer's liability insurance for the protection of such of its employees as are not otherwise protected.
  2. Commercial General Liability. This insurance shall be written in comprehensive form and shall protect the CONTRACTOR against all claims arising from injuries to persons other than its employees or damage to property of the OWNER or others arising out of any act or omission of the CONTRACTOR or its agents, employees, or Subcontractors. The policy shall contain no exclusions for any operations within the scope of this contract.
  3. Comprehensive Automobile Liability. This insurance shall be written in comprehensive form and shall protect the CONTRACTOR against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, and shall cover operation on or off the site of all motor vehicles licensed for highway use, whether they are owned, non-owned, or hired. Coverage for hired motor vehicles should include endorsement covering liability assumed under this Agreement.
  4. Subcontractor's Commercial General Liability Insurance and Commercial Automobile Liability Insurance. The CONTRACTOR shall either require each of its Subcontractors

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to procure and to maintain Subcontractor's Commercial General Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in the Supplementary General Conditions or insure the activities of its Subcontractors in the CONTRACTOR's own policy, in like amount.

5. Builder's Risk. This insurance shall be of the "all risks" type, shall be written in completed value form, and shall protect the CONTRACTOR, the OWNER, and the ENGINEER, against risks of damage to buildings, structures, and materials and equipment. The amount of such insurance shall be not less than the insurable value of the WORK at completion. Builder's risk insurance shall provide for losses to be payable to the CONTRACTOR and the OWNER, as their interests may appear. The policy shall contain a provision that in the event of payment for any loss under the coverage provided, the insurance company shall have no rights of recovery against the CONTRACTOR, the OWNER, and the ENGINEER. The Builder's Risk policy shall insure against all risks of direct physical loss or damage to property from any external cause including flood and earthquake. Allowable exclusions, if any, shall be as specified in the Supplementary General Conditions.

## ARTICLE 6 CONTRACTOR'S RESPONSIBILITIES

### 6.1 SUPERVISION AND SUPERINTENDENCE

- A. The CONTRACTOR shall supervise, inspect, and direct the WORK competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the WORK in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incidental thereto. The CONTRACTOR shall be responsible to see that the completed WORK complies accurately with the Contract Documents.
- B. The CONTRACTOR shall designate in writing and keep on the WORK site at all times during its progress a technically qualified, English-speaking superintendent, who is an employee of the CONTRACTOR and who shall not be replaced without written notice to the OWNER and the ENGINEER. The superintendent will be the CONTRACTOR's representative at the site and shall have authority to act on behalf of the CONTRACTOR. All communications given to the superintendent shall be as binding as if given to the CONTRACTOR. The CONTRACTOR shall issue all its communications to the OWNER through the ENGINEER and the ENGINEER only.
- C. The CONTRACTOR's superintendent shall be present at the site of the WORK at all times while WORK is in progress. Failure to observe this requirement shall be considered suspension of the WORK by the CONTRACTOR until such time as such superintendent is again present at the site.

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6.2 LABOR, MATERIALS, AND EQUIPMENT

- A. The CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the WORK and perform construction as required by the Contract Documents. The CONTRACTOR shall furnish, erect, maintain, and remove the construction plant and any temporary works as may be required. The CONTRACTOR shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the WORK or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all WORK at the site shall be performed during regular working hours, and the CONTRACTOR will not permit overtime work or the performance of work on Saturday, Sunday, or any legal holiday without the OWNER's written consent. The CONTRACTOR shall apply for this consent through the ENGINEER.
- B. Except as otherwise provided in this Paragraph, the CONTRACTOR shall receive no additional compensation for overtime work, i.e., work in excess of 8 hours in any one calendar day or 40 hours in any one calendar week, even though such overtime work may be required under emergency conditions and may be ordered by the ENGINEER in writing. Additional compensation will be paid the CONTRACTOR for overtime work only in the event extra work is ordered by the ENGINEER and the Change Order specifically authorizes the use of overtime work and then only to such extent as overtime wages are regularly being paid by the CONTRACTOR for overtime work of a similar nature in the same locality.
- C. All costs of inspection and testing performed during overtime work by the CONTRACTOR which is allowed solely for the convenience of the CONTRACTOR shall be borne by the CONTRACTOR. The OWNER shall have the authority to deduct the cost of all such inspection and testing from any partial payments otherwise due to the CONTRACTOR.
- D. Unless otherwise specified in the Contract Documents, the CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up, and completion of the WORK.
- E. All materials and equipment to be incorporated into the WORK shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of the OWNER. If required by the ENGINEER, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provisions of any such instructions will be effective to assign to the ENGINEER, or any of the ENGINEER consultants, agents, or employees, any duty or authority to supervise or direct the furnishing or performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraphs 9.9C and 9.9D.

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- F. The CONTRACTOR shall at all times employ sufficient labor and equipment for prosecuting the several classes of WORK to full completion in the manner and time set forth in and required by these specifications. All workers shall have sufficient skill and experience to perform properly the WORK assigned to them. Workers engaged in special WORK, or skilled WORK, shall have sufficient experience in such WORK and in the operation of the equipment required to perform all WORK, properly and satisfactorily.
- G. Any person employed by the CONTRACTOR or by any Subcontractor who, in the opinion of the ENGINEER, does not perform the WORK in a proper and skillful manner, or is intemperate or disorderly shall, at the written request of the ENGINEER, be removed forthwith by the CONTRACTOR or Subcontractor employing such person, and shall not be employed again in any portion of the WORK without the approval of the ENGINEER. Should the CONTRACTOR fail to remove such person or persons as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the WORK, the ENGINEER may suspend the WORK by written notice until such orders are complied with.
- 6.3 ADJUSTING PROGRESS SCHEDULE. The CONTRACTOR shall submit monthly updates of the progress schedule to the ENGINEER for acceptance in accordance with the provisions in Section 01300 - CONTRACTOR Submittals in the General Requirements.
- 6.4 SUBSTITUTES OR "OR-EQUAL" ITEMS. The CONTRACTOR shall submit proposed substitutes or "or-equal" items in accordance with the provisions in Section 01300 - CONTRACTOR Submittals in the General Requirements.
- 6.5 CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS.
- A. The CONTRACTOR shall be responsible to the OWNER and the ENGINEER for the acts and omissions of its Subcontractors and their employees to the same extent as CONTRACTOR is responsible for the acts and omissions of its own employees. Nothing contained in this Paragraph shall create any contractual relationship between any Subcontractor and the OWNER or the ENGINEER nor relieve the CONTRACTOR of any liability or obligation under the prime contract.
- B. The CONTRACTOR shall perform not less than 40% of the WORK with its own forces (i.e., without subcontracting). The 40% requirement shall be understood to mean that the CONTRACTOR shall perform, with its own organization, WORK amounting to at least 40% of the awarded contract amount. The 40% requirement will be calculated based upon the total of the subcontract amounts submitted for contract award, and any other information requested by the OWNER from the apparent low bidder.

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6.6 PERMITS

- A. Unless otherwise provided in the Supplementary General Conditions, the CONTRACTOR shall obtain and pay for all construction permits and licenses from the agencies having jurisdiction, including the furnishing of insurance and bonds if required by such agencies. The enforcement of such requirements under this contract shall not be made the basis for claims for additional compensation. The OWNER shall assist the CONTRACTOR, when necessary, in obtaining such permits and licenses. The CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the WORK, which are applicable at the time of opening of Bids. The CONTRACTOR shall pay all charges of utility owners for connections to the WORK.
- B. These Contract Documents may require that the WORK be performed within the conditions and/or requirements of local, state and/or federal permits. These permits may be bound within the Contract Documents, included within the Contract Documents by reference, or included as part of the WORK, as designated in this Section. The CONTRACTOR is responsible for completing the WORK required for compliance with all permit requirements; this WORK is incidental to other items in the Contract Documents. Any reference to the PERMITTEE in the permits shall mean the CONTRACTOR. If any permits were acquired by the OWNER, this action was done to expedite the start of construction. If the CONTRACTOR does not complete the WORK within the specified permit window, the CONTRACTOR shall be responsible for the permit extension, and for completing any additional requirements placed upon the permit.

6.7 PATENT FEES AND ROYALTIES. The CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the WORK or the incorporation in the WORK of any invention, design, process, product, software or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the WORK and if to the actual knowledge of the OWNER or the ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by the OWNER in the Contract Documents. The CONTRACTOR shall indemnify, defend and hold harmless the OWNER and the ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses, and expenses (including attorneys' fees and court costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the WORK or resulting from the incorporation in the WORK of any invention, design, process, product, or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

6.8 LAWS AND REGULATIONS. The CONTRACTOR shall observe and comply with all federal, state, and local laws, ordinances, codes, orders, and regulations which in any manner affect those engaged or employed on the WORK, the materials used in the WORK, or the conduct of the WORK. If any discrepancy or inconsistency should be discovered in this contract in relation to any such law, ordinance, code, order, or regulation, the CONTRACTOR shall report the same in writing to the ENGINEER. The CONTRACTOR shall indemnify, defend, and hold harmless the OWNER, the

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ENGINEER, and their officers, agents, and employees against all claims or liability arising from violation of any such law, ordinance, code, order, or regulation, whether by CONTRACTOR or by its employees, Subcontractors, or third parties. Any particular law or regulation specified or referred to elsewhere in the Contract Documents shall not in any way limit the obligation of the CONTRACTOR to comply with all other provisions of federal, state, and local laws and regulations.

The OWNER may, per AS 36.30, audit the CONTRACTOR's or Subcontractor(s) records that are related to the cost or pricing data for this contract, all related Change Orders, and/or contract modifications.

6.9 TAXES. The CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by the CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the WORK.

6.10 USE OF PREMISES. The CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to (1) the Project site, (2) the land and areas identified in and permitted by the Contract Documents, and (3) the other land and areas permitted by Laws and Regulations, rights-of-way, permits, leases and easements. The CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the WORK. Should any claim be made against the OWNER or the ENGINEER by any such owner or occupant because of the performance of the WORK, the CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim through litigation. The CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify, defend, and hold the OWNER and the ENGINEER harmless from and against all claims, damages, losses, and expenses (including, but not limited to, fees of engineers attorneys, and other professionals and court costs) arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any such owner or occupant against the OWNER, the ENGINEER, their Consultants, Sub-consultants, and the officers, directors, employees and agents of each and any of them to the extent caused by or based upon the CONTRACTOR's performance of the WORK.

6.11 SAFETY AND PROTECTION

A. The CONTRACTOR shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all employees on the WORK and other persons and organizations who may be affected thereby;
2. all the WORK and materials and equipment to be incorporated therein, whether in storage on or off the site; and
3. other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

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- B. The CONTRACTOR shall comply with all applicable Laws and Regulations whether referred to herein or not) of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utilities when prosecution of the WORK may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
  - C. The CONTRACTOR shall designate a qualified and experienced safety representative at the site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and program.
  - D. Materials that contain hazardous substances or mixtures may be required on the WORK. A Material Safety Data Sheet shall be requested by the CONTRACTOR from the manufacturer of any hazardous product used.
  - E. Material usage shall be accomplished with strict adherence to all safety requirements and all manufacturer's warnings and application instructions listed on the Material Safety Data Sheet and on the product container label.
  - F. The CONTRACTOR shall be responsible for coordinating communications on any exchange of Material Safety Data Sheets or other hazardous material information that is required to be made available to, or exchanged between, or among, employers at the site in accordance with Laws or Regulations.
  - G. The CONTRACTOR shall notify the ENGINEER if it considers a specified product or its intended usage to be unsafe. This notification must be given to the ENGINEER prior to the product being ordered, or if provided by some other party, prior to the product being incorporated in the WORK.

#### 6.12 SHOP DRAWINGS AND SAMPLES

- A. After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, the CONTRACTOR shall submit to the ENGINEER for review, all Shop Drawings in accordance with Section 01300 - CONTRACTOR Submittals in the General Requirements.
- B. The CONTRACTOR shall also submit to the ENGINEER for review all samples in accordance with Section 01300 - CONTRACTOR Submittals in the General Requirements.
- C. Before submittal of each shop drawing or sample, the CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the WORK and the Contract Documents.

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6.13 CONTINUING THE WORK. The CONTRACTOR shall carry on the WORK and adhere to the progress schedule during all disputes or disagreements with the OWNER. No work shall be delayed or postponed pending resolution of any disputes or disagreements, except as the CONTRACTOR and the OWNER may otherwise agree in writing.

6.14 INDEMNIFICATION

A. To the fullest extent permitted by Laws and Regulations, the CONTRACTOR shall indemnify, defend, and hold harmless the OWNER, the ENGINEER, their Consultants, Sub-consultants and the officers, directors, employees, and agents of each and any of them, against and from all claims and liability arising under, by reason of or incidentally to the contract or any performance of the WORK, but not from the sole negligence or willful misconduct of the OWNER, and the ENGINEER. Such indemnification by the CONTRACTOR shall include but not be limited to the following:

1. Liability or claims resulting directly or indirectly from the negligence or carelessness of the CONTRACTOR, its employees, or agents in the performance of the WORK, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the CONTRACTOR, its employees, agents, or third parties;
2. Liability or claims arising directly or indirectly from bodily injury, occupational sickness or disease, or death of the CONTRACTOR's or Subcontractor's own employees engaged in the WORK resulting in actions brought by or on behalf of such employees against the OWNER, and the ENGINEER;
3. Liability or claims arising directly or indirectly from or based on the violation of any law, ordinance, regulation, order, or decree, whether by the CONTRACTOR, its employees, or agents;
4. Liability or claims arising directly or indirectly from the use or manufacture by the CONTRACTOR, its employees, or agents in the performance of this contract of any copyrighted or non-copyrighted composition, secret process, patented or non-patented invention, computer software, article, or appliance, unless otherwise specifically stipulated in this contract.
5. Liability or claims arising directly or indirectly from the breach of any warranties, whether express or implied, made to the OWNER or any other parties by the CONTRACTOR, its employees, or agents;
6. Liabilities or claims arising directly or indirectly from the willful or criminal misconduct of the CONTRACTOR, its employees, or agents; and,
7. Liabilities or claims arising directly or indirectly from any breach of the obligations assumed herein by the CONTRACTOR.

B. The CONTRACTOR shall reimburse the ENGINEER and the OWNER for all costs and expenses, (including but not limited to fees and charges of engineers, attorneys, and other professionals and court costs including all costs of appeals) incurred by said OWNER, and the ENGINEER in enforcing the provisions of this Paragraph 6.14.



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- C. The indemnification obligation under this Paragraph 6.14 shall not be limited in any way by any limitation of the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any such Subcontractor or other person or organization under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- 6.15 CONTRACTOR'S DAILY REPORTS. The CONTRACTOR shall complete a daily report indicating total manpower for each construction trade, major equipment on site, each Subcontractor's manpower, weather conditions, etc., involved in the performance of the WORK. The daily report shall be completed on forms provided by the ENGINEER and shall be submitted to the ENGINEER at the conclusion of each workday. The report should comment on the daily progress and status of the WORK within each major component of the WORK. These components will be decided by the ENGINEER. CONTRACTOR shall record the name, affiliation, time of arrival and departure, and reason for visit for all visitors to the location of the WORK.
- 6.16 ASSIGNMENT OF CONTRACT. The CONTRACTOR shall not assign, sublet, sell, transfer, or otherwise dispose of the contract or any portion thereof, or its right, title, or interest therein, or obligations thereunder, without the written consent of the OWNER except as imposed by law. If the CONTRACTOR violates this provision, the contract may be terminated at the option of the OWNER. In such event, the OWNER shall be relieved of all liability and obligations to the CONTRACTOR and to its assignee or transferee, growing out of such termination.

#### ARTICLE 7 OTHER WORK

##### 7.1 RELATED WORK AT SITE

- A. The OWNER may perform other work related to the Project at the site by the OWNER's own forces, have other work performed by utility owners, or let other direct contracts therefor which may contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to starting any such other work.
- B. The CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (or the OWNER, if the OWNER is performing the additional work with the OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the WORK with theirs. The CONTRACTOR shall do all cutting, fitting, and patching of the WORK that may be required to make its several parts come together properly and integrate with such other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of the ENGINEER and the others whose work will be affected.
- C. If the proper execution or results of any part of the CONTRACTOR's work depends upon the work of any such other contractor or utility owner (or OWNER), the CONTRACTOR shall inspect and report to the ENGINEER in writing any delays, defects, or deficiencies in such

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other work that render it unavailable or unsuitable for such proper execution and results. The CONTRACTOR's failure to report such delays, defects, or deficiencies will constitute an acceptance of the other work as fit and proper for integration with the CONTRACTOR's work except for latent or nonapparent defects and deficiencies in the other work.

- 7.2 **COORDINATION.** If the OWNER contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified in the Supplementary General Conditions, and the specific matters to be covered by such authority and responsibility will be itemized and the extent of such authority and responsibilities will be provided in the Supplementary General Conditions.

## **ARTICLE 8 OWNER'S RESPONSIBILITIES**

### **8.1 COMMUNICATIONS**

- A. The OWNER shall issue all its communications to the CONTRACTOR through the ENGINEER.
- B. The CONTRACTOR shall issue all its communications to the OWNER through the ENGINEER.

- 8.2 **PAYMENTS.** The OWNER shall make payments to the CONTRACTOR as provided in Paragraphs 14.5, 14.8, 14.9 and 14.10.

- 8.3 **LANDS, EASEMENTS, AND SURVEYS.** The OWNER's duties in respect of providing lands and easements and providing surveys to establish reference points are set forth in Paragraphs 4.1 and 4.5.

- 8.4 **CHANGE ORDERS.** The OWNER shall execute Change Orders as indicated in Paragraph 10.1F.

- 8.5 **INSPECTIONS AND TESTS.** The OWNER's responsibility in respect of inspections, tests, and approvals is set forth in Paragraph 13.3.

- 8.6 **SUSPENSION OF WORK.** In connection with the OWNER's right to stop WORK or suspend WORK, see Paragraphs 13.4 and 15.1.

- 8.7 **TERMINATION OF AGREEMENT.** Paragraphs 15.2 and 15.3 deal with the OWNER's right to terminate services of the CONTRACTOR.

## **ARTICLE 9 ENGINEER'S STATUS DURING CONSTRUCTION**

- 9.1 **OWNER'S REPRESENTATIVE.** The ENGINEER will be the OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of the ENGINEER as the OWNER's representative during construction are set forth in the Contract Documents.

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9.2 VISITS TO SITE. The ENGINEER will make visits to the site during construction to observe the progress and quality of the WORK and to determine, in general, if the WORK is proceeding in accordance with the Contract Documents. Exhaustive or continuous on-site inspections to check the quality or quantity of the WORK will not be required of the ENGINEER. The ENGINEER will not, during such visits, or as a result of such observations of the CONTRACTOR's WORK in progress, supervise, direct, or have control over the CONTRACTOR's WORK.

9.3 PROJECT REPRESENTATION. The ENGINEER may furnish an Inspector to assist in observing the performance of the WORK. The duties, responsibilities, and limitations of authority are as follows:

A. Duties, Responsibilities and Limitations of Authority of Inspector

General. The Inspector, who is the ENGINEER's Agent, will act as directed by and under the supervision of the ENGINEER and will confer with the ENGINEER regarding its actions. The Inspector's dealings in matters pertaining to the on-site WORK shall, in general, be only with the ENGINEER and the CONTRACTOR, and dealings with Subcontractors shall only be through or with the full knowledge of the CONTRACTOR. Written communication with the OWNER will be only through or as directed by the ENGINEER.

Duties and Responsibilities. The Inspector may:

1. Review the progress schedule, list of Shop Drawing submittals and schedule of values prepared by the CONTRACTOR and consult with the ENGINEER concerning their acceptability.
2. Attend pre-construction conferences. Arrange a schedule of progress meetings and other job conferences as required in consultation with the ENGINEER and notify those expected to attend in advance. Attend meetings and maintain and circulate copies of minutes thereof.
3. Serve as the ENGINEER's liaison with the CONTRACTOR, working principally through the CONTRACTOR's superintendent and assist said superintendent in understanding the intent of the Contract Documents. Assist the ENGINEER in serving as the OWNER's liaison with the CONTRACTOR when the CONTRACTOR's operations affect the OWNER's on-site operations.
4. As requested by the ENGINEER, assist in obtaining from the OWNER additional details or information, when required at the site for proper execution of the WORK.
5. Receive and record date of receipt of Shop Drawings and samples, receive samples which are furnished at the site by the CONTRACTOR and notify the ENGINEER of their availability for examination.
6. Conduct on-site observations of the WORK in progress to assist the ENGINEER in determining if the WORK is proceeding in accordance with the Contract Documents.
7. Report to the ENGINEER whenever the Inspector believes that any WORK is unsatisfactory, faulty, or defective or does not conform to the Contract Documents, or does not meet the requirements of any inspection, tests or approval required to be made or has been damaged prior to final payment; and advise the ENGINEER when the

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- Inspector believes WORK should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection, or approval.
8. Verify that the tests, equipment, and systems startups and operating and maintenance instruction are conducted as required by the Contract Documents and in presence of the required personnel, and that the CONTRACTOR maintains adequate records thereof; observe, record and report to the ENGINEER appropriate details relative to the test procedures and start-ups.
  9. Accompany visiting inspectors representing public or other agencies having jurisdiction over the WORK, record the outcome of these inspections, and report to the ENGINEER.
  10. Transmit to the CONTRACTOR the ENGINEER's clarifications and interpretations of the Contract Documents.
  11. Consider and evaluate the CONTRACTOR's suggestions for modifications in the Contract Documents and report them with recommendations to the ENGINEER.
  12. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and sample submittals, reproductions of original Contract Documents including all addenda, Change Orders, field orders, additional Drawings issued subsequent to the execution of the contract, the ENGINEER's clarifications and interpretations of the Contract Documents, progress reports, and other related documents.
  13. Keep a diary or log book, recording hours on the job site, weather conditions, data relative to questions of extras or deductions, list all project visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of performing and observing test procedures. Send copies to the ENGINEER.
  14. Record names, addresses, and telephone numbers of the CONTRACTOR, Subcontractors, and major suppliers of materials and equipment.
  15. Furnish the ENGINEER with periodic reports as required of progress of the WORK and the CONTRACTOR's compliance with the accepted progress schedule and schedule of CONTRACTOR submittals.
  16. Consult with the ENGINEER in advance of scheduled major tests, inspections, or start of important phases of the WORK.
  17. Report immediately to the ENGINEER upon the occurrence of any accident.
  18. Review applications for payment with the CONTRACTOR for compliance with the established procedure for their submittal and forward them with recommendations to the ENGINEER, noting particularly their relation to the schedule of values, WORK completed, and materials and equipment delivered at the site but not incorporated in the WORK.
  19. During the course of the WORK, verify that certificates, maintenance and operation manuals, and other data required to be assembled and furnished by the CONTRACTOR are applicable to the items actually installed; and deliver this material to the ENGINEER for its review and forwarding to the OWNER prior to final acceptance of the WORK.
  20. Before the ENGINEER prepares a Certificate of Substantial Completion/Notice of Completion, as applicable, review the CONTRACTOR's punch list items requiring completion or correction and add any items that CONTRACTOR has omitted.

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21. Conduct final inspection in the company of the ENGINEER, the OWNER, and the CONTRACTOR, and prepare a final punch list of items to be completed or corrected.
  22. Verify that all items on the punch list have been completed or corrected and make recommendations to the ENGINEER concerning acceptance.

Limitations of Authority. Except upon written instruction of the ENGINEER, the Inspector:

1. Shall not authorize any deviation from the Contract Documents or approve any substitute material or equipment.
2. Shall not exceed limitations on the ENGINEER's authority as set forth in the Contract Documents.
3. Shall not undertake any of the responsibilities of the CONTRACTOR, Subcontractors or CONTRACTOR's superintendent, or expedite the WORK.
4. Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences, or procedures of construction unless such is specifically called for in the Contract Documents.
5. Shall not advise on or issue directions as to safety precautions and programs in connection with the WORK.

9.4 CLARIFICATIONS AND INTERPRETATIONS. The ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as the ENGINEER may determine necessary, which shall be consistent with, or reasonably inferred from, the overall intent of the Contract Documents.

9.5 AUTHORIZED VARIATIONS IN WORK. The ENGINEER may authorize variations in the WORK from the requirements of the Contract Documents. These may be accomplished by a Field Order and will require the CONTRACTOR to perform the WORK involved in a manner that minimizes the impact to the WORK and the contract completion date. If the CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time, the CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

9.6 REJECTING DEFECTIVE WORK. The ENGINEER will have authority to reject WORK which the ENGINEER believes to be defective and will also have authority to require special inspection or testing of the WORK as provided in Paragraph 13.3G, whether or not the WORK is fabricated, installed, or completed.

9.7 CONTRACTOR SUBMITTALS, CHANGE ORDERS, AND PAYMENTS

- A. In accordance with the procedures set forth in the General Requirements, the ENGINEER will review all CONTRACTOR submittals, including Shop Drawings, samples, substitutes, or "or equal" items, etc., in order to determine if the items covered by the submittals will, after installation or incorporation in the WORK, conform to the requirements of the Contract Documents and be compatible with the design concept of the completed project as a functioning whole as indicated by the Contract Documents. The ENGINEER's review will not

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extend to means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto.

- B. In connection with the ENGINEER's responsibilities as to Change Orders, see Articles 10, 11, and 12.
- C. In connection with the ENGINEER's responsibilities in respect of Applications for Payment, see Article 14.

#### 9.8 DECISIONS ON DISPUTES

- A. The ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the WORK thereunder. Claims, disputes, and other matters relating to the acceptability of the WORK; the interpretation of the requirements of the Contract Documents pertaining to the performance of the WORK; and those claims under Articles 11 and 12 in respect to changes in the Contract Price or Contract Time will be referred initially to the ENGINEER in writing with a request for formal decision in accordance with this paragraph, which the ENGINEER will render in writing within 30 days of receipt of the request. Written notice of each such claim, dispute, and other matter will be delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 30 days) after the occurrence of the event giving rise thereto. Written supporting data will be submitted to the ENGINEER within 60 days after such occurrence unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim.
- B. The rendering of a decision by the ENGINEER with respect to any such claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in Paragraph 14.12) will be a condition precedent to any exercise by the OWNER or the CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Law or Regulations in respect of any such claim, dispute, or other matter.

#### 9.9 LIMITATION ON ENGINEER'S RESPONSIBILITIES

- A. Neither the ENGINEER's authority to act under this Article or other provisions of the Contract Documents nor any decision made by the ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the ENGINEER to the CONTRACTOR, any Subcontractor, any Supplier, any surety for any of them, or any other person or organization performing any of the WORK.
- B. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as reviewed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of the ENGINEER as to the WORK, it is intended that such requirement, direction, review, or judgment will be solely to evaluate the WORK for compliance with the requirements of the

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Contract Documents, and conformance with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, unless there is a specific statement indicating otherwise. The use of any such term or adjective shall not be effective to assign to the ENGINEER any duty or authority to supervise or direct the performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.9C or 9.9D.

- C. The ENGINEER will not supervise, direct, control, or have authority over or be responsible for the CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the CONTRACTOR to comply with Laws and Regulations, applicable to the performance of the WORK. The ENGINEER will not be responsible for the CONTRACTOR's failure to perform the WORK in accordance with the Contract Documents.
- D. The ENGINEER will not be responsible for the acts or omissions of the CONTRACTOR nor of any Subcontractor, supplier, or any other person or organization performing any of the WORK.

## ARTICLE 10 CHANGES IN THE WORK

### 10.1 GENERAL

- A. Without invalidating the Agreement and without notice to any surety, the OWNER may at any time or from time to time, order additions, deletions, or revisions in the WORK; these will be authorized by a written Field Order and/or a Change Order issued by the ENGINEER.
- B. If the CONTRACTOR believes that it is entitled to an increase or decrease in the Contract Price, or an extension or shortening in the Contract Time as the result of a Field Order, a claim may be made as provided in Articles 11 and 12.
- C. If the OWNER and CONTRACTOR agree on the value of any work, or the amount of Contract Time that should be allowed as a result of a Field Order, upon receiving written notice from the ENGINEER, the CONTRACTOR shall proceed so as to minimize the impact on and delays to the work pending the issuance of a Change Order.
- D. If the OWNER and the CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Field Order, the ENGINEER can direct the CONTRACTOR to proceed on the basis of Time and Materials so as to minimize the impact on and delays to WORK, and a claim may be made therefor as provided in Articles 11 and 12.

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- E. The CONTRACTOR shall not be entitled to an increase in the Contract Price nor an extension of the Contract Time with respect to any work performed that is not required by the Contract Documents as amended, modified, supplemented by Change Order, except in the case of an emergency and except in the case of uncovering work as provided in Paragraph 13.3G.
- F. The OWNER and the CONTRACTOR shall execute appropriate Change Orders covering:
1. changes in the WORK which are ordered by the OWNER pursuant to Paragraph 10.1A;
  2. changes required because of acceptance of Defective WORK under Paragraph 13.7;
  3. changes in the Contract Price or Contract Time which are agreed to by the parties; or
  4. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by the ENGINEER pursuant to Paragraph 9.8.
- G. If notice of any change is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be the CONTRACTOR's responsibility, and the amount of each applicable Bond shall be adjusted accordingly.

## 10.2 ALLOWABLE QUANTITY VARIATIONS

- A. In the event of an increase or decrease in Bid item quantity of a unit price contract, the total amount of WORK actually done or materials or equipment furnished shall be paid for according to the unit price established for such WORK under the Contract Documents, wherever such unit price has been established; provided, that an adjustment in the Contract Price may be made for changes which result in an increase or decrease in excess of 25% of the estimated quantity of any major item of the WORK. Major Item is defined as any bid item amount that is ten percent (10%) or more of the total contract amount.
- B. In the event a part of the WORK is to be entirely eliminated and no lump sum or unit price is named in the Contract Documents to cover such eliminated work, the price of the eliminated work shall be agreed upon in writing by the OWNER and the CONTRACTOR. If the OWNER and the CONTRACTOR fail to agree upon the price of the eliminated work, said price shall be determined in accordance with the provisions of Article 11.

## ARTICLE 11 CHANGE OF CONTRACT PRICE

### 11.1 GENERAL

- A. The Contract Price constitutes the total compensation payable to the CONTRACTOR for performing the WORK. All duties, responsibilities, and obligations assigned to or undertaken by the CONTRACTOR to complete the WORK shall be at its expense without change in the Contract Price.



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- B. The Contract Price may only be changed by a Change Order. Any claim for an increase in the Contract Price shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 7 days) after the start of the occurrence or the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within 14 days after such occurrence (unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which the CONTRACTOR is entitled as a result of said occurrence or event. All claims for adjustment in the Contract Price shall be determined by the ENGINEER in accordance with Paragraph 9.8A if the OWNER and the CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this Paragraph 11.1B.
- C. The value of any WORK covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:
1. Where the WORK involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved.
  2. By mutual acceptance of a lump sum, which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.4.
  3. On the basis of the cost of WORK (determined as provided in Paragraphs 11.3) plus a CONTRACTOR's fee for overhead and profit (determined as provided in Paragraph 11.4).
- 11.2 COSTS RELATING TO WEATHER. The CONTRACTOR shall have no claims against the OWNER for damages for any injury to WORK, materials, or equipment, resulting from the action of the elements. If, however, in the opinion of the ENGINEER, the CONTRACTOR has made all reasonable efforts to protect the materials, equipment and work, the CONTRACTOR may be granted a reasonable extension of Contract Time to make proper repairs, renewals, and replacements of the work, materials, or equipment.
- 11.3 COST OF WORK (BASED ON TIME AND MATERIALS)
- A. General. The term "cost of work" means the sum of all costs necessarily incurred and paid by the CONTRACTOR for labor, materials, and equipment in the proper performance of extra work. Except as otherwise may be agreed to in writing by the OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project; shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.5 EXCLUDED COSTS.
- B. Labor. The costs of labor will be the actual cost for wages prevailing for each craft or type of workers performing the extra work at the time the extra work is done, plus employer payments of payroll taxes, worker's compensation insurance, liability insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State or

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local laws, as well as assessments or benefits required by lawful collective bargaining agreements. Labor costs for equipment operators and helpers shall be paid only when such costs are not included in the invoice for equipment rental. The labor costs for forepersons shall be proportioned to all of their assigned work and only that applicable to extra work shall be paid. Non-direct labor costs including superintendence shall be considered part of the mark-up set out in paragraph 11.4.

- C. Materials. The cost of materials reported shall be at invoice or lowest current price at which materials are locally available and delivered to the job in the quantities involved, plus the cost of freight, delivery and storage, subject to the following:
1. Trade discounts available to the purchaser shall be credited to the OWNER notwithstanding the fact that such discounts may not have been taken by the CONTRACTOR.
  2. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual supplier as determined by the ENGINEER. Mark-up except for actual costs incurred in the handling of such materials will not be allowed.
  3. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from said sources on extra work items or the current wholesale price for such materials delivered to the work site, whichever price is lower.
  4. If in the opinion of the ENGINEER the cost of material is excessive, or the CONTRACTOR does not furnish satisfactory evidence of the cost of such material, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned delivered to the work site less trade discount. The OWNER reserves the right to furnish materials for the extra work and no claim shall be allowed by the CONTRACTOR for costs and profit on such materials.
- D. Equipment. The CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the Supplementary General Conditions. Such rental rate will be used to compute payments for equipment whether the equipment is under the CONTRACTOR's control through direct ownership, leasing, renting, or another method of acquisition. The rental rate to be applied for use of each item of equipment shall be the rate resulting in the least total cost to the OWNER for the total period of use. If it is deemed necessary by the CONTRACTOR to use equipment not listed in the publication specified in the Supplementary General Conditions, an equitable rental rate for the equipment will be established by the ENGINEER. The CONTRACTOR may furnish cost data which might assist the ENGINEER in the establishment of the rental rate.
1. All equipment shall, in the opinion of the ENGINEER, be in good working condition and suitable for the purpose for which the equipment is to be used.
  2. Before construction equipment is used on the extra work, the CONTRACTOR shall plainly stencil or stamp an identifying number thereon at a conspicuous location, and

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- shall furnish to the ENGINEER, in duplicate, a description of the equipment and its identifying number.
3. Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.
  4. Individual pieces of equipment or tools having a replacement value of \$200 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor.
  5. Rental time will not be allowed while equipment is inoperative due to breakdowns.
  6. Equipment Rental Rates. Unless otherwise agreed in writing, the CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the current edition of the following reference publication: "Rental Rate Blue Book" as published by Dataquest (a company of the Dunn and Bradstreet Corporation), 1290 Ridder Park Drive, San Jose, CA 95131, telephone number (800) 227-8444.
- E. Equipment on the Work Site. The rental time to be paid for equipment on the work site shall be the time the equipment is in productive operation on the extra work being performed and, in addition, shall include the time required to move the equipment to the location of the extra work and return it to the original location or to another location requiring no more time than that required to return it to its original location; except, that moving time will not be paid if the equipment is used on other than the extra work, even though located at the site of the extra work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made for loading and transporting costs when the equipment is used at the site of the extra work on other than the extra work. The following shall be used in computing the rental time of equipment on the work site.
1. When hourly rates are listed, any part of an hour less than 30 minutes of operation shall be considered to be 1/2-hour of operation, and any part of an hour in excess of 30 minutes will be considered one hour of operation.
  2. When daily rates are listed, any part of a day less than 4 hours operation shall be considered to be 1/2-day of operation. When owner-operated equipment is used to perform extra work to be paid for on a time and materials basis, the CONTRACTOR will be paid for the equipment and operator, as set forth in Paragraphs (3), (4), and (5), following.
  3. Payment for the equipment will be made in accordance with the provisions in Paragraph 11.3D, herein.
  4. Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the CONTRACTOR to other workers operating similar equipment already on the work site, or in the absence of such labor, established by collective bargaining agreements for the type of worker and location of the extra work, whether or not the operator is actually covered by such an agreement. A labor surcharge will be added to the cost of labor described herein in accordance with the provisions of Paragraph 11.3B, herein, which surcharge shall constitute full compensation for payments

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- imposed by state and federal laws and all other payments made to or on behalf of workers other than actual wages.
5. To the direct cost of equipment rental and labor, computed as provided herein, will be added the allowances for equipment rental and labor as provided in Paragraph 11.4, herein.
- F. Specialty Work. Specialty work is defined as that work characterized by extraordinary complexity, sophistication, or innovation or a combination of the foregoing attributes which are unique to the construction industry. The following shall apply in making estimates for payment for specialty work:
1. Any bid item of WORK to be classified as Specialty Work shall be listed as such in the Supplementary General Conditions. Specialty work shall be performed by an entity especially skilled in the work to be performed. After validation of invoices and determination of market values by the ENGINEER, invoices for specialty work based upon the current fair market value thereof may be accepted without complete itemization of labor, material, and equipment rental costs.
  2. When the CONTRACTOR is required to perform work necessitating special fabrication or machining process in a fabrication or a machine shop facility away from the job site, the charges for that portion of the work performed at the off-site facility may, by agreement, be accepted as specialty work and accordingly, the invoices for the work may be accepted without detailed itemization.
  3. All invoices for specialty work will be adjusted by deducting all trade discounts offered or available, whether the discounts were taken or not. In lieu of the allowances for overhead and profit specified in Paragraph 11.4, herein, an allowance of 5 percent will be added to invoices for specialty work.
- G. Sureties. All work performed hereunder shall be subject to all of the provisions of the Contract Documents and the CONTRACTOR's sureties shall be bound with reference thereto as under the original Agreement. Copies of all amendments to surety bonds or supplemental surety bonds shall be submitted to the OWNER for review prior to the performance of any work hereunder.

#### 11.4 CONTRACTOR'S FEE

- A. Extra work ordered on the basis of time and materials will be paid for at the actual necessary cost as determined by the ENGINEER, plus allowances for overhead and profit. The allowance for overhead and profit shall include full compensation for superintendence, bond and insurance premiums, taxes, field office expense, extended overhead, home office overhead, and all other items of expense or cost not included in the cost of labor, materials, or equipment provided for under Paragraph 11.3. The allowance for overhead and profit will be made in accordance with the following schedule:

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Actual Overhead and Profit Allowance:

Labor.....	15 percent
Materials .....	10 percent
Equipment.....	10 percent

To the sum of the costs and mark-ups provided for in this Article, one percent shall be added as compensation for bonding.

- B. It is understood that labor, materials, and equipment may be furnished by the CONTRACTOR or by the Subcontractor on behalf of the CONTRACTOR. When all or any part of the extra work is performed by a Subcontractor, the allowance specified herein shall be applied to the labor, materials, and equipment costs of the Subcontractor, to which the CONTRACTOR may add 5 percent of the Subcontractor's total cost for the extra work. Regardless of the number of hierarchical tiers of Subcontractors, the 5 percent increase above the Subcontractor's total cost which includes the allowances for overhead and profit specified herein may be applied one time only.

11.5 EXCLUDED COSTS. The term "Cost of the Work" shall not include any of the following:

- A. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, estimators, attorneys' auditors, accountants, purchasing and contracting agents, expenditures, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the work, or not specifically covered by paragraph 11.3, all of which are to be considered administrative costs covered by the CONTRACTOR's fee.
- B. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.
- C. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the WORK and charges against CONTRACTOR for delinquent payments.
- D. Cost of premiums for all bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by paragraph 11.4 above).
- E. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of Defective WORK, disposal of materials or equipment wrongly supplied and making good any damage to property.
- F. Other overhead or general expense costs of any kind and the cost of any item not specifically and expressly included in paragraph 11.4.

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**ARTICLE 12 CHANGE OF CONTRACT TIME**

12.1 GENERAL

- A. The Contract Time may only be changed by a Change Order. Any claim for an extension of the Contract Time (or Milestones) shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 30 days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within 60 days after such occurrence (unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by the ENGINEER in accordance with Paragraph 9.8 if the OWNER and the CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this Paragraph 12.1A. An increase in Contract Time does not mean that the Contractor is due an increase in Contract Price. Only compensable time extensions will result in an increase in Contract Price.
- B. All time limits stated in the Contract Documents are of the essence of the Agreement.
- C. Where CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost on the critical path of the project due to such delay if a claim is made therefor as provided in paragraph 12.1. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, unprecedented weather conditions or acts of God. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.
- D. Where CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost on the critical path of the project due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. In no event shall the OWNER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of CONTRACTOR, or (ii) delays beyond the control of both parties including but not limited to fires, floods, epidemics abnormal weather conditions, acts of God or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

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- 12.2 EXTENSIONS OF TIME FOR DELAY DUE TO WEATHER. Contract Time may be extended by the ENGINEER because of delays in completion of the WORK due to unusually severe weather, provided that the CONTRACTOR shall, within 10 days of the beginning of any such delay, notify the ENGINEER in writing of the cause of delay and request an extension of Contract Time. The ENGINEER will ascertain the facts and the extent of the delay and extend the time for completing the work when, in the ENGINEER's judgment, the findings of fact justify such an extension. Unprecedented, abnormal, or unusually severe weather will be defined as an event, or events, with a greater than 50-year recurrence interval, as determined by the National Weather Service, or equivalent State or Federal agency

**ARTICLE 13 WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK**

- 13.1 WARRANTY AND GUARANTEE. The CONTRACTOR warrants and guarantees to the OWNER and the ENGINEER that all work will be in accordance with the Contract Documents and will not be defective. Prompt notice of defects known to the OWNER or ENGINEER shall be given to the CONTRACTOR. All defective work, whether or not in place, may be rejected, corrected, or accepted as provided in this Article 13.
- 13.2 ACCESS TO WORK. OWNER, ENGINEER, their Consultants, sub-consultants, other representatives and personnel of OWNER, independent testing laboratories and governmental agencies with jurisdictional interests will have access to the WORK at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.
- 13.3 TESTS AND INSPECTIONS
- A. The CONTRACTOR shall give the ENGINEER timely notice of readiness of the WORK for all required inspections, tests, or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. If Laws or Regulations of any public body having jurisdiction other than the OWNER require any WORK to specifically be inspected, tested, or approved, the CONTRACTOR shall pay all costs in connection therewith. The CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with the OWNER's or the ENGINEER's acceptance of a Supplier of materials or equipment proposed as a substitution or (or-equal) to be incorporated in the WORK, or of materials or equipment submitted for review prior to the CONTRACTOR's purchase thereof for incorporation in the WORK. The cost of all inspections, tests, and approvals in addition to the above which are required by the Contract Documents shall be paid by the OWNER (unless otherwise specified).

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- C. The ENGINEER will make, or have made, such inspections and tests as the ENGINEER deems necessary to see that the WORK is being accomplished in accordance with the requirements of the Contract Documents. Unless otherwise specified in the Supplementary General Conditions, the cost of such inspection and testing will be borne by the OWNER. In the event such inspections or tests reveal non-compliance with the requirements of the Contract Documents, the CONTRACTOR shall bear the cost of corrective measures deemed necessary by the ENGINEER, as well as the cost of subsequent reinspection and retesting. Neither observations by the ENGINEER nor inspections, tests, or approvals by others shall relieve the CONTRACTOR from the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.
- D. All inspections, tests, or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to the ENGINEER and the CONTRACTOR.
- E. If any WORK (including the work of others) that is to be inspected, tested, or approved is covered without written concurrence of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for observation. Such uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the ENGINEER timely notice of the CONTRACTOR's intention to perform such test or to cover the same and the ENGINEER has not acted with reasonable promptness in response to such notice.
- F. If any WORK is covered contrary to the written request of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for the ENGINEER's observation and recovered at the CONTRACTOR's expense.
- G. If the ENGINEER considers it necessary or advisable that covered WORK be observed by the ENGINEER or inspected or tested by others, the CONTRACTOR, at the ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, material, and equipment. If it is found that such WORK is defective, the CONTRACTOR shall bear all direct, indirect, and consequential costs and damages of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction, including but not limited to fees and charges of engineers, attorneys, and other professionals. However, if such WORK is not found to be defective, the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, the CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.
- 13.4 OWNER MAY STOP THE WORK. If the WORK is defective, or the CONTRACTOR fails to perform work in such a way that the completed WORK will conform to the Contract Documents, the OWNER may order the CONTRACTOR to stop the WORK, or any portion thereof, until the cause for such order has been eliminated; however, this right of the OWNER to stop the WORK shall not



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- give rise to any duty on the part of the OWNER to exercise this right for the benefit of the CONTRACTOR or any other party.
- 13.5 CORRECTION OR REMOVAL OF DEFECTIVE WORK. If required by the ENGINEER, the CONTRACTOR shall promptly, either correct all defective work, whether or not fabricated, installed, or completed, or, if the WORK has been rejected by the ENGINEER, remove it from the site and replace it with non-defective work. The CONTRACTOR shall bear all direct, indirect and consequential costs and damages of such correction or removal, including but not limited to fees and charges of engineers, attorneys, and other professionals made necessary thereby.
- 13.6 ONE YEAR CORRECTION PERIOD
- A. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any work is found to be defective, the CONTRACTOR shall promptly, without cost to the OWNER and in accordance with OWNER's written notification, (i) correct such Defective WORK, or, if it has been rejected by the OWNER, remove it from the site and replace it with non-defective work, and (ii) satisfactorily correct or remove and replace any damage to other work of others resulting therefrom. If the CONTRACTOR does not promptly comply with such notification, or in an emergency where delay would cause serious risk of loss or damage, the OWNER may have the Defective WORK corrected or the rejected WORK removed and replaced, and all direct, indirect, and consequential costs and damages of such removal and replacement including but not limited to fees and charges of engineers, attorneys and other professionals will be paid by the CONTRACTOR.
- B. Where Defective WORK (and damage to other WORK resulting therefrom) has been corrected, removed or replaced under this paragraph 13.6, the correction period hereunder with respect to such WORK will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- 13.7 ACCEPTANCE OF DEFECTIVE WORK. If, instead of requiring correction or removal and replacement of defective work, the OWNER prefers to accept the WORK, the OWNER may do so. The CONTRACTOR shall bear all direct, indirect, and consequential costs attributable to the OWNER's evaluation of and determination to accept such defective work. If any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK, and the OWNER shall be entitled to an appropriate decrease in the Contract Price.

#### ARTICLE 14 PAYMENTS TO CONTRACTOR AND COMPLETION

- 14.1 SCHEDULE OF VALUES (LUMP SUM PRICE BREAKDOWN). The schedule of values or lump sum price breakdown established as provided in the General Requirements shall serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the ENGINEER.

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14.2 UNIT PRICE BID SCHEDULE. Progress payments on account of Unit Price work will be based on the number of units completed.

14.3 APPLICATION FOR PROGRESS PAYMENT

- A. Unless otherwise prescribed by law, on the 25th of each month, the CONTRACTOR shall submit to the ENGINEER for review, an Application for Payment filled out and signed by the CONTRACTOR covering the WORK completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.
- B. The Application for Payment shall identify, as a sub-total, the amount of the CONTRACTOR'S Total Earnings to Date, plus the Value of Materials Stored at the Site which have not yet been incorporated in the WORK, and less a deductive adjustment for materials installed which were not previously incorporated in the WORK, but for which payment was allowed under the provisions for payment for Materials Stored at the Site, but not yet incorporated in the WORK.
- C. The Net Payment Due the CONTRACTOR shall be the above-mentioned subtotal from which shall be deducted the total amount of all previous payments made to the CONTRACTOR. Progress payments will be paid in full in accordance with Article 14 of the General Conditions until 90% of the Contract Price has been paid. The remaining 10% of the Contract Price amount may be withheld until:
1. final inspection has been made;
  2. completion of the Project; and
  3. acceptance of the Project by the OWNER.
- D. The Value of Materials Stored at the Site shall be an amount equal to the specified percent of the value of such materials as set forth in the Supplementary General Conditions. Said amount shall be based upon the value of all acceptable materials and equipment not incorporated in the WORK but delivered and suitably stored at the site or at another location agreed to in writing; provided, each such individual item has a value of more than \$5,000.00 and will become a permanent part of the WORK. The Application for Payment shall also be accompanied by an invoice (including shipping), a certification that the materials meet the applicable contract specifications, and any evidence required by the OWNER that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the OWNER's interest therein, all of which will be satisfactory to the OWNER. Payment for materials will not constitute final acceptance. It shall be the CONTRACTOR's responsibility to protect the material from damage, theft, loss, or peril while in storage. Unless otherwise prescribed by law, the Value of Materials Stored at the Site shall be paid at the invoice amount up to a maximum of 85% of the Contract Price for those items.

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14.4 CONTRACTOR'S WARRANTY OF TITLE. The CONTRACTOR warrants and guarantees that title to all work, materials, and equipment covered by an Application for Payment, whether incorporated in the WORK or not, will pass to the OWNER no later than the time of payment free and clear of all liens.

14.5 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT

- A. The ENGINEER will, within 7 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to the OWNER, or return the Application to the CONTRACTOR indicating in writing the ENGINEER's reasons for refusing to recommend payment. In the later case, the CONTRACTOR may make the necessary corrections and resubmit the Application. If the ENGINEER still disagrees with a portion of the Application, it will submit the Application recommending the undisputed portion of the Application to the OWNER for payment and provide reasons for recommending non-payment of the disputed amount. Thirty days after presentation of the Application for Payment with the ENGINEER's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.5B) become due and when due will be paid by the OWNER to the CONTRACTOR.
- B. The OWNER may refuse to make payment of the full amount recommended by the ENGINEER because claims have been made against the OWNER on account of the CONTRACTOR's performance of the WORK or Liens have been filed in connection with the WORK or there are other items entitling the OWNER to a credit against the amount recommended, but the OWNER must give the CONTRACTOR written notice within 7 days (with a copy to the ENGINEER) stating the reasons for such action.

14.6 PARTIAL UTILIZATION

- A. The OWNER shall have the right to utilize or place into service any item of equipment or other usable portion of the WORK prior to completion of the WORK. Whenever the OWNER plans to exercise said right, the CONTRACTOR will be notified in writing by the OWNER, identifying the specific portion or portions of the WORK to be so utilized or otherwise placed into service.
- B. It shall be understood by the CONTRACTOR that until such written notification is issued, all responsibility for care and maintenance of all of the WORK shall be borne by the CONTRACTOR. Upon issuance of said written notice of partial utilization, the OWNER will accept responsibility for the protection and maintenance of all such items or portions of the WORK described in the written notice.
- C. The CONTRACTOR shall retain full responsibility for satisfactory completion of the WORK, regardless of whether a portion thereof has been partially utilized by the OWNER and the CONTRACTOR's one year correction period shall commence only after the date of Substantial Completion for the WORK.

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- 14.7 SUBSTANTIAL COMPLETION. When the CONTRACTOR considers the WORK ready for its intended use the CONTRACTOR shall notify the OWNER and the ENGINEER in writing that the WORK is substantially complete. The CONTRACTOR will attach to this request a list of all work items that remain to be completed and a request that the ENGINEER prepare a Notice of Completion. Within a reasonable time thereafter, the OWNER, the CONTRACTOR, and the ENGINEER shall make an inspection of the WORK to determine the status of completion. If the ENGINEER does not consider the WORK substantially complete, or the list of remaining work items to be comprehensive, the ENGINEER will notify the CONTRACTOR in writing giving the reasons therefor. If the ENGINEER considers the WORK substantially complete, the ENGINEER will prepare and deliver to the OWNER, for its execution and recording, the Notice of Completion signed by the ENGINEER and CONTRACTOR, which shall fix the date of Substantial Completion.
- 14.8 FINAL APPLICATION FOR PAYMENT. After the CONTRACTOR has completed all of the remaining work items referred to in Paragraph 14.7 and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, record as-built documents (as provided in the General Requirements) and other documents, all as required by the Contract Documents, and after the ENGINEER has indicated that the WORK is acceptable, the CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to the OWNER) of all liens arising out of or filed in connection with the WORK.
- 14.9 FINAL PAYMENT AND ACCEPTANCE
- A. If, on the basis of the ENGINEER's observation of the WORK during construction and final inspection, and the ENGINEER's review of the final Application for Payment and accompanying documentation, all as required by the Contract Documents, the ENGINEER is satisfied that the WORK has been completed and the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the ENGINEER will, within 14 days after receipt of the final Application for Payment, indicate in writing the ENGINEER's recommendation of payment and present the Application to the OWNER for payment.
- B. After acceptance of the WORK by the OWNER's governing body, the OWNER will make final payment to the CONTRACTOR of the amount remaining after deducting all prior payments and all amounts to be kept or retained under the provisions of the Contract Documents, including the following items:
1. Liquidated damages, as applicable.
  2. Two times the value of outstanding items of correction work or punch list items yet uncompleted or uncorrected, as applicable. All such work shall be completed or corrected to the satisfaction of the OWNER within the time stated on the Notice of Completion, otherwise the CONTRACTOR does hereby waive any and all claims to all monies withheld by the OWNER to cover the value of all such uncompleted or uncorrected items.

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14.10 RELEASE OF RETAINAGE AND OTHER DEDUCTIONS

- A. After executing the necessary documents to initiate the lien period, and not more than 45 days thereafter (based on a 30-day lien filing period and 15-day processing time), the OWNER will release to the CONTRACTOR the retainage funds withheld pursuant to the Agreement, less any deductions to cover pending claims against the OWNER pursuant to Paragraph 14.5B.
- B. After filing of the necessary documents to initiate the lien period, the CONTRACTOR shall have 30 days to complete any outstanding items of correction work remaining to be completed or corrected as listed on a final punch list made a part of the Notice of Completion. Upon expiration of the 45 days, referred to in Paragraph 14.10A, the amounts withheld pursuant to the provisions of Paragraph 14.9B herein, for all remaining work items will be returned to the CONTRACTOR; provided, that said work has been completed or corrected to the satisfaction of the OWNER within said 30 days. Otherwise, the CONTRACTOR does hereby waive any and all claims for all monies withheld by the OWNER under the Contract to cover 2 times the value of such remaining uncompleted or uncorrected items.

14.11 CONTRACTOR'S CONTINUING OBLIGATION. The CONTRACTOR's obligation to perform and complete the WORK in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by the ENGINEER, nor the issuance of a Notice of Completion, nor any payment by the OWNER to the CONTRACTOR under the Contract Documents, nor any use or occupancy of the WORK or any part thereof by the OWNER, nor any act of acceptance by the OWNER nor any failure to do so, nor any review of a Shop Drawing or sample submittal, will constitute an acceptance of work not in accordance with the Contract Documents or a release of the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.

14.12 FINAL PAYMENT TERMINATES LIABILITY OF OWNER. Final payment is defined as the last progress payment made to the CONTRACTOR for earned funds, less monies withheld as applicable, pursuant to Paragraph 14.10A. The acceptance by the CONTRACTOR of the final payment referred to in Paragraph 14.9 herein, shall be a release of the OWNER and its agents from all claims of liability to the CONTRACTOR for anything done or furnished for, or relating to, the WORK or for any act of neglect of the OWNER or of any person relating to or affecting the WORK, except demands against the OWNER for the remainder, if any, of the amounts kept or retained under the provisions of Paragraph 14.9 herein; and excepting pending, unresolved claims filed prior to the date of the Notice of Completion.

**ARTICLE 15 SUSPENSION OF WORK AND TERMINATION**

15.1 SUSPENSION OF WORK BY OWNER. The OWNER, acting through the ENGINEER, may, at any time and without cause, suspend the WORK or any portion thereof for a period of not more than 90 days by notice in writing to the CONTRACTOR. The CONTRACTOR shall resume the WORK on receipt from the ENGINEER of a notice of resumption of work. The CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if the CONTRACTOR makes an approved claim therefor as provided in Articles 11 and 12.

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15.2 TERMINATION OF AGREEMENT BY OWNER (CONTRACTOR DEFAULT)

- A. In the event of default by the CONTRACTOR, the OWNER may give 10 days written notice to the CONTRACTOR of OWNER's intent to terminate the Agreement and provide the CONTRACTOR an opportunity to remedy the conditions constituting the default. It shall be considered a default by the CONTRACTOR whenever CONTRACTOR shall: (1) declare bankruptcy, become insolvent, or assign its assets for the benefit of its creditors; (2) fail to provide materials or quality of work meeting the requirements of the Contract Documents; (3) disregard or violate provisions of the Contract Documents or ENGINEER's instructions; (4) fail to prosecute the WORK according to the approved progress schedule; or, (5) fail to provide a qualified superintendent, competent workers, or materials or equipment meeting the requirements of the Contract Documents. If the CONTRACTOR fails to remedy the conditions constituting default within the time allowed, the OWNER may then issue the Notice of Termination.
- B. In the event the Agreement is terminated in accordance with Paragraph 15.2A, herein, the OWNER may take possession of the WORK and may complete the WORK by whatever method or means the OWNER may select. The cost of completing the WORK shall be deducted from the balance which would have been due the CONTRACTOR had the Agreement not been terminated and the WORK completed in accordance with the Contract Documents. If such cost exceeds the balance which would have been due, the CONTRACTOR shall pay the excess amount to the OWNER. If such cost is less than the balance which would have been due, the CONTRACTOR shall not have claim to the difference.

15.3 TERMINATION OF AGREEMENT BY OWNER (FOR CONVENIENCE). The OWNER may terminate the Agreement at any time if it is found that reasons beyond the control of either the OWNER or CONTRACTOR make it impossible or against the OWNER's interests to complete the WORK. In such a case, the CONTRACTOR shall have no claims against the OWNER except: (1) for the value of work performed up to the date the Agreement is terminated; and, (2) for the cost of materials and equipment on hand, in transit, or on definite commitment, as of the date the Agreement is terminated which would be needed in the WORK and which meet the requirements of the Contract Documents. The value of work performed and the cost of materials and equipment delivered to the site, as mentioned above, shall be determined by the ENGINEER in accordance with the procedure prescribed for the making of the final application for payment and payment under Paragraphs 14.8 and 14.9.

15.4 TERMINATION OF AGREEMENT BY CONTRACTOR. The CONTRACTOR may terminate the Agreement upon 10 days written notice to the OWNER, whenever: 1) the WORK has been suspended under the provisions of Paragraph 15.1, herein, for more than 90 consecutive days through no fault or negligence of the CONTRACTOR, and notice to resume work or to terminate the Agreement has not been received from the OWNER within this time period; or, 2) the OWNER should fail to pay the CONTRACTOR any monies due him in accordance with the terms of the Contract Documents and within 60 days after presentation to the OWNER by the CONTRACTOR of a request therefor, unless

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within said 10-day period the OWNER shall have remedied the condition upon which the payment delay was based. In the event of such termination, the CONTRACTOR shall have no claims against the OWNER except for those claims specifically enumerated in Paragraph 15.3, herein, and as determined in accordance with the requirements of said paragraph.

#### ARTICLE 16 MISCELLANEOUS

- 16.1 GIVING NOTICE. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.
- 16.2 RIGHTS IN AND USE OF MATERIALS FOUND ON THE WORK
- A. The CONTRACTOR may use on the Project, with ENGINEER's approval, such stone, gravel, sand, or other material determined suitable by the ENGINEER, as may be found in the excavation. The CONTRACTOR will be paid for the excavation of such material at the corresponding contract unit price. No additional payment will be made for utilizing the material from excavation as borrow, or select borrow.
  - B. The CONTRACTOR shall replace, at its own expense, with other acceptable material, all of that portion of the excavated material so removed and used which was needed for use on the project. No charge for the materials so used will be made against the CONTRACTOR except that the CONTRACTOR shall be responsible for payment of any royalties required.
  - C. The CONTRACTOR shall not excavate or remove any material from within the Project location which is not within the grading limits, as indicated by the slope and grade lines, without written authorization from the ENGINEER.
  - D. In the event the CONTRACTOR has processed materials from OWNER-furnished sources in excess of the quantities required for performance of this contract, including any waste material produced as a by-product, the City and Borough of Wrangell may retain possession of such materials without obligation to reimburse the CONTRACTOR for the cost of their production. When such materials are in a stockpile, the ENGINEER may require: That it remain in stockpile; the CONTRACTOR level such stockpile(s); or that the CONTRACTOR remove such materials and restore the premises to a satisfactory condition at the CONTRACTOR's expense. This provision shall not preclude the City and Borough of Wrangell from arranging with the CONTRACTOR to produce material over and above the contract needs, payment for which shall be by written agreement between the City and Borough of Wrangell and the CONTRACTOR.
  - E. Unless otherwise provided, the material from any existing old structure may be used temporarily by the CONTRACTOR in the erection of the new structure. Such material shall not be cut or otherwise damaged except with the approval of the ENGINEER.

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- 16.3 **RIGHT TO AUDIT.** If the CONTRACTOR submits a claim to the OWNER for additional compensation, the OWNER shall have the right, as a condition to considering the claim, and as a basis for evaluation of the claim, and until the claim has been settled, to audit the CONTRACTOR's books to the extent they are relevant. This right shall include the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to discover and verify all direct and indirect costs of whatever nature claimed to have been incurred or anticipated to be incurred and for which the claim has been submitted. The right to audit shall include the right to inspect the CONTRACTOR's plants, or such parts thereof, as may be or have been engaged in the performance of the WORK. The CONTRACTOR further agrees that the right to audit encompasses all subcontracts and is binding upon Subcontractors. The rights to examine and inspect herein provided for shall be exercisable through such representatives as the OWNER deems desirable during the CONTRACTOR's normal business hours at the office of the CONTRACTOR. The CONTRACTOR shall make available to the OWNER for auditing, all relevant accounting records and documents, and other financial data, and upon request, shall submit true copies of requested records to the OWNER.
- 16.4 **ARCHEOLOGICAL OR HISTORICAL DISCOVERIES.** When the CONTRACTOR's operation encounters prehistoric artifacts, burials, remains of dwelling sites, paleontological remains, such as shell heaps, land or sea mammal bones or tusks, or other items of historical significance, the CONTRACTOR shall cease operations immediately and notify the ENGINEER. No artifacts or specimens shall be further disturbed or removed from the ground and no further operations shall be performed at the site until so directed. Should the ENGINEER order suspension of the CONTRACTOR's operations in order to protect an archaeological or historical finding, or order the CONTRACTOR to perform extra work, such order(s) shall be covered by an appropriate contract change document.
- 16.5 **CONSTRUCTION OVER OR ADJACENT TO NAVIGABLE WATERS.** All work over, on, or adjacent to navigable waters shall be so conducted that free navigation of the waterways will not be interfered with and the existing navigable depths will not be impaired, except as allowed by permit issued the U.S. Coast Guard and/or the U.S. Army Corps of Engineers, as applicable.
- 16.6 **GRATUITY AND CONFLICT OF INTEREST.** The CONTRACTOR agrees to not extend any loan, gratuity or gift of money of any form whatsoever to any employee or elected official of the OWNER, nor will the CONTRACTOR rent or purchase any equipment or materials from any employee or elected official of the OWNER, or to the best of the CONTRACTOR's knowledge, from any agent of any employee or elected official of the OWNER. Before final payment, the CONTRACTOR shall execute and furnish the OWNER an affidavit certifying that the CONTRACTOR has complied with the above provisions of the contract.
- 16.7 **SUITS OF LAW CONCERNING THE WORK**
- A. Should a suit of law be entered into, either by the CONTRACTOR (or the CONTRACTOR's surety) against the OWNER, or by the OWNER against the CONTRACTOR (or the CONTRACTOR's surety), the suit of law shall be tried in the First Judicial District of Alaska.



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- B. If one of the questions at issue is the satisfactory performance of the work by the CONTRACTOR and should the appropriate court of law judge the work of the CONTRACTOR to be unsatisfactory, then the CONTRACTOR (or the CONTRACTOR's surety) shall reimburse the OWNER for all legal and all other expenses (as may be allowed and set by the court) incurred by the OWNER because of the suit of the law and, further, it is agreed that the OWNER may deduct such expense from any sum or sums then, or any that become due the CONTRACTOR under the contract.

16.8 CERTIFIED PAYROLLS

- A. All CONTRACTORs or Subcontractors who perform work on a public construction contract for the OWNER shall file a certified payroll with the Alaska Department of Labor before Friday of each week that covers the preceding week (Section 14-2-4 ACLA 1949; and Section 4 ch 142 SLA 1972).
- B. In lieu of submitting the State payroll form, the CONTRACTOR's standard payroll form may be submitted, provided it contains the information required by AS 36.05.040 and a statement that the CONTRACTOR is complying with AS 36.10.010.
- C. A contractor or subcontractor, who performs work on public construction in the State, as defined by AS 36.95.010(3), shall pay not less than the current prevailing rate of wages as issued by the Alaska Department of Labor before the end of the pay period. (AS 36.05.010).

16.9 PREVAILING WAGE RATES

- A. Wage rates for Laborers and Mechanics on Public Contracts, AS 36.05.070. The CONTRACTOR, or Subcontractors, shall pay all employees unconditionally and not less than once a week. Wages may not be less than those stated in Paragraph 16.8C, regardless of the contractual relationship between the CONTRACTOR or Subcontractors and laborers, mechanics, or field surveyors. The scale of wages to be paid shall be posted by the CONTRACTOR in a prominent, easily accessible place at the site of the WORK.
- B. Failure to Pay Agreed Wages, AS 36.05.080. If it is found that a laborer, mechanic, or field surveyor employed by the CONTRACTOR or Subcontractor has been, or is being, paid a rate or wages less than the established rate, the OWNER may, by written notice, terminate the CONTRACTOR or Subcontractors right to proceed with the work. The OWNER may prosecute the work to completion by contract or otherwise, and the CONTRACTOR and sureties will be held liable to the OWNER for excess costs for completing the WORK. (Section 2 ch 52 SLA 1959).
- C. Listing Contractor's Who Violate Contracts, AS 36.05.090. In addition, a list giving the names of persons who have disregarded the rights of their employees shall be distributed to all departments of State government and all political subdivisions. No person appearing on this list, and no firm, corporation, partnership or association in which the person has an interest, may work as a CONTRACTOR or Subcontractor on a public construction contract for the

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State, or a political subdivision of the state, until three years after the date of publication of the list. (Section 3 ch 52 SLA 1959; and Section 9 ch 142 SLA).

16.10 EMPLOYMENT REFERENCE. Workers employed in the execution of the contract by the CONTRACTOR or by any Subcontractor under this contract shall not be required or permitted to labor more than 8 hours a day or 40 hours per week in violation of the provisions of the Alaska Wage and Hour Act, Section 23.10.060.

16.11 COST REDUCTION INCENTIVE

- A. At any time within 30 days after the date of the Notice of Award, the CONTRACTOR may submit to the ENGINEER in writing, proposals for modifying the plans, specifications, or other requirements of this contract for the sole purpose of reducing the total cost of construction. The cost reduction proposal shall not impair in any manner the essential functions or characteristics of the project, including but not limited to, service life, economy of operation, ease of maintenance, desired appearance or design and safety standards.
- B. The cost reduction proposal shall contain the following information:
1. Description of both the existing contract requirements for performing the WORK and the proposed changes.
  2. An itemization of the contract requirements that must be changed if the proposal is adopted.
  3. A detailed estimate of the time required and the cost of performing the WORK under both the existing contract and the proposed change.
  4. A statement of the date by which the CONTRACTOR must receive the decision from the OWNER on the cost reduction proposal.
  5. The contract items of WORK effected by the proposed changes including any quantity variations.
  6. A description and estimate of costs the OWNER may incur in implementing the proposed changes, such as test and evaluation and operating and support costs.
  7. A prediction of any effects the proposed change would have on future operations and maintenance costs to the OWNER.
- C. The provisions of this section shall not be construed to require the OWNER to consider any cost reduction proposal which may be submitted; nor will the OWNER be liable to the CONTRACTOR for failure to accept or act upon any cost reduction proposal submitted, or for delays to the work attributable to the consideration or implementation of any such proposal.
- D. If a cost reduction proposal is similar to a change in the plans or specifications for the project under consideration by the OWNER at the time the proposal is submitted, the OWNER will not accept such proposal and reserves the right to make such changes without compensation to the CONTRACTOR under the provisions of this section.

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- E. The CONTRACTOR shall continue to perform the work in accordance with the requirements of the contract until an executed Change Order incorporating the cost reduction proposal has been issued. If any executed Change Order has not been issued by the date upon which the CONTRACTOR's cost reduction proposal specifies that a decision should be made by the OWNER, in writing, the cost reduction proposal shall be considered rejected.
- F. The OWNER, shall be the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings in Contract Time and construction costs resulting from the adoption of all or any part of such proposal. Should the CONTRACTOR disagree with OWNER's decision on the cost reduction proposal, there is no further consideration. The OWNER reserves the right to make final determination.
- G. If the CONTRACTOR's cost reduction proposal is accepted in whole or in part, such acceptance will be made by a contract Change Order, which specifically states that the change is executed pursuant to this cost reduction proposal section. Such Change Order shall incorporate the changes in the plans and specifications which are necessary to permit the cost reduction proposal or such part of it as has been accepted to be put into effect and shall include any conditions upon which the OWNER's approval is based, if such approval is conditional. The Change Order shall also describe the estimated net savings in the cost of performing the work attributable to the cost reduction proposal, and shall further provide that the contract cost be adjusted by crediting the OWNER with the estimated net savings amount.
- H. Acceptance of the cost reduction proposal and performance of the work does not extend the time of completion of the contract, unless specifically provided in the Change Order authorizing the use of the submitted proposal. Should the adoption of the cost reduction proposal result in a Contract Time savings, the total Contract Time shall be reduced by an amount equal to the time savings realized.
- I. The amount specified to the CONTRACTOR in the Change Order accepted in the cost reduction proposal shall constitute full compensation for the performance of WORK. No claims for additional costs as a result of the changes specified in the cost reduction proposal shall be allowed.
- J. The OWNER reserves the right to adopt and utilize any approved cost reduction proposal for general use on any contract administered when it is determined suitable for such application. Cost reduction proposals identical, similar, or previously submitted will not be accepted for consideration if acceptance and compensation has previously been approved. The OWNER reserves the right to use all or part of any cost reduction proposal without obligation or compensation of any kind to the CONTRACTOR.
- K. The CONTRACTOR shall bear the costs, if any, to revise all bonds and insurance requirements for the project, to include the cost reduction WORK.

**END OF SECTION**

**GENERAL.** These Supplementary General Conditions make additions, deletions, or revisions to the General Conditions as indicated herein. All provisions which are not so added, deleted, or revised remain in full force and effect. Terms used in these Supplementary General Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

**SGC 1 DEFINITIONS.** *Remove* the definition for Contract Documents and *replace* with the following:

Contract Documents – The Table of Contents, Notice Inviting Bids, Instructions to Bidders, Bid Forms (including the Bid, Bid Schedule(s), Subcontractor Report, Bid Bond, and all required certificates and affidavits), Agreement, Performance Bond, Payment Bond, General Conditions, Supplementary General Conditions, Alaska Labor Standards, Reporting, and Prevailing Wage Rate Determination, Special Provisions, Technical Specifications, Drawings, Permits, and all Addenda, and Change Orders executed pursuant to the provisions of the Contract Documents.

**SGC 2.2 COPIES OF DOCUMENTS.** *Add* the following:

The OWNER shall furnish to the CONTRACTOR up to five (5) copies of the Contract Documents which may include bound reduced Drawings, if any, together with up to three (3) sets of full-scale Drawings. The City and Borough of Wrangell shall notify the CONTRACTOR after issuance of Notice of Intent to Award to determine how many copies are needed. Additional quantities of the Contract Documents and full-scale Drawings will be furnished at reproduction cost.

**SGC 5.2 INSURANCE AMOUNTS.** The limits of liability for the insurance required by Paragraph 5.2 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

A. Workers' Compensation: (under Paragraph 5.2C.1 of the General Conditions) as in accordance with AS 23.30.045:

1. State: Statutory
2. Applicable Federal (e.g., Longshore): Statutory

Note: If the WORK called for in the Contract Documents involves work in or on any navigable waters, the CONTRACTOR shall provide Workers' Compensation coverage which shall include coverage under the Longshore and Harbor Workers' Compensation Act, the Jones Act, and any other coverage required under Federal or State laws pertaining to workers in or on navigable waters.

3. Employers Liability  
Bodily Injury by Accident: \$100,000.00 Each Accident  
Bodily Injury by Disease: \$100,000.00 Each Employee  
Bodily Injury by Disease: \$500,000.00 Policy Limit

- a. CONTRACTOR agrees to waive all rights of subrogation against the OWNER for WORK performed under contract.
- b. If CONTRACTOR directly utilizes labor outside of the State of Alaska in the prosecution of the WORK, “Other States” endorsement shall be required as a condition of the contract.

B. Commercial General Liability: (under Paragraph 5.2C.2 of the General Conditions):

1.	General Policy	\$1,000,000.00	Each Occurrence
		\$2,000,000.00	Annual Aggregate
2.	Products/Completed Operations	\$1,000,000.00	Each Occurrence
		\$2,000,000.00	Annual Aggregate
3.	Personal Injury	\$1,000,000.00	Each Occurrence

C. Commercial Automobile Liability: (under Paragraph 5.2C.3 of the General Conditions) including Owned, Hired, and Non-Owned Vehicles:

Combined Single Limit, Bodily Injury and Property Damage \$1,000,000.00

D. Builder’s Risk: BUILDERS RISK DOES NOT APPLY TO THIS PROJECT.

E. Policies shall also specify insurance provided by CONTRACTOR will be considered primary and not contributory to any other insurance available to the OWNER.

F. All policies will provide for 30 Days written notice prior to any cancellation or nonrenewal of insurance policies required under contract. “Will endeavor” and “but failure to mail such notice shall impose no obligation or liability of any kind upon the Company, its agents or representatives” wording will be deleted from certificates.

G. The City and Borough of Wrangell shall be named as an “Additional Insured” under all liability coverages listed in this Section, except for workers’ compensation insurance.

**SGC 14.3 APPLICATION FOR PROGRESS PAYMENT.** Paragraph D.

- D. The Value of Materials Stored at the site shall be an amount equal to 85%.

**SGC 14.9 FINAL PAYMENT AND ACCEPTANCE.** *Add* the following paragraph:

- C. Prior to the final payment the CONTRACTOR shall contact the Alaska Department of Labor (ADOL) and provide the OWNER with clearance from the ADOL for the CONTRACTOR and all Subcontractors that have worked on the Project. This clearance shall indicate that all Employment Security Taxes have been paid. A sample form for this purpose is at the end of this section. Also, the CONTRACTOR shall submit a "NOTICE OF COMPLETION OF PUBLIC WORKS" signed by ADOL.

**SGC 16.8 CERTIFIED PAYROLLS.** *Change* paragraph A. to read:

- A. All CONTRACTORS or Subcontractors who perform work on a public construction contract for the OWNER shall file a certified payroll with Alaska Department of Labor. See Section 00830 - Alaska Labor Standards, Reporting, and Prevailing Wage Rate Determination.

Date: \_\_\_\_\_

To: Alaska Department of Labor  
Juneau Field Tax Office  
907-465-2787  
FAX 907-465-2374

From: \_\_\_\_\_

Subject: CITY AND BOROUGH OF WRANGELL LANDFILL CLOSURE

Project No. 2009-10

Timeframe of Contract \_\_\_\_\_

Please advise whether or not clearance is granted for the following CONTRACTOR and Subcontractor(s):  
(List only one CONTRACTOR or Subcontractor per page.)

\_\_\_\_\_  
Name Address

Per AS 23.20.265 of the Alaska Employment Security Act, this request is for tax liability clearance and release to make final payment for WORK performed under the subject contract. Please send your response to:

City and Borough of Wrangell Project Manager  
P.O. Box 531  
Wrangell, Alaska 99929  
FAX 907-874-2381

- ( ) Tax Clearance is granted.  
( ) Tax Clearance is NOT granted.

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**DIVISION 0 – BIDDING AND CONTRACT  
REQUIREMENTS, CONTRACT FORMS  
AND CONDITIONS OF THE CONTRACT  
SECTION 00800  
SUPPLEMENTARY GENERAL CONDITIONS**

**PROJECT NO. 2009-10**

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Remarks: \_\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Title

**END OF SECTION**

**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**DIVISION 0 – BIDDING AND CONTRACT  
REQUIREMENTS, CONTRACT FORMS  
AND CONDITIONS OF THE CONTRACT  
SECTION 00830  
ALASKA LABOR STANDARDS, REPORTING  
AND PREVAILING WAGE RATE  
DETERMINATION**

**PROJECT NO. 2009-10**

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State of Alaska, Department of Labor, Laborers' and Mechanics' Minimum Rates of Pay, AS 36.05.010 and AS 36.05.050, Wage and Hour Administration Pamphlet No. 600, the latest edition published by the State of Alaska, Department of Labor inclusive, are made a part of this contract by reference.

The CONTRACTOR is responsible for contacting the Alaska Department of Labor to determine compliance with current regulations.

Required Reporting During Contract (to be provided by every CONTRACTOR and Subcontractor):

- A. **Certified Payrolls must be submitted every two weeks. Before the second Friday**, each CONTRACTOR and Subcontractor must file Certified Payrolls with Statements of Compliance for the previous two weeks. If there was no activity for that pay period, indicate "**No Activity.**" Indicate "**Start**" on your first payroll, and "**Final**" on your last payroll for this Project. Send to:

***Wage and Hour Section***  
State of Alaska  
Department of Labor and Workforce Development  
Labor Standards and Safety Division  
Wage and Hour Administration                      and  
P.O. Box 11149  
Juneau, AK 99811-1149  
907-465-4842

***Contract Administrator***  
City and Borough of Wrangell  
P.O. Box 531  
Wrangell, AK 99929  
(907) 874-2381

- B. **Within 10 Days of "Notice of Award/Notice to Proceed"** make a list of all Subcontractors. Include their name, address, phone, estimated subcontract amount, and estimated start and finish dates. Send to:

***Contract Administrator***  
City and Borough of Wrangell  
P.O. Box 531  
Wrangell, AK 99929                      and  
(907) 874-2381

***Wage and Hour Section***  
State of Alaska  
Department of Labor and Workforce Development  
Labor Standards and Safety Division  
Wage and Hour Administration  
P.O. Box 11149  
Juneau, AK 99811-1149

- C. As part of the **final payment request package**:

- A completed Compliance Certificate and Release form (provided in Section 01700 - Project Closeout) from every CONTRACTOR.
- A final Subcontractor list complete with final subcontract amounts and including all equipment rentals (with operators).

A "NOTICE OF COMPLETION OF PUBLIC WORKS" form signed by ADOL personnel.

**END OF SECTION**



**PROJECT NO. 2009-10**

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**PART 1 - GENERAL**

**1.1 INDEX OF PERMITS**

- A. No permits have been issued for this project.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 GENERAL**

- A. The work to be performed under this Contract shall consist of furnishing all plant, tools, equipment, materials, supplies, manufactured articles and furnishing all labor, transportation and services, including all fuel, power, water and essential communications and performing all WORK, or other operations required for the fulfillment of the contract in strict accordance with the Contract Documents. The WORK shall be complete, and all work, materials, and services, not expressly indicated or called for in the Contract documents which may be necessary for the complete and proper construction of the WORK in good faith shall be provided by the CONTRACTOR as though originally so indicated, at no increase in cost to the OWNER.

**1.2 WORK COVERED BY CONTRACT DOCUMENTS**

- A. The WORK covered in the contract Documents generally includes clearing and grubbing, erosion control, excavation, base course grading D-1, 18-inch CPP storm drain pipe, regrading and compacting existing landfill materials, 4-inch minus drainage/gas rock, ditch grading, 8-inch PVC sewer, 4-inch force main sewer pipe, sanitary sewer pipe, topsoil/erosion vegetative layer, seeding, geosynthetic clay liner, leachate collection system, leachate pump system, reconstruct landfill perimeter road, landfill gas vent system, electrical work, construction surveying and miscellaneous related work for construction of the City and Borough of Wrangell Landfill Closure, Wrangell, Alaska
- B. The site of the WORK is located off of 1-1/4 miles north of downtown Wrangell, Alaska, along Evergreen Avenue and turning left on Third Avenue.

**1.3 CONTRACT METHOD**

- A. The WORK, hereunder will be constructed under a Unit Price contract.

**1.4 WORK BY OTHERS**

- A. The CONTRACTOR's attention is directed to the fact that work may be conducted at the site by other contractors during the performance of the WORK under this Contract. The CONTRACTOR shall conduct its operations so as to cause a minimum of interference with the WORK of such other contractors, and shall cooperate fully with such contractors to provide continued safe access to their respective portions of the site, as required to perform work under their respective contracts.

**1.5 CONTRACTOR USE OF PROJECT SITE**

- A. The CONTRACTOR's use of the project site shall include construction operations and storage of materials, fabrication facilities, and field offices only in those areas identified on the plan drawings.

PROJECT NO. 2009-10

SECTION 01010  
SUMMARY OF WORK

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1.6 OWNER USE OF THE PROJECT SITE

- A. The OWNER may utilize all or part of the existing site during the entire period of construction for the conduct of the OWNER's normal operations. The CONTRACTOR shall cooperate and coordinate with the ENGINEER to facilitate the OWNER's operations and to minimize interference with the CONTRACTOR's operation at the same time. In any event, the OWNER shall be allowed access to the project site during the period of construction.

1.7 PROJECT MEETINGS

1. Prior to the commencement of WORK at the site, a Pre-Construction Conference will be held at a mutually agreed time and place which shall be attended by the CONTRACTOR's Project Manager, its superintendent, and its subcontractors as the CONTRACTOR deems appropriate. Other attendants will be:
  - a) ENGINEER and Inspector.
  - b) Representatives of OWNER.
  - c) Governmental representatives as appropriate.
  - d) Others as requested by CONTRACTOR, OWNER, or ENGINEER
  
2. Unless previously submitted to the ENGINEER, the CONTRACTOR shall bring to the Pre-Construction Conference one copy each of the following:
  - a) Plan of Operation.
  - b) Project Overview Bar Chart Schedule.
  - c) Procurement schedule of major equipment and materials and items requiring long lead time.
  - d) Shop Drawing/Sample/Substitute or "Or Equal" submittal schedule.
  - e) Name and telephone number of CONTRACTOR's Project Supervisor.
  - f) Storm Water Pollution Prevention Plan (SWPPP)
  
3. The purpose of the Pre-Construction Conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedure for handling such matters established. The complete agenda will be furnished to the CONTRACTOR prior to the meeting date. The CONTRACTOR should be prepared to discuss all of the items listed below:
  - a) CONTRACTOR's tentative schedules.
  - b) Transmittal, review, and distribution of CONTRACTOR's submittals.
  - c) Processing applications for payment.
  - d) Maintaining record documents.
  - e) Critical work sequencing.
  - f) Field decisions and Change Orders.
  - g) Use of project site, office and storage areas, security, housekeeping, and OWNER's needs.
  - h) Major equipment deliveries and priorities.
  - i) CONTRACTOR's assignments for safety and first aid.

4. The OWNER will preside at the Pre-Construction Conference and will arrange for keeping and distributing the minutes to all persons in attendance.

B. Progress Meetings

1. The CONTRACTOR shall schedule and hold regular on-site progress meetings at least weekly and at other times as requested by the ENGINEER, or as required by progress of the WORK. The CONTRACTOR, ENGINEER, and all subcontractors active on the site must attend each meeting. CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturers, and other subcontractors.
2. The ENGINEER shall preside at the meetings and will arrange for keeping and distributing the minutes. The purpose of the meetings will be to review the progress of the WORK, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. During each meeting, the CONTRACTOR is required to present any issues which may impact the WORK, with a view toward resolving these issues expeditiously.

1.8 DEFINITIONS APPLICABLE TO TECHNICAL SPECIFICATIONS

- A. The following words have the meaning defined in the Technical Portions of the WORK:

1. Indicated- is a word used to direct the CONTRACTOR to information contained on the drawings or in the Specifications. Terms such as "shown", "noted", "scheduled", and "specified" also may be used to assist in locating information but no limitation of location is implied or intended.
2. Furnish- means to supply and deliver to the site, to unload and unpack ready for assembly, installation, testing, inspection and start-up.
3. Install- defines operations at the site including assembly, erection, placing, anchoring, applying, shaping to dimension, finishing, curing, protecting, and cleaning, ready for the OWNER's use.
4. Provide- is defined as furnish and install, ready for the intended use.
5. Installer- a person or firm engaged by the CONTRACTOR or its subcontract, or any subcontractor, for the performance of installation, erection, or application work at the site. Installers must be expert in the operations they are engaged to perform.

**PART 2 - PRODUCTS** (Not Used)

**PART 3 - EXECUTION** (Not Used)

**END OF SECTION**

**PART 1 - GENERAL**

1.1 SCOPE

- A. Payment for the various items of the Bid Schedule, as further specified herein, shall include all compensation to be received by the CONTRACTOR for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items for WORK being described, as necessary to complete the various items of the WORK all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of permits and cost of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA) and Occupational Safety and Health Standards of the Alaska Department of Labor, Division of Labor Standards and Safety.
- B. No separate payment will be made for any Pay Item that is not specifically set forth in the Bid Schedule, and all costs therefore shall be included in the prices named in the Bid Schedule for the various appurtenant items of WORK.
- C. In addition to other incidental items of WORK listed elsewhere in the contract, the following items shall also be considered as incidental to other items of WORK under this contract:
  - 1. Maintenance of all services through the Project area including power, water, storm and sanitary sewers, garbage pickup, bus service and emergency vehicles.
  - 2. Traffic control, traffic control plan, including flaggers, and installation and maintenance of traffic control devices in accordance with the Manual of Uniform Traffic Control Devices – Millennium Edition (MUTCD).
  - 3. Repair or replacement of existing adjacent facilities including piping, landscaping, steel, timber, concrete and asphalt items.
  - 4. Final clean-up and site restoration.
  - 5. Removal and replacement of survey monuments and markers disturbed during construction, whether shown on the Drawings or not.
  - 6. Watering and sweeping of Evergreen Avenue and Third Avenue to the site as necessary for dust and litter control.
  - 7. All fittings required for storm sewer pipes and sanitary sewer pipes.

1.2 MOBILIZATION (Pay Item No. 1505.1) PRICE BASED ON LUMP SUM PAY UNIT

- A. Measurement for payment for Mobilization will be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.

PROJECT NO. 2009-10

SECTION 01025  
MEASUREMENT AND PAYMENT

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- B. Payment for Mobilization will be made at the amount shown on the Bid Schedule under Pay Item No. 1505.1, which payment will constitute full compensation for all WORK described in Section 01505 - Mobilization, as shown on the Drawings and as directed by the ENGINEER.
  - C. Partial payments will be made as the WORK progresses as follows:
    - 1. When 5% of the total original contract amount is earned from other Pay Items, 50% of the amount bid for Mobilization, or 5% of the original contract amount, whichever is less, will be paid.
    - 2. When 10% of the total original contract amount is earned from other Pay Items, 100% of the amount bid for Mobilization, or 10% of the original contract amount, whichever is less, will be paid.
    - 3. Upon completion of all WORK on the Project, payment of any amount bid for Mobilization in excess of 10% of the total contract amount will be paid.
- 1.3 EROSION AND SEDIMENT CONTROL (Pay Item No. 1570.1) PRICE BASED ON LUMP SUM PAY UNIT
- A. Measurement for payment for Erosion and Sediment Control will be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.
  - B. Erosion and Sediment Control will include all resources to install and maintain erosion control devices; including, but not limited to, silt fences, hay or straw bales, drain guards, rock check dams, ditches for the duration of the Project. This also includes the CONTRACTOR preparing a Stormwater Pollution Prevention Plan (SWPPP) in accordance to current EPA guidelines and obtaining a NPDES permit from EPA for this Project.
  - C. Payment for Erosion and Sediment Control will be made at the Unit Price named in the Bid Schedule under Pay Item No. 1570.1, which payment will constitute full compensation for all WORK described in Section 01570 – Erosion Control, as shown on the Drawings and as directed by the ENGINEER.
- 2.1 CLEARING AND GRUBBING (Pay Item No. 2201.1) PRICE BASED ON LUMP SUM PAY UNIT
- A. Measurement for payment for Clearing and Grubbing will be based upon the completion of the entire WORK as a Lump Sum unit, complete, all in accordance with the Contract Documents.
  - B. WORK under this item includes removal and disposal at an approved site of all trees, tree clusters, stumps and bushes, and other vegetative overburden material within the construction limits, as shown or described on the Drawings.

- C. Payment for Clearing and Grubbing will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2201.1, which payment will constitute full compensation for all WORK described in SECTION 02201 – Clearing and Grubbing, as shown on the Drawings and as directed by the ENGINEER.
- 2.2 REGRADE EXISTING LANDFILL MATERIAL (Pay Item No. 2202.1) PRICE BASED ON QUANTITY, CUBIC YARD
- A. Measurement for payment for Regrade Existing Landfill Material will be based on the number of cubic yards of landfill material actually excavated, placed and recompacted, as determined by the average end area method. Where impractical to measure by the average end area method, the ENGINEER may approve other acceptable methods involving three-dimensional measurements. WORK outside of the limits indicated in the Drawings or directed by the ENGINEER will not be measured for payment.
- B. All accepted landfill excavation, placement and recompacted, will be measured in its original position by cross sectioning.
- C. Landfill excavated, placed and recompacted will be paid for only to the pay limits and grades established on the Drawings, or as directed by the ENGINEER. Excavation outside of these limits will not be measured for payment.
- D. Original cross sections for the measurement of the existing ground line to be used for determining excavation pay quantities may be taken after clearing has been accomplished, but prior to grubbing.
- E. Unauthorized landfill grading WORK outside of the limits shown on the Drawings, or as directed by the ENGINEER shall be considered incidental to other WORK under the Contract.
- F. The final cleaning of ditches shall be considered incidental to other WORK under the Contract.
- G. The following will not be measured for direct payment; the cost of such WORK will be considered incidental to other WORK under the Contract:
1. Overburden and other spoil material from developing available borrow sources.
  2. Removal of water by aeration or gravity, of material to obtain required moisture content.
  3. Any volumes of water or other liquid material.
  4. Field cutting any scrap metal, wire rope, or other landfill material that projects above the landfill surface so that a uniform slope can be constructed.
  5. Slide or slipout material attributable to the carelessness of the CONTRACTOR.
  6. All compaction required on the existing landfill waste material to construct the required slopes.

- I. Payment for Regrade Existing Landfill Material will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2202.1, which payment will constitute full compensation for all WORK described in Section 02202 – Excavation and Embankment, as shown on the Drawings and as directed by the ENGINEER.
- 2.3 SCREENED WRANGELL INSTITUTE MATERIAL (Pay Item No. 2202.2) PRICE BASED ON QUANTITY, CUBIC YARD
- A. Measurement for payment for Screened Wrangell Institute Material will be based on the number of cubic yards of material in place as determined by the average end area method. Screened material placed outside of the lines, grades and cross sections indicated in the Drawings, or as directed by the ENGINEER, will be deducted from screened Wrangell Institute material quantities for pay purposes.
- B. Payment for Screened Wrangell Institute material will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2202.2, which payment will constitute full compensation for all WORK described in Section 02202 – Excavation and Embankment, as shown on the Drawings and as directed by the ENGINEER.
- 2.4 4-INCH MINUS DRAINAGE/GAS ROCK (Pay Item No. 2202.3) PRICE BASED ON QUANTITY, CUBIC YARD
- A. Measurement for payment for 4-Inch Minus Drainage/Gas Rock will be based on the number of cubic yards of material in place as determined by the average end area method. Where impractical to measure by the average end area method, the ENGINEER may approve other acceptable methods involving three-dimensional measurements. Embankment outside of the lines, grades and cross sections indicated in the Drawings, or as directed by the ENGINEER, will be deducted from shot rock borrow quantities for pay purposes.
- B. Payment for 4-Inch Minus Drainage/Gas Rock will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2202.3 which payment will constitute full compensation for all WORK described in Section 02202 – Excavation and Embankment, as shown on the Drawings and as directed by the ENGINEER.
- 2.5 DITCH GRADING (Pay Item No. 2202.4) PRICE BASED ON LUMP SUM PAY UNIT
- A. Measurement for payment for Ditch Grading will be based on the completion of the entire WORK as a Lump Sum Pay Unit, complete, including all excavation and placement of usable material from excavation into the sideslope and ditch swale areas, all in accordance with the requirements of the Contract Documents.
- B. Payment for Ditch Grading will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2202.4, which payment will constitute full compensation for all WORK described in Section 02202 – Excavation and Embankment, as shown on the Drawings and as directed by the ENGINEER.



2.6 BASE COURSE, GRADING D-1 (Pay Item No. 2204.1) PRICE BASED ON QUANTITY, CUBIC YARD

- A. Measurement for payment for Base Course, Grading, D-1 will be based on the number of cubic yards of base course material actually placed and compacted as determined by the average end area method. Where impractical to measure by the average end area method, the ENGINEER may approve other acceptable methods involving three-dimensional measurements.
- B. Water needed for compaction and added to the base material on the grade will be considered incidental.
- C. Payment for Base Course, Grading D-1, will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2204.1, which payment will constitute full compensation for all WORK described in Section 02204 – Base Course, as shown on the Drawings and as directed by the ENGINEER.

2.7 SANITARY SEWER PIPE, 8-INCH PVC (Pay Item No. 2401.1) PRICE BASED ON QUANTITY, LINER FOOT

- A. Sanitary Sewer Pipe, 8-Inch PVC will be measured along the slope of the pipe in feet, from center to center of manholes, from center of manholes to end of pipe, or to limits of payment as shown on the Drawings. The aggregate laid lengths of wyes will not be deducted from lengths of pipe so measured.
- B. Cleaning and testing sanitary sewer pipe will not be measured for payment, but will be considered incidental to other WORK under Section 02401 – Sanitary Sewer Pipe.
- C. Trench excavation, bedding, backfill and warning ribbon will not be measured for payment, but will be considered incidental to other WORK under Section 02401 – Sanitary Sewer Pipe.
- E. Payment for Sanitary Sewer Pipe, 8-Inch PVC, will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2401.1, which payment will constitute full compensation for all WORK described in Section 02401 – Sanitary Sewer Pipe, as shown on the Drawings and as directed by the ENGINEER.

2.8 SANITARY SEWER PIPE, 4-INCH HDPE FORCE MAIN (Pay Item No. 2401.2) PRICE BASED ON QUANTITY, LINEAR FOOT

- A. Sanitary Sewer Pipe, 4-Inch HDPE Force Main, will be measured along the slope of the pipe in feet, from center to center of manholes or pump station structures.
- B. Cleaning and testing of sanitary sewer pipe will not be measured for payment, but will be considered incidental to other WORK under Section 02401 – Sanitary Sewer Pipe.

PROJECT NO. 2009-10

SECTION 01025  
MEASUREMENT AND PAYMENT

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- C. Trench excavation, backfill, bedding, and warning ribbon will not be measured for payment, but will be considered incidental to other WORK under the Contract.
  - D. No measurement for payment will be made for heat fuse welding for HDPE force main sewer pipe.
  - E. Payment for Sanitary Sewer Pipe, 4-Inch HDPE Force Main will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2401.2, which payment will constitute full compensation for all WORK described in Section 02401 – Sanitary Sewer Pipe, as shown on the Drawings and as directed by the ENGINEER.
- 2.9 SANITARY SEWER MANHOLE, TYPE I, (Pay Item No. 2402.1) PRICE BASED ON QUANTITY, EACH
- A. Sanitary Sewer Manhole, Type I, will be measured per each, complete in place, including all earthwork.
  - B. Trench excavation, backfill, bedding, water proofing and all other WORK required for complete manhole installation, will be considered incidental to other WORK under the Contract.
  - C. Payment for Sanitary Sewer Manhole, Type I, will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2402.1, which payment will constitute full compensation for all WORK described in Section 02402 – Sanitary Sewer Manholes, as shown on the Drawings and as directed by the ENGINEER.
- 2.10 18-INCH PIPE CULVERT (Pay Item No. 2501.1) PRICE BASED ON QUANTITY, LINEAR FOOT
- A. Pipe Culverts, including all coupling bands, bends and other items necessary for the proper joining of the pipe culvert sections, will be measured by the staked length in linear feet.
  - B. Pipes for storm drains shall be measured by the staked length, to the ends of the pipe.
  - C. Branch connections, coupling adapters and bends will be included in the linear foot measurement for conduit.
  - D. Trench excavation, rock excavation, warning ribbon, bedding and backfill will not be measured for payment, but will be considered incidental to other WORK under the Contract.
  - E. Payment for 18-Inch Pipe Culvert will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2501.1, which payment shall constitute full compensation for all WORK described in Section 02501 – Storm Sewer Pipe, as shown on the Drawings and as directed by the ENGINEER.

- 2.11 PIPE INSULATION (Pay Item No. 2607.1) PRICE BASED ON QUANTITY, BOARDS
- A. Measurement for payment of Pipe Insulation will be the actual number of 2" x 2' x 8' boards installed.
  - B. Payment for Pipe Insulation will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2607.1, which payment will constitute full compensation for all WORK described in Section 02607 – Pipe Insulation, as shown on the Drawings and as directed by the ENGINEER.
- 2.12 CONSTRUCTION SURVEYING (Pay Item No. 2702.1) PRICE BASED ON LUMP SUM PAY UNIT
- A. Measurement for payment of Construction Surveying will be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.
  - B. Payment for Construction Surveying will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2702.1, which payment will constitute full compensation for all WORK described in Section 02702 – Construction Surveying, as shown on the Drawings and as directed by the ENGINEER.
- 2.13 TOPSOIL/EROSION VEGETATIVE LAYER (Pay Item No. 2709.1) PRICE BASED ON QUANTITY, CUBIC YARD
- A. Topsoil/Erosion Vegetative Layer will be measured for payment by the cubic yard on the basis of truck measure for all WORK performed in the contract under Section 02709 – Topsoil, completed and accepted.
  - B. Any Topsoil/Erosion Vegetative Layer found to be in excess of 8-inches thick, in place and to final grade, will be deducted from the quantity measured by truck measure based on depths measured at randomly selected locations. Deductions will be computed on the basis of the average end area method.
  - C. Payment for Topsoil/Erosion Vegetative Layer will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2709.1, which payment will constitute full compensation for all WORK described in Section 02709 – Topsoil, as shown on the Drawings and as directed by the ENGINEER.
- 2.14 SEEDING, HYDRAULIC METHOD, (Pay Item No. 2710.1) PRICE BASED ON QUANTITY, SLURRY UNIT
- A. Seeding, Hydraulic Method will be measured for payment by the number of slurry units (to the nearest 1/10 unit) of mixture actually applied to the designated area as directed by the ENGINEER.

PROJECT NO. 2009-10

SECTION 01025  
MEASUREMENT AND PAYMENT

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- B. Payment for Seeding, Hydraulic Method, will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2710.1, which payment will constitute full compensation for all WORK described in Section 02710 – Seeding, as shown on the Drawings and as directed by the ENGINEER.
- 2.15 STORM PIPE AND STRUCTURE REMOVAL (Pay Item No. 2717.1) PRICE BASED ON LUMP SUM
- A. Measurement for payment for Storm Pipe and Structure Removal will be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.
- B. Payment for Storm Pipe and Structure Removal will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2717.1, which payment will constitute full compensation for all WORK described in Section 02717 – Storm and Sanitary Structure Removal, as shown on the Drawings and as directed by the ENGINEER.
- 2.16 SIGN ASSEMBLY (Pay Item No. 2718.1) PRICE BASED ON QUANTITY, EACH
- A. Sign Assembly will be measured per each, as described in Section 02718 – Sign Assembly.
- B. WORK under this Pay Item includes providing all new sign assembly materials.
- C. Payment for Sign Assembly will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2718.1, which payment will constitute full compensation for all WORK described in Section 02718 – Sign Assembly, as shown on the Drawings and as directed by the ENGINEER.
- 2.17 GEOSYNTHETIC CLAY LINER (Pay Item No. 2730.1) PRICE BASED ON QUANTITY, SQUARE FOOT
- A. Measurement for payment for Geosynthetic Clay Liner will be based on the number of square feet, measured complete in place, all in accordance with the requirements of the Contract Documents.
- B. Seams, liner penetrations and Geosynthetic Clay Liner <sup>overlaps</sup> ~~overlays~~ will be constructed in accordance with requirements of Section 02730 – Geosynthetic Clay Liner, and will be considered incidental to other items of WORK under this Section.
- C. Torn or otherwise damaged Geosynthetic Clay Liner material will be repaired or replaced as directed by the ENGINEER, and will be considered incidental to other items of WORK under this Section.
- D. Payment for Geosynthetic Clay Liner will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2730.1, which payment will constitute full compensation for all WORK described in Section 02730 – Geosynthetic Clay Liner, as shown on the Drawings and as directed by the ENGINEER.

- 2.18 LEACHATE COLLECTION SYSTEM (Pay Item No. 2740.1) PRICE BASED ON LUMP SUM
- A. Measurement for payment for Leachate Collection System will be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with requirements of the Contract Documents.
  - B. This WORK shall include all excavation, bedding, backfill, HDPE leachate pipe, leachate cleanouts, filter cloth, pipe fittings and other items of WORK to make a complete and functional leachate collection system as shown on the Drawings.
  - C. Payment for Leachate Collection System will be made at the Unit Price named in the Bid Schedule under Pay Item No. 2740.1, which payment will constitute full compensation for all WORK described in Section 02740 – Leachate Collection System, as shown on the Drawings and as directed by the ENGINEER.
- 2.19 LEACHATE PUMP SYSTEM (Pay Item No. 2750.1) PRICE BASED ON LUMP SUM
- A. Measurement for payment for Leachate Pump System will be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.
  - B. Leachate Pump System shall include, but is not limited to, all earthwork to install, bed and backfill the leachate lift station wet well and valve vault including all pipe, valves, fittings, pumps, rails, equipment, supports, bar screens, ladders, guard posts, nuts, bolts, and appurtenances; manholes, hatches, covers, frames, waterproofing, concrete work at the entrances; all testing, warranties, operations and technical data as required, and any other material and WORK necessary for a complete, working and acceptable installation.
  - C. Payment for Leachate Pump System will be made at the amount shown in the Bid Schedule under Pay Item No. 2750.1, which payment will constitute full compensation for all WORK described in Section 02750 – Leachate Pump System, as described in the Contract Documents and as directed by the ENGINEER.
- 2.20 RECONSTRUCT LANDFILL PERIMETER ROAD (Pay Item No. 2760.1) PRICE BASED ON LUMP SUM
- A. Measurement for payment for Reconstruct Landfill Perimeter Road will be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.
  - B. This WORK shall include excavation, placement and compaction of shot rock, placement and compaction of base course grading D-1 as shown on the Drawings.
  - C. Payment for Reconstruct Landfill Perimeter Road will be made at the amount shown in the Bid Schedule under Pay Item No. 2760.1, which payment will constitute full compensation for all WORK described in Section 02760 – Reconstruct Landfill Perimeter Road, as described in the Contract Documents and as directed by the ENGINEER.

2.21 LANDFILL GAS VENT SYSTEM (Pay Item No. 2770.1) PRICE BASED ON LUMP SUM

- A. Measurement for payment for Landfill Gas Vent System will be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.
- B. This WORK shall include trenching, backfill, HDPE vent pipe, HDPE end caps, HDPE fittings, heat fused thermal pipe welding, screen, bentonite GCL liner seal and other items of WORK as described in the Drawings to make a satisfactory Landfill Gas Vent System.
- C. Payment for Landfill Gas Vent System will be made at the amount shown in the Bid Schedule under Pay Item No. 2770.1, which payment will constitute full compensation for all WORK described in Section 02770 – Landfill Gas Vent System, as described in the Contract Documents and as directed by the ENGINEER.

16.1 ELECTRICAL (Pay Item No. 16000.1) PRICE BASED ON LUMP SUM PAY UNIT

- A. Measurement for Payment for Electrical will be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.
- B. Electrical shall include, but is not limited to, all electrical work, electrical engineering design work, earthwork, concrete, metal fabrication, meter/disconnect, safety switch, pump control panel, outer galvanized steel protective enclosures, galvanized posts, galvanized rack, power to wetwell, underground feeders, connection to existing panels, electrical controls, switches, power connections, conduit, buried conduit, pull boxes, local control panels, alarms, all testing, warranties, operations and technical data as required, and any other material and work necessary for a complete, working and acceptable installation for the control panels and leachate pump station, as described in the Contract Documents and as directed by the ENGINEER.
- C. Payment for Electrical will be made at the amount shown in the Bid Schedule under Pay Item No. 16000.1, which payment will constitute full compensation for all WORK described in the Contract Documents and as directed by the ENGINEER.

**PART 2 - PRODUCTS** (Not Used)

**PART 3 - EXECUTION** (Not Used)

**END OF SECTION**

**PART 1 – GENERAL**

**1.1 GENERAL**

- A. Titles of Sections and Paragraphs. Captions accompanying Specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.
- B. Applicable Publications. Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the WORK is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.
- C. Specialists, Assignments. In certain instances, specification text requires (or implies) that specific WORK is to be assigned to specialists or expert entities, who must be engaged for the performance of that WORK. Such assignments shall be recognized as special requirements over which the CONTRACTOR has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the WORK; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the CONTRACTOR.

**1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS**

- A. Without limiting the generality of other requirements of the Specifications, all WORK specified herein shall conform to or exceed the requirements of applicable codes and the applicable requirements of the following documents.
- B. References herein to "Building Code" or "International Building Code" shall mean International Building Code of the International Conference of Building Officials (ICBO).
- C. Similarly, references to "Mechanical Code" or "Uniform Mechanical Code," "Plumbing Code" or "Uniform Plumbing Code," "Fire Code" or "Uniform Fire Code," shall mean Uniform Mechanical Code, Uniform Plumbing Code and Uniform Fire Code of the International Conference of the Building Officials (ICBO). "Electric Code" or "National Electric Code (NEC)" shall mean the National Electric Code of the National Fire Protection Association (NFPA). The latest edition of the codes as approved by the Municipal Code and used by the local agency as of the date that the WORK is advertised for bids, as adopted by the agency having jurisdiction, shall apply to the WORK herein, including all addenda, modifications, amendments, or other lawful changes thereto.

- D. In case of conflict between codes, reference standards, Drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the ENGINEER for clarification and directions prior to ordering or providing any materials or furnishing labor. The CONTRACTOR shall bid for the most stringent requirements.
- E. The CONTRACTOR shall construct the WORK specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein.
- F. Applicable Standard Specifications. References in Contract Sections 02801 -Asphalt Concrete Pavement to Standard Specifications shall mean the Alaska Department of Transportation and Public Facilities "Standard Specifications for Highway Construction," most recent version and any supplements or amendments thereto.
- G. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
- H. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**



**PART 1 - GENERAL**

1.1 GENERAL

- A. Wherever submittals are required hereunder, all such submittals by the CONTRACTOR shall be submitted to the ENGINEER.
- B. Within 14 days after the date of commencement as stated in the Notice to Award, the CONTRACTOR shall submit the following items to the ENGINEER for review:
  - 1. A preliminary schedule of Shop Drawing, Sample, and proposed Substitutes or "Or-Equal" submittals.
  - 2. A list of all permits and licenses the CONTRACTOR shall obtain indicating the agency required to grant the permit and the expected date of submittal for the permit and required date for receipt of the permit.
  - 3. A complete progress schedule for all phases of the Project.
  - 4. All required Material Safety Data Sheets.
  - 5. A traffic maintenance plan, as required.
  - 6. A plan for Storm Water Pollution Prevention Plan (SWPPP), as required.
  - 7. A letter designating the CONTRACTOR's Superintendent, defining that person's responsibility and authority.
  - 8. A letter designating the CONTRACTOR's safety representative and the Equal Employment Opportunity (EEO) Officer and that person's responsibility and authority.
- C. No payments shall be made to the CONTRACTOR until all these items are submitted in their entirety, as determined by the ENGINEER.

1.2 SHOP DRAWING SUBMITTAL

- A. Wherever called for in the Contract Documents, or where required by the ENGINEER, the CONTRACTOR shall furnish to the ENGINEER, for review, 6 copies of each shop drawing submittal. The term "Shop Drawings" as used herein shall be understood to include detail design calculations, shop drawings, fabrication, and installation drawings, erection drawings, lists, graphs, operating instructions, catalog sheets, data sheets, and similar items.
- B. All Shop Drawing submittals shall be accompanied by the CONTRACTOR's standard submittal transmittal form. Any submittal not accompanied by such a form, or where all applicable items on the form are not completed, will be returned for re-submittal.
- C. Normally, a separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Transmittal of a submittal of various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates review of the group or package as a whole. A multiple-page submittal shall be collated into sets, and each set shall be stapled or bound, as appropriate, prior to transmittal to the ENGINEER.

- D. Except as may otherwise be provided herein, the ENGINEER will return prints of each submittal to the CONTRACTOR with its comments noted thereon, within 30 calendar days following their receipt by the ENGINEER. It is considered reasonable that the CONTRACTOR shall make a complete and acceptable submittal to the ENGINEER by the second submission of a submittal item. The OWNER reserves the right to withhold monies due the CONTRACTOR to cover additional costs of the ENGINEER review beyond the second submittal. The ENGINEER's maximum review period for each submittal including all re-submittals will be 30 days per submission. In other words, for a submittal that requires 2 re-submittals before it is complete, the maximum review period for that submittal could be 90 days.
- E. If 3 copies of a submittal are returned to the CONTRACTOR marked "NO EXCEPTIONS TAKEN," formal revision and re-submission of said submittal will not be required.
- F. If 3 copies of a submittal are returned to the CONTRACTOR marked "MAKE CORRECTIONS NOTED," formal revision and re-submission of said submittal will not be required.
- G. If one copy of the submittal is returned to the CONTRACTOR marked "AMEND-RESUBMIT," the CONTRACTOR shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the ENGINEER.
- H. If one copy of the submittal is returned to the CONTRACTOR marked "REJECTED-RESUBMIT," the CONTRACTOR shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the ENGINEER.
- I. Fabrication of an item may be commenced only after the ENGINEER has reviewed the pertinent submittal and returned copies to the CONTRACTOR marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED." Corrections indicated on submittal shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for changes to the Contract requirements. Only a change order can alter the contract price, time, or requirements.
- J. All CONTRACTOR shop drawing submittals shall be carefully reviewed by an authorized representative of the CONTRACTOR, prior to submission to the ENGINEER. Each submittal shall be dated, signed, and certified by the CONTRACTOR, as being correct and in strict conformance with the Contract Documents. In the case of shop drawings, each sheet shall be so dated, signed, and certified. No consideration for review by the ENGINEER of any CONTRACTOR submittal will be made for any items which have not been so certified by the CONTRACTOR. All non-certified submittals will be returned to the CONTRACTOR without action taken by the ENGINEER, and any delays caused thereby shall be the total responsibility of the CONTRACTOR.

- K. The ENGINEER's review of CONTRACTOR shop drawing submittals shall not relieve the CONTRACTOR of the entire responsibility for the correctness of details and dimensions. The CONTRACTOR shall assume all responsibility and risk for any misfits due to any errors in CONTRACTOR submittals. The CONTRACTOR shall be responsible for the dimensions and the design of adequate connections and details.

### 1.3 RECORD DRAWINGS SUBMITTAL

- A. The CONTRACTOR shall keep and maintain, at the job site, one record set of Drawings. On these, it shall mark all Project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented on the original Contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings. Said record drawings shall be supplemented by any detailed sketches as necessary or directed to indicate, fully, the WORK as actually constructed. These master record drawings of the CONTRACTOR's representation of as-built conditions, including all revisions made necessary by addenda, change orders, and the like shall be maintained up-to-date during the progress of the WORK.
- B. In the case of those drawings which depict the detail requirement for equipment to be assembled and wired in the factory, such as motor control centers and the like, the record drawings shall be updated by indicating those portions which are superseded by change order drawings or final shop drawings, and by including appropriate reference information describing the change orders by number and the shop drawings by manufacturer, drawing, and revision numbers.
- C. Record drawings shall be accessible to the ENGINEER at all times during the construction period and shall be delivered to the ENGINEER upon completion of the WORK.
- D. Final payment will not be acted upon until the CONTRACTOR-prepared record drawings have been delivered to the ENGINEER.

### 1.4 PROGRESS SCHEDULES

- A. The progress schedule shall be in Bar Chart or Critical Path Method (CPM) form, as required by the ENGINEER.
- B. The progress schedule shall show the order in which the CONTRACTOR proposes to carry out the WORK and the contemplated dated on which the CONTRACTOR and their subcontractors will start and finish each of the salient features of the WORK, including any scheduled periods of shutdown. The schedule shall also indicate any anticipated periods of multiple-shift WORK.

- C. Upon substantial changes to the CONTRACTOR's progress schedule of WORK or upon request of the ENGINEER, the CONTRACTOR shall submit a revised progress schedule(s) in the form required. Such revised schedule(s) shall conform with the Contract Time and take into account delays which may have been encountered in the performance of the WORK. In submitting a revised schedule, the CONTRACTOR shall state specifically the reason for the revision and the adjustments made in its schedule or methods of operation to ensure the completion of all the WORK within the contract time.

1.5 PROPOSED SUBSTITUTES OR "OR-EQUAL" ITEM SUBMITTAL

- A. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the naming of the item is intended to establish the type, function, and quality required. If the name is followed by the words "or-equal" indicating that a substitution is permitted, materials or equipment of other Suppliers may be accepted by the ENGINEER if sufficient information is submitted by the CONTRACTOR to allow the ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named, subject to the following requirements:

1. The burden of proof as to the type, function, and quality of any such substitute material or equipment shall be upon the CONTRACTOR.
2. The ENGINEER will be the sole judge as to the type, function, and quality of any such substitute material or equipment and the ENGINEER's decision shall be final.
3. The ENGINEER may require the CONTRACTOR, to furnish at the CONTRACTOR's expense, additional data about the proposed substitute.
4. The OWNER may require the CONTRACTOR to furnish at the CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.
5. Acceptance by the ENGINEER of a substitute item proposed by the CONTRACTOR shall not relieve the CONTRACTOR of the responsibility for full compliance with the Contract Documents and for adequacy of the substitute item.
6. The CONTRACTOR shall be responsible for resultant changes and all additional costs which the accepted substitution requires in the CONTRACTOR's WORK, the WORK of its subcontractors and of other contractors, and shall effect such changes without cost to the OWNER. This shall include the cost for redesign and claims of other contractor affected by the resulting change.

- B. The procedure for review by the ENGINEER will include the following:

1. If the CONTRACTOR wishes to furnish or use a substitute item of material or equipment, the CONTRACTOR shall make written application to the ENGINEER on the "Substitution Request" for acceptance thereof. The CBJ Engineering "Substitution Request Form" is located at the end of this Section.
2. Unless otherwise provided by law or authorized in writing by the ENGINEER, the "Substitution Requests" shall be submitted within the 14-day period after Notice of Award.

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SECTION 01300  
CONTRACTOR SUBMITTALS

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3. Wherever a proposed substitute material or equipment has not been submitted within said 14-day period, or wherever the submission of a proposed substitute material or equipment has been judged to be unacceptable by the ENGINEER, the CONTRACTOR shall provide material or equipment named in the Contract Documents.
  4. The CONTRACTOR shall certify that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified, and be suited to the same use as that specified.
  5. The ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. In no case will this reasonable time period be less than 30 days.
  6. As applicable, no shop drawing submittals will be made for a substitute item nor will any substitute item be ordered, installed, or utilized without the ENGINEER's prior written acceptance of the CONTRACTOR's "Substitution Request" which will be evidenced by a Change Order.
  7. The ENGINEER will record the time required by the ENGINEER in evaluating substitutions proposed by the CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not the ENGINEER accepts a proposed substitute, the CONTRACTOR shall reimburse the OWNER for the charges of the ENGINEER for evaluating each proposed substitute.
- C. The CONTRACTOR's application using the "Substitution Request" shall contain the following statements and/or information which shall be considered by the ENGINEER in evaluating the proposed substitution:
1. The evaluation and acceptance of the proposed substitute will not prejudice the CONTRACTOR's achievement of substantial completion on time.
  2. Whether or not acceptance of the substitute for use in the WORK will require a change in any of the Contract Documents to adopt the design to the proposed substitute.
  3. Whether or not incorporation or use of the substitute in connection with the WORK is subject to payment of any license fee or royalty.
  4. All variations of the proposed substitute for that specified will be identified.
  5. Available maintenance, repair, and replacement service and its estimated cost will be indicated.
  6. Itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including cost of redesign and claims of other contractors affected by the resulting change.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**(Substitution Request Form - next page)**

**SUBSTITUTION REQUEST FORM**

TO: \_\_\_\_\_ Project: \_\_\_\_\_  
Contract No. \_\_\_\_\_  
OWNER: \_\_\_\_\_

**SPECIFIED ITEM:**

Section	Page	Paragraph	Description
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The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: \_\_\_\_\_

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of the request. Applicable portions of the data are clearly identified.

The undersigned states that the following paragraphs, unless modified on attachments, are correct:

1. The proposed substitution does not affect dimensions shown on Drawings and will not require a change in any of the Contract Documents.
2. The undersigned will pay for changes to the design, including engineering design, detailing, and construction costs caused by the requested substitution which is estimated to be approximately \$ \_\_\_\_\_.
3. The proposed substitution will have no adverse affect on other contractors, the construction schedule (specifically the date of substantial completion), or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.
5. The incorporation or use of the substitute in connection with the WORK is not subject to payment of any license fee or royalty.

The undersigned further states that the function, appearance, and quality of the proposed substitution is the equivalent of, or is superior to, the specified item.

Submitted by Contractor: _____	Reviewed by Architect/Engineer: _____
Signature _____	___ Accepted      ___ Accepted as Noted
Firm: _____	___ Not Accepted      ___ Received Too Late
By: _____	Date: _____
Title: _____	Telephone: _____
Date: _____	
Attachments: _____	

**END OF SECTION**

**PART 1 - GENERAL**

1.1 DEFINITION

- A. Specific quality control requirements for the WORK are indicated throughout the Contract Documents. The requirements of this Section are primarily related to performance of the WORK beyond furnishing of manufactured products. The term "Quality Control" includes inspection, sampling and testing, and associated requirements.

1.2 INSPECTION AND TESTING LABORATORY SERVICE

- A. Inspection and testing laboratory service shall comply with the following:
  - 1. OWNER will appoint, employ, and pay for services of an independent firm to perform inspection and testing or will perform inspection and testing itself.
  - 2. The ENGINEER will perform inspections as specified in individual Specification sections.
  - 3. Reports will be submitted by the independent firm to the ENGINEER in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
  - 4. The CONTRACTOR shall cooperate with the ENGINEER or independent firm and furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
  - 5. The CONTRACTOR shall notify ENGINEER 24 hours prior to the expected time for operations requiring inspection and laboratory testing services.
  - 6. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the ENGINEER. The CONTRACTOR shall bear all costs from such retesting at no additional cost to the OWNER.
  - 7. For samples and tests required for CONTRACTOR'S use, the CONTRACTOR shall make arrangements with an independent firm for payment and scheduling of testing. The cost of sampling and testing for the CONTRACTOR'S use shall be included in the Contract Price.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

3.1 INSTALLATION

- A. Inspection. The CONTRACTOR shall inspect materials or equipment upon the arrival on the job site and immediately prior to installation, and reject damaged and defective items.
- B. Measurements. The CONTRACTOR shall verify measurements and dimensions of the WORK, as an integral step of starting each installation.

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SECTION 01400  
QUALITY CONTROL

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- C. Manufacturer's Instructions. Where installations include manufactured products, the CONTRACTOR shall comply with manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than applicable requirements indicated in Contract Documents.

END OF SECTION



PROJECT NO. 2009-10

SECTION 01505  
MOBILIZATION

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**PART 1 - GENERAL**

**1.1 GENERAL**

- A. Mobilization shall include obtaining all permits; moving all plant and equipment onto the site; furnishing and erecting plants, temporary buildings, and other construction facilities; implementing security requirements, all as required for the proper performance and completion of the WORK. Mobilization shall include the following principal items:
1. Moving all the CONTRACTOR's plant and equipment required for operations onto the site.
  2. Providing all on-site communication facilities, including radios and cellular phones.
  3. Providing on-site sanitary facilities.
  4. Obtaining all required permits.
  5. Having all OSHA-required notices and establishment of safety programs.
  6. Having the CONTRACTOR's superintendent at the jobsite full time.
  7. Submitting initial submittals.

**1.2 PAYMENT FOR MOBILIZATION**

- A. The CONTRACTOR's attention is directed to the condition that no payment for Mobilization, or any part thereof, will be approved for payment under the contract until all Mobilization items listed above have been completed as specified.
- B. As soon as practicable, after receipt of Notice to Proceed, the CONTRACTOR shall submit a breakdown showing the estimated value of each major component of Mobilization to the ENGINEER for approval. When approved by the ENGINEER, the breakdown will be the basis for initial progress payments in which Mobilization is included.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

PROJECT NO. 2009-10

SECTION 01530  
PROTECTION AND RESTORATION OF  
EXISTING FACILITIES

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## PART 1 - GENERAL

### 1.1 GENERAL

- A. The CONTRACTOR shall protect all existing utilities and improvements (shed, monitoring well, asphalt pavement, landfill liner, etc.) not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.
- B. The CONTRACTOR shall verify the exact locations and depths of all utilities and the CONTRACTOR shall make exploratory excavations of all utilities that may interfere with the WORK. All such exploratory excavations shall be performed as soon as practicable after award of the contract and, in any event, a sufficient time in advance of construction to avoid possible delays to the CONTRACTOR's WORK. Any utility or service in conflict with the WORK will be reburied by the CONTRACTOR prior beginning the WORK to avoid damage.

### 1.2 PROTECTION OF SURVEY MONUMENTS, STREET AND/OR ROADWAY MARKERS

- A. The CONTRACTOR shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. No pavement breaking or excavation shall be started until all survey or other permanent marker points that will be disturbed by the construction operations have been properly referenced. All survey monuments, markers or points disturbed by the CONTRACTOR shall be accurately re-established, at the CONTRACTOR's expense unless provided for elsewhere in the contract, after all street or roadway resurfacing has been completed. Re-establishment of all survey monuments shall be by a Registered Alaskan Land Surveyor.

### 1.3 RESTORATION OF PAVEMENT

- A. General. All paved areas, including asphalt concrete berms, cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit. All temporary and permanent pavement shall conform to the requirements of the affected pavement owner. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.

### 1.4 EXISTING UTILITIES AND IMPROVEMENTS

- A. General. The CONTRACTOR shall protect all underground utilities and other improvements which may be impaired during construction operations. It shall be the CONTRACTOR's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The CONTRACTOR shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.

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SECTION 01530  
PROTECTION AND RESTORATION OF  
EXISTING FACILITIES

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- B. OWNER's Right of Access. The right is reserved to the OWNER and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the WORK of this Contract.
- C. All costs of locating, repairing damage not due to failure of the CONTRACTOR to exercise reasonable care, and removing or relocating such utility facilities not shown in the Contract Documents with reasonable accuracy, and for equipment on the Project which was actually working on that portion of the WORK which was interrupted or idled by removal or relocation of such utility facilities, and which was necessarily idled during such WORK will be paid for as extra WORK in accordance with the provisions of Articles 10, 11, and 12 of the General Conditions.

#### 1.5 TREES WITHIN PROJECT LIMITS

- A. General. The CONTRACTOR shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within street rights-of-way and project limits, and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or OWNER. All existing trees and shrubs which are damaged during construction shall be trimmed or replaced by the CONTRACTOR or a certified tree company under permit from the jurisdictional agency and/or the OWNER. Tree trimming and replacement shall be accomplished in accordance with the following paragraphs.

#### 1.6 PROTECTION OF EXISTING STRUCTURES

- A. Compaction Equipment and Operations. The CONTRACTOR shall restrict compaction operations as necessary to assure no damage occurs to adjacent buildings. This may require the use of smaller compaction equipment than is usually employed for trench backfill and roadway embankment compaction operations when in the vicinity of buildings sensitive to vibrating or other impact-type activities. It shall be the CONTRACTOR's responsibility to determine in which areas of the Project the compaction operations must be restricted, to avoid damage to existing buildings. The foregoing restrictions on the size of, and magnitude of impact energy exerted by, compaction equipment will in no way relieve the CONTRACTOR from the compaction requirements as specified in other Sections of the contract.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 HIGHWAY LIMITATIONS**

- A. The CONTRACTOR shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the WORK. It shall be the CONTRACTOR's responsibility to construct and maintain any haul roads required for its construction operations.

**1.2 MAINTENANCE OF TRAFFIC**

- A. General. Unless otherwise provided, the roadway undergoing improvements shall be kept open to all traffic by the CONTRACTOR. Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, alleyway, or parking area during the performance of the WORK hereunder, and it shall so conduct its operations as not to interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleyways, or parking areas. The CONTRACTOR shall provide unimpeded access through the Project limits for emergency vehicles and make every effort to provide minimum delay to United States Postal Service vehicles and garbage collection vehicles.
- B. The CONTRACTOR shall take all necessary precautions for the protection of the WORK and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The CONTRACTOR shall station such guards or flaggers and shall conform to such special safety regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. All signs, signals, and barricades shall conform to the requirements of Subpart G, Part 1926, of the OSHA Safety and Health Standards for Construction.
- C. On-Site Cellular Phones. The CONTRACTOR shall maintain one active cellular phone at the project site at all times with the phone number provided to the City and Borough of Wrangell Fire and Police Departments. The cellular phone shall be carried by the person in charge of the field operations. The CONTRACTOR shall provide and allow the use of the CONTRACTOR's radio frequency to facilitate communication between the CONTRACTOR and the ENGINEER.

**1.4 CONTRACTOR'S WORK AND STORAGE AREA**

- A. The CONTRACTOR shall make its own arrangements for any necessary off-site storage or shop areas necessary for the proper execution of the WORK.
- B. Should the CONTRACTOR find it necessary to use any additional land for its staging area or for other purposes during the construction of the WORK, it shall provide for the use of such lands at its own expense.
- C. The CONTRACTOR shall construct and use a separate storage area for hazardous materials used in constructing the WORK.
  - 1. For the purpose of this paragraph, hazardous materials to be stored in the separate area are all products labeled with any of the following terms: **Warning, Caution, Poisonous, Toxic, Flammable, Corrosive, Reactive, or Explosive**. In addition,

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SECTION 01550  
SITE ACCESS AND STORAGE

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whether or not so labeled, the following materials shall be stored in the separate area: diesel fuel, gasoline, new and used motor oil, hydraulic fluid, cement, paints and paint thinners, two-part epoxy coatings, sealants, asphaltic products, glues, solvents, wood preservatives, sand blast materials, and spill absorbent.

2. The CONTRACTOR shall develop and submit to the ENGINEER a plan for storing and disposing of the materials above.
3. The separate storage area shall meet all the requirements of all authorities having jurisdiction over the storage of hazardous materials.
4. The separate storage area shall be inspected by the ENGINEER prior to construction of the area, upon completion of construction of the area, and upon clean-up and removal of the area.
5. All hazardous materials which are delivered in containers shall be stored in the original containers until use. Hazardous materials which are delivered in bulk shall be stored in containers which meet the requirements of authorities having jurisdiction.

1.5 PARKING

- A. The CONTRACTOR shall direct its employees to park in areas as directed by the ENGINEER.
- B. Traffic and parking areas shall be maintained in a sound condition, free of excavated material, construction equipment, mud, and construction materials. The CONTRACTOR shall repair breaks, potholes, low areas which collect standing water, and other deficiencies.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

## PART 1 - GENERAL

### 1.1 DUST ABATEMENT

- A. The CONTRACTOR shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The CONTRACTOR shall be responsible for any damage resulting from any dust originating from its operations. The dust abatement measures shall be continued until dust is no longer produced and the CONTRACTOR is relieved of further responsibility by the ENGINEER.

### 1.2 RUBBISH CONTROL

- A. During the progress of the WORK, the CONTRACTOR shall keep the site of the WORK and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The CONTRACTOR shall dispose of all rubbish and waste materials of any nature occurring at the WORK site, and shall establish regular intervals of collection and disposal of such materials and waste. The CONTRACTOR shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

### 1.3 SANITATION

- A. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for the use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction.
- B. Sanitary and Other Organic Wastes: The CONTRACTOR shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the CONTRACTOR or organic material wastes from any other source related to the CONTRACTOR's operations shall be disposed of away from the site in a manner satisfactory to the ENGINEER and in accordance with all laws and regulations pertaining thereto.

### 1.4 CHEMICALS

- A. All chemicals used during Project construction or furnished for Project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

1.5 CULTURAL RESOURCES

- A. The CONTRACTOR's attention is directed to the National Historic Preservation Act of 1966 (16 U.S.C. 470) and 36 CFR 800 which provides for the preservation of potential historical architectural, archaeological, or cultural resources (hereinafter called "cultural resources").
- B. The CONTRACTOR shall conform to the applicable requirements of the National Historic Preservation Act of 1966 as it relates to the preservation of cultural resources.
- C. In the event potential cultural resources are discovered during subsurface excavations at the site of construction, stop work immediately and notify the ENGINEER.

1.6 EAGLE NESTING TREES

- A. Eagle nesting trees are known to exist in the Wrangell area, although none are known to exist in the immediate vicinity of the project site. The Contractor has the responsibility for adherence to the Bald Eagle Protection Act (16 U.S.C. 668-668d) which prohibits molesting or disturbing bald eagles, their nests, eggs, or young.
- B. Guidelines for compliance to the Bald Eagle Protection Act are supervised by the U.S. Department of the Interior, Fish and Wildlife Service, Raptor Management Studies, P. O. Box 021287, Juneau, Alaska 99802-1287, phone (907) 586-7243. The contact person is Mike Jacobson, Eagle Management Specialist. The CONTRACTOR shall contact the Eagle Management Specialist for guidelines of the Bald Eagle Protection Act.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF SECTION**

PROJECT NO. 2009-10

SECTION 01570  
EROSION CONTROL

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## PART 1 - GENERAL

### 1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary to maintain existing temporary erosion control devices; including, but not limited to, silt fences, settling ponds, wheel wash system, hay or straw bales, rock check dams, ditches, etc. The WORK also includes preparing a SWPPP and HMCP.
- B. The WORK also includes sweeping, watering, vacuuming of the existing asphalt roadways including Evergreen Avenue and Airport Road.

### 1.2 DEFINITIONS

- A. Erosion and Sediment Control Plan (ESCP). Permanent and temporary prevention of erosion and control of sedimentation during construction of the Project is included in the project Plans and Specifications.
- B. Storm Water Pollution Prevention Plan (SWPPP). The CONTRACTOR's site-specific plan for the permanent and temporary prevention of erosion and control of sedimentation during construction of the project. The SWPPP must address the requirements of the ESCP.
- C. Hazardous Material Control Plan (HMCP). The CONTRACTOR's detailed plan to prevent pollution from the use, containment, cleanup and disposal of hazardous materials (see 40 CFR 117 and 302 for listing), including petroleum products generated by construction equipment or activities.
- D. Final Stabilization. That point when all soil disturbing activities resulting from the project have been completed and a live uniform blanket of perennial vegetation, to preclude erosion, has been established on all unpaved areas (excluding graveled shoulders and crushed aggregate base course) not covered by permanent structures or equivalent permanent stabilization measures, such as use of riprap, gabions or geotextiles, have been implemented.
- E. Best Management Practices (BMP's). A wide range of project management practices, schedules of activities or prohibition of practices that when used singly or in combination, prevent or reduce erosion, sedimentation and pollution of adjacent water bodies and wetlands. BMP's include both structural devices and non-structural practices and can be temporary or permanent. The State of Alaska DOT/PF Best management Practices for Construction Erosion and Sediment Control describes a variety of standard BMP's.

### 1.3 SUBMITTALS

- A. Submit the following items for approval a minimum of 5 calendar days prior to the Preconstruction Conference.



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EROSION CONTROL

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1. SWPPP
  2. HMCP
- B. The OWNER will review submittals within 14 calendar days then either approve them or require changes. If required for approval, modify the submittals within 5 calendar days of receiving comments from the OWNER.
- C. The approved SWPPP and HMCP become the project SWPPP and HMCP. Both must be signed by the CONTRACTOR and the OWNER. A copy must be kept on site by the CONTRACTOR.
- D. Once the SWPPP is approved, the OWNER will submit a copy of the State of Alaska Department of Environmental Conservation (DEC) Storm Water Coordinator.
- E. Follow the same approval process for amendments to the SWPPP is as with the draft SWPPP.

## PART 2 - PRODUCTS

### 2.1 STORM WATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS

- A. Use the ESCP as a basis to develop the SWPPP. Include revisions where necessary to accommodate your scheduling, equipment, or use of alternative BMP's. Base the SWPPP on the approach of first avoiding and preventing erosion, then minimizing erosion and finally trapping sediment before it leaves the project site.
- B. Address all ground disturbing activities required by the contract as well as those planned for your operations. Insure that all erosion, sediment and pollution control requirements are met for all activities associated with this contract and are addressed in the SWPPP.
- C. The plan must demonstrate that any offsite operations, including material sources, waste areas, and haul roads are in compliance with all local, state and federal erosion, sediment and pollution control requirements. When you obtain material from a commercial source, evidence of compliance is not required. A commercial source is defined as one that serves multiple unrelated projects and would continue to operate after project completion. A site developed solely for the project is considered a CONTRACTOR source.
- D. Have the SWPPP prepared under the direction of and stamped by a professional ENGINEER currently registered in the State of Alaska. Follow the format presented in the ESCP, and address all storm water discharge control and management issues identified by and discussed in the ESCP:
1. Site Description
    - a. Description of the nature of the construction activity.

- 
- b. Description of the intended sequence of major activities which disturb soils on major portions of the site (within the right-of-way limits and including grubbing, excavation, grading and other work in or near surface waters).
  - c. Estimates of the total area of the project site (including related off-site areas) and the total area that is expected to be disturbed by excavation, grading, or other activities.
  - d. Estimate of appropriate drainage parameters for the site before, during, and after construction activities are completed; narrative and/or data describing existing conditions of the soil, including soil loss parameters for disturbed soils, and the quality of any discharge from the site, including pass-through discharges.
  - e. Site map indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of soil disturbance, an outline of the areas which will not be disturbed, the location of major structural and nonstructural erosion, sediment and pollution controls identified in the Plans, the location of areas where stabilization practices are expected to occur, location of all surface waters (including wetlands and all waters that will pass through the project site), and locations where storm water is discharged to a surface water.
  - f. Identify all receiving waters and wetlands within or adjacent to the site which will be disturbed or which will receive discharges from disturbed areas of the project.
2. Control Measures. Describe the appropriate control measures to be implemented at the construction site and off-site areas. Clearly describe for each major activity, appropriate control measures and the period during the construction process that the measures will be implemented. Address erosion and sediment controls, stabilization practices, structural practices, and permanent storm water management as described in the ESCP.

Specifically address your plan for controlling and managing erosion and sedimentation during construction at the following locations.

- a. Cut and fill slopes steeper than 2:1 and over 16 feet in height.
  - b. All construction adjacent to existing drainages, streams, lakes, water bodies, wetlands, and other sensitive areas.
  - c. Culvert installations and/or bridge construction.
  - d. City and Borough of Wrangell designated disposal sites and material sites.
  - e. Any additional sites which may be sensitive due to the proposed construction operation (including contractor supplied material and disposal sites, staging areas, stockpile locations, and slopes opened up after the seeding deadline).
3. Maintenance. Include a description of maintenance procedures for the timely inspection and maintenance of vegetative cover, temporary and permanent erosion and sediment control measures, and other protective measures identified in the SWPPP and the contract Plans and Specifications. Specifically address details to stabilize the site prior to winter shutdown.

4. Inspections. Identify the CONTRACTOR personnel responsible for inspection of the project's erosion and pollution control measures.
5. Non-Storm Water Discharges. Identify on-site sources of non-storm water associated with the construction activity, including those combined with storm water discharges from the site. Exclude flows from fire fighting activities. Identify appropriate pollution prevention measures for the non-storm water component(s) of the discharge.
6. Responsible Party. Clearly identify for each measure shown in the plan, the CONTRACTOR and/or subcontractors that will implement and maintain the measure.

## 2.2 HAZARDOUS MATERIAL CONTROL PLAN (HMCP) REQUIREMENTS

- A. Prepare a HMCP which details your plan for fueling and maintaining equipment and machinery and the storage of fuels and petroleum products. Identify the locations where fueling and maintenance activities will take place, and all controls to contain the accidental spillage of petroleum products.
- B. List and give the location of potentially hazardous materials, including petroleum products, to be used and/or stored on site, and their estimated quantities. List the types and quantities of equipment and materials available on site to be used for hazardous material containment and cleanup.
- C. Detail your plan for storing hazardous materials as well as disposing of waste petroleum products and/or other hazardous materials generated by the project.
- D. Detail your plan for the prevention, containment, cleanup and disposal of soil and water contaminated by accidental spills. Detail your plan for dealing with unexpected contaminated soil and water encountered during construction. Specify the line of authority and designate a field representative for spill response for the CONTRACTOR and each subcontractor.

## PART 3 - EXECUTION

### 3.1 CONSTRUCTION REQUIREMENTS

- A. Do not begin earth disturbing work until written approval of the SWPPP and HMCP has been received from the OWNER.
- B. Contain, clean up, and dispose of all construction related (including office facilities) discharges of petroleum products and/or other materials hazardous to the land, air, water and organic life forms. Perform all fueling operations in a safe and environmentally responsible manner. Comply with the requirements of 18 AAC 75 and AS 46, Oil and Hazardous Substances Pollution Control.

- C. Implement all temporary and permanent erosion and sediment control measures identified in the SWPPP and contract Plans and ensure that the SWPPP remains current.
- D. Prior to the start of construction, conduct a joint on-site inspection with the OWNER, and the professional ENGINEER who stamped the SWPPP, to discuss the implementation of the requirements of the SWPPP. Conduct additional joint inspection, as needed, when requested by the OWNER or the CONTRACTOR.
- E. During construction, inspect the following at least once every 7 calendar days:
  - 1. Disturbed areas of the construction site where final stabilization is not complete.
  - 2. Areas used for storage of materials that are exposed to rain.
  - 3. Structural control measures.
  - 4. Locations where vehicles enter or exit the site.
- F. Perform inspections also within 24 hours of the end of a storm resulting in rainfall of 1/2 inch or greater.
- G. Perform other inspections, if directed, during or following high intensity rainfall events of any depth.
- H. Prepare inspection reports summarizing the scope of the inspections, names of personnel making the inspection, the dates of the inspections and major observations relating to the implementation of the SWPPP. Identify any incidents of non-compliance, steps taken to implement corrective actions, and state that the facility is in compliance with the SWPPP. Submit the inspection reports to the OWNER within 3 calendar days of each inspection.
- I. Based on the results of each inspection, modify the SWPPP as necessary to include additional or modified BMP's designed to correct problems identified. Complete the revisions to the SWPPP within 7 calendar days following the inspection. Implement modified or additional BMP's before the next anticipated storm event or as soon as practicable.
- J. Amend the SWPPP within 7 calendar days when conditions change or if directed. Have all SWPPP amendments prepared under the direction of and stamped by the professional ENGINEER of record.
- K. If a storm event occurs, where storm water discharges pose a threat to water quality, take immediate suitable action to preclude erosion and pollution. Submit an amendment to the SWPPP, within 7 calendar days of the storm event, covering the emergency measures that were taken.
- L. Prior to winter shutdown, ensure that the site has been stabilized as detailed in the SWPPP. Prior to project closeout and demobilization, the ENGINEER will review all areas disturbed by construction to determine if final stabilization is complete.

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SECTION 01570  
EROSION CONTROL

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- M. The Contractor shall maintain existing temporary erosion control structures as necessary and/or as directed by the OWNER for the duration of the contract. They shall be maintained in effective operating conditions at all times. Rock check dams, straw hay bale check dams and silt fences shall be cleaned whenever they have become half-filled with silt or debris, and other items shall be cleaned, repaired, or replaced as necessary.
- N. Temporary erosion control structures shall remain in place until the OWNER approves their removal.

END OF SECTION

PROJECT NO. 2009-10

SECTION 01700  
PROJECT CLOSE-OUT

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**PART 1 - GENERAL**

**1.1 FINAL CLEAN-UP**

- A. The CONTRACTOR shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the WORK by the OWNER will be withheld until the CONTRACTOR has satisfactorily complied with the foregoing requirements for final clean-up of the Project site.

**1.2 CLOSEOUT TIMETABLE**

- A. The CONTRACTOR shall establish dates for equipment testing, acceptance periods, and on-site instructional periods (as required under the contract). Such dates shall be established not less than one week prior to beginning any of the foregoing items, to allow the OWNER, the ENGINEER, and their authorized representatives sufficient time to schedule attendance at such activities.

**1.3 FINAL SUBMITTALS**

- A. The CONTRACTOR, prior to requesting final payment, shall obtain and submit the following items to the ENGINEER for transmittal to the OWNER:
1. Written guarantees, where required.
  2. Maintenance stock items; spare parts; special tools, where required.
  3. Completed record drawings.
  4. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
  5. Releases from all parties who are entitled to claims against the subject project, property.
  6. Or improvement pursuant to the provisions of law.
  7. Completed Certificate of Compliance and Release for all contractors involved in the WORK.
  8. A final Subcontractor list complete with the final subcontract amounts (including all equipment rentals with operators).
  9. Submit original documents for item numbers 7 and 8 above to the City and Borough of Wrangell.

**1.4 MAINTENANCE AND GUARANTEE**

- A. The CONTRACTOR shall comply with the maintenance and guarantee requirements contained in the General Conditions.
- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the CONTRACTOR which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless the CONTRACTOR

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PROJECT CLOSE-OUT

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shall have obtained a statement in writing from the affected private owner or public agency releasing the OWNER from further responsibility in connection with such repair or resurfacing.

- C. The CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order from the OWNER. If the CONTRACTOR fails to make such repairs or replacements promptly, the OWNER reserves the right to do the WORK and the CONTRACTOR and the CONTRACTOR's surety shall be liable to the OWNER for the cost thereof.

1.5 BOND

1. The CONTRACTOR shall provide a bond to guarantee performance of the provisions contained in Paragraph "Maintenance and Guarantee" above.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**COMPLIANCE CERTIFICATE AND RELEASE FORM** next page.

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SECTION 01700  
PROJECT CLOSE-OUT

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COMPLIANCE CERTIFICATE AND RELEASE FORM

PROJECT: CITY AND BOROUGH OF WRANGELL LANDFILL CLOSURE.

The CONTRACTOR and each Subcontractor must complete and submit this to the Engineer. Subcontractors must complete this form with respect to their own scope of work. The CONTRACTOR shall complete this form with respect to the entire contract.

Completed forms may be submitted when the Subcontractor's portion of the WORK is finished, or upon completion of the Project. All requirements and submittals must be met before final payment will be made to the CONTRACTOR.

*I certify that the following and any referenced attachments are true:*

- All WORK has been performed, materials supplied, and requirements met in accordance with the applicable plans, Specifications, and Contract Documents.
- All suppliers and Subcontractors have been paid in full with no claims for labor, materials, or other services outstanding. If all Subcontractors and suppliers are not paid in full, please explain on a separate sheet.
- All employees have been paid not less than the current prevailing wage rates set by the State of Alaska (or U.S. Department of Labor, as applicable).
- All equal employment opportunity, certified payroll and other reports have been filed in accordance with the prime contract.
- The attachment list of Subcontractors is complete (required from prime contractors). The Engineer was advised and approved of all Subcontractors before WORK was performed and has approved any substitutions of Subcontractors.
- All DBE firms listed as a precondition of the prime contract award must have performed a commercially useful function in order for the work to count to a DBE goal. All DBE firms performed the work stated and have received at least the amount claimed for credit in the contract documents.
- All DBE Subcontractors must attach a signed statement of the payment amount received, the nature of WORK performed, whether any balance is outstanding, and indicate that no rebates are involved.
- If the amount paid is less than the amount originally claimed for DBE credit, the CONTRACTOR has attached approval from the City Engineer for under utilization.

*I understand it is unlawful to misrepresent information in order to receive a payment which would otherwise be withheld if these conditions were not met. I am an authorized agent of this firm and sign this freely and voluntarily. The foregoing statements are true and apply to the following project contractor.*

\_\_\_\_\_  
Firm Name

Capacity:  Prime Contractor  Subcontractor

\_\_\_\_\_  
Signed

\_\_\_\_\_  
Printed Name and Title

\_\_\_\_\_  
Date



**END OF SECTION**

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all supervision, labor, materials, tools and equipment necessary for final clean-up and restoration of all areas disturbed by construction activities, to a condition equal to, or better than, before construction started. This does not include clean-up or restoration incidental to, or directly provided for by, other construction items.

**PART 2 - PRODUCTS**

2.1 MATERIALS

- A. Any materials required shall conform to the appropriate Section of these Specifications.

**PART 3 - EXECUTION**

3.1 CONSTRUCTION

- A. The CONTRACTOR shall clean up all sites disturbed during construction of the Project. This includes removal of all construction equipment, disposal of all excess materials, disposal of all rubbish and debris, removal of all temporary structures, and grading of the sites so that no standing water is evident.

**END OF SECTION**

**PART 1 – GENERAL**

1.1 GENERAL

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for clearing, grubbing, removing and disposing of all vegetation and debris (including earthen materials incidentally removed with vegetation and debris), within the limits shown on the Drawings or designated by the ENGINEER, except such objects as are designated to remain in place or are to be removed in accordance with other sections of these Specifications. The WORK shall also include the preservation from injury or defacement of all vegetation and objects designated to remain.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

3.1 GENERAL

- A. The ENGINEER will establish the limits of the WORK and will designate all trees, plants, shrubs and other items to remain. The CONTRACTOR shall protect and preserve all items designated to remain.
- B. Miscellaneous trimming of trees or shrubs designated to remain shall be conducted when directed by the ENGINEER. Trimming shall be in accordance with good tree surgery practice.
- C. All vegetation and debris to be removed shall be disposed of by the CONTRACTOR within areas indicated on the Drawings or areas approved by the ENGINEER. When burning is permitted, it shall be under the constant care of competent employees. Burning shall be performed in a manner such that anything designated to remain on the right-of-way, the surrounding forest cover, or other adjacent property will not be jeopardized. Burning shall be done in accordance with all applicable laws and ordinances. The CONTRACTOR shall obtain all required permits.
- D. The CONTRACTOR is responsible for:
1. Securing waste disposal sites,
  2. Obtaining written permission of the owner of the disposal site,
  3. Securing any required permits, if none is indicated on the Drawings, and
  4. Obtaining written permission of City and Borough of Wrangell for on-site burning.

The cost of securing such sites shall be borne by the CONTRACTOR. If requested by the ENGINEER, the CONTRACTOR shall furnish the permit numbers of all required permits for disposal sites.

- E. Timber cleared within the project limits shall be limbed and cold decked at a location determined by the ENGINEER by the CONTRACTOR for Public use. Public notice 3 days prior to making the timber available on the local radio station and postings at the Post Office and City and Borough of Wrangell is required.

3.2 GRUBBING

- A. All trees, stumps, roots and other objects not designated to remain shall be cleared and grubbed. If the area is not to be benched, the removal of undisturbed stumps and roots and nonperishable solid objects that will be a minimum of four feet below the embankment surface and that do not extend more than six inches above the original ground line, will not be required.
- B. In areas outside of the grading limits of cut and embankment areas and to the established limits of the WORK, all stumps and nonperishable solid objects permitted to remain in place shall be cut off not more than six inches above the ground line or low water level.
- C. Except in areas to be excavated, stump holes and other holes from which obstructions are removed shall be backfilled with suitable materials and compacted in accordance with the Contract Documents.

END OF SECTION

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for excavating, regrading and compacting the existing landfill waste material to the lines, grades and cross sections indicated in the Drawings or as directed by the ENGINEER.
- B. The WORK also includes screening existing stockpiled material at the Wrangell Institute and placing material as shown on the Drawings, or as directed by the ENGINEER.
- C. The WORK also includes placing, grading and compacting a 4-inch minus shot rock drainage/gas layer as shown on the Drawings, or as directed by the ENGINEER.
- D. The WORK also includes constructing drainage ditches and slope intercept benches as shown on the Drawings, or as directed by the ENGINEER.

1.2 SUBMITTALS

- A. Construction Surveying – Section 02702.

**PART 2 - PRODUCTS**

2.1 REGRADE AND COMPACT LANDFILL MATERIAL

- A. Regrade and Compact Landfill Material shall consist of existing landfill materials including but not limited to scrap iron, wire rope, earth, construction debris, timber, logs, tree stumps, boulders, concrete, asphalt, metal pipe, pallets and other landfill materials.

2.2 SCREENED WRANGELL INSTITUTE MATERIAL

- A. Screened Wrangell Institute Material shall consist of screening stockpiled material to remove the oversize material (+1"). Gradation of screened material shall meet the following:

<u>Screen Size</u>	<u>Percent Passing</u>
1-inch	100%
No. 4	60-80%
No. 200	0-20%

2.3 4-INCH MINUS DRAINAGE/GAS ROCK

- A. 4-Inch Minus Drainage/Gas Rock layer shall consist of 4-Inch minus shot rock and shall contain no muck, frozen material, sod or deleterious matter. Rock material will be obtained from City and Borough of Wrangell quarry.

- B. 4-Inch Minus Drainage/Gas Rock shall conform to the following gradation:

<u>Screen Size</u>	<u>Percent Passing</u>
4-inch	100%
1-inch	50-75%
No. 4	20-40%
No. 200	0-8%

### PART 3 - EXECUTION

#### 3.1 EXCAVATION

- A. Clearing and grubbing in excavation areas must be completed prior to beginning excavation operations in accordance with provisions of Section 02201 – Clearing and Grubbing.
- B. Excavations shall be reasonably smooth and uniform to the lines, grades and cross sections shown in the Drawings or as directed by the ENGINEER. Excavations shall be conducted to insure that material outside of excavation limits remains undisturbed.
- C. Excavations shall be protected from erosion and maintained to drain freely at all times.
- D. Where excavation to the limits indicated on the Drawings encounters unsuitable underlying material, the ENGINEER may require the CONTRACTOR to remove the unsuitable material and backfill with approved material. The CONTRACTOR shall allow time to take the necessary cross section measurements before backfill is placed.
- E. Excavated soils that do not meet the requirements for usable excavation material shall be disposed of by the CONTRACTOR at a location and in a manner approved by the ENGINEER.
- F. The CONTRACTOR is responsible for securing waste disposal sites for excess material not stockpiled on site. The CONTRACTOR shall obtain the written permission of the landowner for use of all disposal sites, and shall either obtain any required permits or assure that they have been obtained by others. If requested by the ENGINEER, the CONTRACTOR shall furnish the permit numbers of all required permits for the disposal sites. The cost of securing such sites shall be borne by the CONTRACTOR.
- G. Temporary storage of usable or suitable excavation is the responsibility of the CONTRACTOR, and no additional payment will be made.
- H. The CONTRACTOR shall conduct all operations to prevent contaminating usable excavation with unsuitable material.
- I. The CONTRACTOR shall provide added care when excavating adjacent to existing retaining walls, fences and houses. Damage caused to existing walls, fences and houses by the CONTRACTOR shall be repaired at the CONTRACTOR's expense.

3.2 4-INCH DRAINAGE/GAS ROCK

- A. 4-Inch Drainage/Gas Rock shall be constructed to a reasonably smooth and uniform shape conforming to the lines, grades and cross sections indicated on the Drawings or as directed by the ENGINEER.
- B. The underlying waste material shall be properly prepared prior to placing 4-inch minus rock material. Clearing and Grubbing in usable excavation areas must be completed prior to 4-Inch minus rock operations. Debris shall be removed and surface depressions or holes shall be filled with landfill material to a level uniform surface and compacted before the 4-Inch minus rock is constructed.
- C. 4-Inch rock material over soft ground may be constructed by end-dumping an initial lift of sufficient depth to support hauling and spreading equipment.
- D. The finish grade of shot rock surface shall not vary more than 0.10-foot from established grade.
- E. 4-Inch shot rock shall not be dumped in final position, but shall be deposited on the landfill slopes and distributed by blading or dozing so that voids, packets and bridging will be reduced to a minimum. Intervening spaces and interstices shall be filled with smaller stones and earth to form a dense, well compacted drainage/gas layer is obtained.
- G. Compaction of 4-Inch rock shall be obtained by routing construction equipment and/or rollers uniformly over the entire surface of each layer before the next layer is placed.
- H. Dumping and rolling areas shall be kept separate, and no lift shall be covered by another until compaction has been completed and approved by the OWNER's on-site representative.
- I. All usable rock excavation surfaces shall be rolled full width with a minimum of six passes of a vibratory grid roller (minimum centrifugal force shall be 50,000 lb) prior to placement of subsequent layer of material. A vibratory grid roller will be required for this project.

3.3 DITCH GRADING

- A. Ditch Grading shall include all excavation, backfill, compaction, grading and other WORK necessary to construct drainage ditches, as shown or described on the Drawings, in these Specifications, or as directed by the ENGINEER.
- B. Ditch Grading, which includes all grading of areas beyond the landfill grading limits, shall extend to the limits shown on the Drawings, or to limits necessary to provide a smooth, uniform transition from the ditch swale to the existing undisturbed areas. All slopes shall be 3:1 or flatter, unless shown on the Drawings, or otherwise approved by the ENGINEER.

END OF SECTION

**PART 1 - GENERAL**

1.1 GENERAL

- A. The WORK under this section includes providing all labor, materials, tools and equipment necessary for the excavation and backfill required for installation of storm drain pipe
- B. Bedding for this project shall meet the requirements for Bedding, Class B.
- C. Submittals - Bedding Material.

**PART 2 - PRODUCTS**

2.1 TRENCH EXCAVATION

- A. Trench excavation shall consist of all material, of whatever nature, excepting liquids, excavated from trenches within the limits described in Section 01025 - Measurement and Payment.

2.2 BEDDING

- A. Bedding, Class B, shall be three inch minus sand/gravel or processed shot rock material, free of muck, frozen material, lumps, organic material, trash, lumber or other debris, with no more than 10% passing the No. 200 screen.

2.3 BACKFILL

- A. Backfill is defined as material placed above the level of bedding material. Backfill material consists of native material excavated from the trench that is determined by the ENGINEER to be suitable as backfill. Backfill material used shall be granular material, non-frost susceptible, that is free of rocks larger than six inches, muck, frozen material, lumps, organic material, trash, lumber, or other debris. All backfill material available from trench excavation shall be utilized prior to the use of imported backfill.

**PART 3 - EXECUTION**

3.1 EXCAVATION

- A. Prior to excavating trenches, all necessary clearing and grubbing shall be completed in accordance with the provisions of Section 02201 – Clearing and Grubbing.
- B. Excavation for trenches shall conform to the lines and grades shown on the Drawings. The CONTRACTOR shall also do any grading necessary to prevent surface water from entering the trench.
- C. Excavation of any and all material more than two feet below the invert of the pipe as shown on the Drawings shall be done only when ordered in writing by the ENGINEER.



- D. All excavated material suitable for use as backfill shall be piled in an orderly manner separately from unsuitable material, at a sufficient distance from the edge to prevent material from sloughing or sliding back into the trench; except that when the trench is in a traveled roadway the ENGINEER may require removal and temporary storage of excavated material elsewhere.
- E. Material unsuitable for use as backfill shall be hauled to a CONTRACTOR furnished disposal site off the Project, unless otherwise directed in writing by the ENGINEER. The CONTRACTOR is responsible for securing waste disposal sites if none are indicated on the Drawings. The CONTRACTOR shall obtain the written permission of the landowner for use of all disposal sites, and shall either obtain any required permits or assure that they have been obtained by others. If requested by the ENGINEER, the CONTRACTOR shall furnish the permit numbers of all required permits for the disposal sites. The cost of securing such sites shall be borne by the CONTRACTOR.
- F. If the CONTRACTOR fails to comply with the provisions of any city ordinance or permit pertaining to waste disposal or disposal sites; the OWNER shall have the right, after giving 30 days written notice, to bring the disposal sites into compliance and collect the cost of the WORK from the CONTRACTOR, either directly or by withholding monies otherwise due under the contract.
- G. If explosives are used, the CONTRACTOR shall obtain all necessary permits and comply with all pertinent regulations. All utility companies shall be informed a minimum of 48 hours prior to the use of explosives in the vicinity of their facilities.
- H. The CONTRACTOR shall protect and preserve all existing pavement throughout the entire construction period. No tracked equipment may be operated on any pavement without first protecting the pavement with pavement pads approved by the ENGINEER. All pavement which is damaged in any manner by the CONTRACTOR's operations shall be restored to original or better condition at the CONTRACTOR's expense.
- I. Where required to prevent caving of the trench, or by any safety law or regulation, the CONTRACTOR shall furnish and install bracing and/or sheeting to protect the excavation. This bracing and/or sheeting shall be removed as trench backfill progresses.
- J. The CONTRACTOR shall remove and dispose of all water entering the excavation. Disposal of water shall be done in a manner to prevent damage or nuisance to adjacent property, and in accordance with all applicable laws and regulations. Pumps shall be adequate to maintain a dry trench during the bedding, pipe installation, and initial backfill to an elevation at least one foot above the top of pipe. No backfill may be placed in standing water under any circumstance.

### 3.2 BEDDING

- A. Bedding shall be placed in conformance with the lines and grades shown on the Drawings. Before placing any bedding material, the bottom of the trench shall be hand-raked ahead of the pipe laying operation to remove stones and lumps which will interfere with smooth and complete bedding of the pipe. The specified bedding material shall then be placed in layer(s) the full width of the trench, each layer not exceeding eight inches in thickness loose measure, and compacted to 95% of maximum density as determined by AASHTO T 180 D, until the elevation of the plan grade for the pipe invert is attained. The pipe bed shall then be fine-graded by hand and compacted as above. Bell holes shall be hand dug at the location of the joints and shall be of sufficient size to allow proper making of the joint and to prevent the collar or bell of the pipe from bearing on the bottom of the trench.
- B. After the pipe has been laid and approved for covering, the specified bedding material shall be placed evenly on both sides of the pipe for the full width of the trench. Approval for covering does not imply final acceptance of the pipe, or relieve the CONTRACTOR in any way of responsibility to complete the Project in conformance with the Drawings and Specifications. Bedding material shall be placed by hand in layers. The thickness, loose measure, of the first layer shall be either one-half the outside diameter of the pipe plus two inches or eight inches, whichever is least. This layer shall be compacted as specified above to provide solid support to the underside of the pipe. For pipe ten inches and smaller nominal diameter, the next layer shall be of the thickness required to complete placement of the bedding to a plane six inches above the pipe, after compaction as specified above.
- C. For pipe 12 inches and larger, the bedding material shall be placed and compacted in layers not more than 8 inches in thickness, loose measure, up to a plane 6 inches above the top of the pipe.
- D. The initial density test at any location will be paid for by the OWNER. If the initial test shows that the material compaction is not as specified, the CONTRACTOR shall modify the compaction methods used, as approved by the ENGINEER, and have the material retested until the tests show that the compaction meets the specification requirements. All tests, after the initial test at any given location, shall be paid for by the CONTRACTOR.

### 3.3 BACKFILL

- A. The trench shall be backfilled above the bedding material, as shown on the Drawings, with approved material saved from trench excavation. If there is not sufficient approved material from the excavation, the backfilling of the trench shall be completed utilizing suitable material from driveway excavation, or imported backfill. The backfill and/or suitable material from driveway excavation shall be compacted to 95% of optimum density, as determined by AASHTO T 180-D. Lifts shall not exceed eight inches in depth for loose material, unless a backhoe mounted vibratory headshaker-type compactor is used, in which case the depth of each lift may be increased to 12-inches. After backfilling of the trench is completed, any excess material from trench excavation shall be hauled to a CONTRACTOR furnished disposal site off the project.

- B. At least 24 hours prior to commencing backfilling operations, the CONTRACTOR shall notify the ENGINEER of the proposed method of compaction. No method will be approved until the CONTRACTOR has demonstrated, under actual field conditions, that such method will produce the degree of compaction required.
  
- C. The initial density test at any location will be paid for by the OWNER. If the initial test shows that the material compaction is not as specified, the CONTRACTOR shall modify the compaction methods used, as approved by the ENGINEER, and have the material retested until the tests show that the compaction meets the specification requirements. All tests, after the initial test at any given location, shall be paid for by the CONTRACTOR.

**END OF SECTION**

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**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and placing aggregate base course on a prepared surface to the lines and grades shown on the Drawings.

1.2 SUBMITTALS

- A. Base course grading D-1 gradation analysis and modified proctor.

**PART 2 - PRODUCTS**

2.1 MATERIAL

- A. Aggregate base course shall consist of crushed gravel or crushed stone, conforming to the quality requirements of AASHTO M 147. The aggregate shall be free from lumps, balls of clay, or other objectionable matter, and shall be durable and sound.
- B. Base course material shall conform to the following gradations:

BASE COURSE GRADING D-1 GRADATION	
Screen Size	Percent Passing By Weight
1"	100
3/4"	70-100
3/8"	50-80
No. 4	35-65
No. 8	20-50
No. 40	8-30
No. 200	0-6

- C. For gradings D-1 at least 70% by weight of the particles retained on a No. 4 sieve shall have at least one fractured face as determined by Alaska Test Method T-4.

### PART 3 - EXECUTION

#### 3.1 CONSTRUCTION

- A. Prior to placement of the base course, the underlying surface shall be prepared by dressing, shaping, wetting or drying, and compacting of the underlying material to a minimum density of 95% as determined by AASHTO T 180-D. Surfaces shall be cleaned of all foreign substances and debris.
- B. Any ruts or soft yielding spots that may appear shall be corrected by loosening and removing unsatisfactory material and adding approved material as required, reshaping, and recompacting the affected areas to the lines and grades indicated on the Drawings. If required by the ENGINEER, the CONTRACTOR shall proof load questionable areas with a loaded truck or other piece of equipment approved by the ENGINEER.
- C. Blue top grading hubs shall be set to the top of base course at road centerline. They shall be set by the CONTRACTOR at breaks in grade and on even grade at intervals not to exceed 25', with additional stakes at vertical and horizontal curves.
- D. Base course material shall be deposited and spread in a uniform layer to the required grades, and to such loose depth that when compacted to the density required, the thickness will be as indicated on the Drawings. Portions of the layer which become segregated shall be removed and replaced with a satisfactory mixture, or shall be remixed to the required gradation.
- E. The maximum compacted thickness of any one layer shall not exceed six-inches, except the compacted depth of a single layer may be increased to eight-inches if compaction equipment capable of delivering sufficient compactive energy, as determined by the ENGINEER, is used. If the ENGINEER requires the compacted depth to exceed six-inches, and if compaction equipment capable of delivering sufficient compactive energy, as determined by the ENGINEER is not used, the base shall be constructed in two or more layers of approximately equal thickness. Each layer shall be shaped and compacted before the succeeding layer is placed.
- F. The base course shall be compacted to at least 95% of maximum density as determined by AASHTO T 180-D. In places not accessible to rolling equipment, the mixture shall be compacted with hand tamping equipment.
- G. Blading, rolling, and tamping shall continue until the surface is smooth and free from waves and irregularities. If at any time the mixture is excessively moistened, it shall be aerated by means of blade graders, harrows, or other approved equipment, until the moisture content is such that the surface can be recompacted and finished as above.

- H. The grading operations shall be conducted in a manner that will remove any quarter crowns, or other humps in the cross section of the roadway. The cutting edges of the grading blade shall be replaced if they are found to be worn beyond the tolerances specified for the roadway surface. The finished surface shall not have humps or dips between blue-topped intervals along the roadway alignment that exceed the tolerances given in paragraph I below.
- I. The finished surface of the base course, when tested using a 10-foot straightedge, shall not show any deviation in excess of 3/8-inch between two contact points. The finish surface shall not vary more than 1/2-inch from established grade. Additionally, the algebraic average of all deviations from established grade of the finish base course surface elevations taken at 50-foot intervals shall be less than 0.02-foot.
- J. The initial density test at any location will be paid for by the OWNER. If the initial test shows that the material compaction is not as specified, the CONTRACTOR shall modify the compaction methods used, as approved by the ENGINEER, and have the material retested until the tests show that the compaction meets the specification requirements. All tests, after the initial test at any given location, shall be paid for by the CONTRACTOR.

**END OF SECTION**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division I Specification Sections, apply to this Section.

1.2 SUMMARY

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing sanitary sewer pipe, in accordance with these Specifications and in reasonably close conformity with the lines and grades shown on the Drawings and Standard Details.
- B. This WORK includes furnishings and installing connecting bands, branch connections, elbows or other fittings, and all appurtenances required to complete the sanitary sewer and connect to existing sanitary sewer pipe.
- C. The WORK includes installing a pvc cap and marking in the field with painted green, pressure treated, 4"x4" post.

1.3 SUBMITTALS

- A. Sanitary Sewer Pipe: Material certifications stating conformance with the requirements of this Section.
- B. HDPE Force Main Pipe: Material Certifications stating conformance with the requirements of this Section.

**PART 2 - PRODUCTS**

2.1 PVC SEWER PIPE

- A. PVC Sewer Pipe, four inch through 15 inch in diameter, inclusive, shall have a standard dimension ratio (SDR) of 35, and conform to ASTM D 3034. Before any PVC pipe is used on this Project, the CONTRACTOR shall supply certifications, signed by an authorized agent of the seller or manufacturer, stating that the material has been sampled, tested, and inspected in accordance with ASTM D 3034.
- B. PVC Sewer Pipe greater than 15 inch in diameter shall conform to ASTM F 679. Before any PVC pipe is used, the CONTRACTOR shall supply certifications, signed by an authorized agent of the seller or manufacturer, stating that the material has been sampled, tested, and inspected in accordance with ASTM F 679.

- C. The pipe shall have integral wall bell and spigot joints conforming to ASTM D 3212. The bell shall consist of an integral wall section with a solid cross-section elastomeric ring, factory assembled, securely locked in place to prevent displacement.
- D. Flexible water-tight connections, approved by the OWNER's Representative, shall be used at PVC pipe connections to manholes and other rigid structures.

## 2.2 HDPE PRESSURE PIPE

- A. High-Density Polyethylene (HDPE) pipe shall conform to ASTM D 3550 designation PE 3407 or PE 3408. The pipe shall have a minimum pressure rating of 100 pounds per square inch and a Standard Dimension Ratio (SDR) of 17.0. All HDPE shall have a standard iron pipe size (IPS) outside diameter.
- B. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions or other injurious defects. It shall be uniform in color, opacity, density, and other physical properties.
- C. HDPE pipe shall have an ASTM D-3350 material Cell Classification of no less than 335434C.
- D. The pipe shall be marked at five foot intervals with a coded number which identifies the manufacturer, SDR size, PPI rating, manufacturing standard reference and production code from which data and place of manufacturer can be determined.
- E. When HDPE pipe is connected to ductile iron pipe, a flange adapter shall be used. A flange-coupling adapter shall be used on the ductile iron pipe. HDPE flange adapters shall be manufactured by the same manufacturer as the pipe using the same resin as the pipe. Each flange adapter shall be furnished with a ductile iron convoluted back-up ring drilled to match the standard ANSI bolt pattern for the nominal diameter of pipe used.
- F. Connection of the pipe and fittings shall be performed by the thermal butt fusion system. HDPE pipe lengths, fittings, and flange adapter connections to be fused shall be of the same type, grade and class of polyethylene compound and supplied by the same raw material supplier.

## 2.3 UNDERGROUND MARKING TAPE

- A. Underground marking tape shall be green, at least four (4) inches wide, four mil thick, polyethylene tape, with a metallic backing capable of being traced with locators. The tape shall have black letters with the following wording: "Caution: Sewer Line Buried Below." The marking tape shall be installed 12 inches above the top of all sewer mains and services.



### PART 3 - EXECUTION

#### 3.1 CONSTRUCTION

- A. Excavation, bedding, and backfill shall conform to the requirements of Section 02203 - Trenching. Underground marking tape shall be installed as shown on CBJ Standard Detail 125 - Pavement Resurfacing and Trench Detail.
- B. Sheeting and bracing required for trenches shall be removed to the elevation of the conduit, but no sheeting will be allowed to be pulled, removed, or disturbed below the conduit. Sheeting and bracing shall meet OSHA requirements.
- C. Before lowering into the trench, the pipe shall be inspected for defects. All cracked, chipped, or broken pipe shall be discarded. The ends and interior of the pipe shall be clean. Belled ends shall be laid upgrade. Handling of the pipe shall be accomplished in a manner that will not damage the pipe. The joint shall be made in the manner recommended by the manufacturer. Care shall be taken not to buckle or disturb previously laid pipe.
- D. Pipe shall be laid accurately to the staked line and grade. All service connections shall be installed as indicated on the Drawings. Where existing service sewers are to be connected, suitable fittings and adapters shall be provided by the CONTRACTOR.
- E. Pipe shall be cleaned of all foreign matter, and water shall be kept out of trenches until joints have been completed. When WORK is not in progress, open ends of pipe and fittings shall be securely closed to keep foreign matter and animals from entering.
- F. Each joint shall be inspected to ensure that it is properly made before backfilling is done. Care shall be taken to prevent any dirt or foreign matter from entering the open end of the pipe. Where it is necessary to cut pipe, such cuts shall be neatly made in an approved manner. The laid pipe shall be true to line and grade and, when completed, the sewer shall have a smooth and uniform invert. No section of gravity sewer, including service connections, shall have an adverse grade which would pond water in the invert of the sewer.
- G. Connections to pipe stubs of a different pipe material shall be made with DFW/HPI non-shear-type connector. Connectors must be approved by the OWNER's Representative prior to installation.
- H. Connections to existing sewer mains, service connections, and manholes shall be made in such a manner so as to not damage the existing facility. Such connections shall be made so that no projections or rough surfaces occur within the pipe.
- I. All Sanitary Sewer Cleanouts shall be provided with a cast iron ring and cover which shall be locking-type Olympic Foundry No. M-1025, or approved equal. The cover shall be clearly marked with the word "SEWER" case into it.

- J. Where gravity flow sanitary sewers cross above or less than 18 inches below waterlines, or approximately parallel water lines within ten feet horizontally, the sewer pipe shall meet the requirements of ductile iron pipe or PVC pressure pipe, as described in Part 2 of this Section.
- K. HDPE to HDPE connections shall be made by thermal butt fusion, in accordance with ASTM D2657. Fusion jointing shall utilize a pipe manufacturer approved fusion machine operated by experienced and qualified personnel. The CONTRACTOR shall provide three copies of a "Heat Fusion Qualification Guide," published by the HDPE manufacturer, that provides criteria for inspection of thermal fusion joints. The guide shall include criteria for operator training requirements and experience; visual inspection criteria (including photographs) for both intact thermal fusion joints and sample strips cut for thermal fusion joints. The thermal fusion machine operator shall perform a minimum of three test joints in the presence of the ENGINEER. The test joints will be examined from both exterior appearances and from appearance of the joint cross section once the samples have been cut into strips.
- L. Bolted HDPE to HDPE connections shall include a polyethylene flange adapter (stub end) butt fused to the pipe, a backup flange ring, bolts, nuts and a gasket. Flange rings shall be Standard Steel ring Flanges, Class D, in accordance with AWWA C207. High strength bolts, nuts, washers and gaskets shall be in conformance with AWWA C207, Appendix A. Flange rings, bolts, nuts and washers shall be hot dip galvanized after fabrication per ASTM A153 and A386. Gasket dimensions and bolt lengths shall be per pipe manufacturer's recommendations.

### 3.2 TESTING

- A. Prior to testing, the sewer shall be complete with laterals, and trenches shall be fully backfilled and compacted to finish grade, or, if the sewer is under pavement, finish pavement subgrade.
- B. For WORK involving placement of new sanitary sewer collection systems, all sections of pipe shall be tested for leakage using the Exfiltration Test for either air or water as specified hereafter; or, at the sole direction of the OWNER's Representative, when the normal water table is above the sewer throughout the section under test, the OWNER's Representative may permit use of the Infiltration Test procedure specified hereafter. Where leakage is in excess of the specified rate, the sewer shall be repaired by the CONTRACTOR as required to comply with the leakage test requirements. The OWNER's Representative may require the CONTRACTOR to repair obvious leaks even though the total length of the test section falls within the maximum allowable leakage for the test used.
- C. Defective pipe joints shall be repaired in a manner that the repaired pipe joint will have some flexibility and the effectiveness of the repair will not be affected by differential

movement of the adjoining pipes. A "CSSI" or DFW/HPI non-shear coupling, or approved equal, will be acceptable in making such repairs.

- D. The OWNER's Representative will make one complete TV inspection after all sewers have passed the specified watertightness test. All defects regarding sewer alignment and grade, damaged pipe, and visible leaks observed during this inspection, shall be corrected by the CONTRACTOR. The CONTRACTOR shall de-water the sewers as required for the performance of the TV inspection work by the OWNER's Representative. The CONTRACTOR shall be responsible for all costs associated with any TV inspection required following the initial TV inspection, if any defects were observed during this or any subsequent TV inspections.
- E. The hydrostatic test procedure for HDPE Pipe shall consist of two (2) steps: the initial expansion phase and the test period. In order to accommodate the initial expansion of the pipe under test, sufficient make-up water shall be added to the system at hourly intervals for three hours to return to the test pressure. The test period begins after the final addition of make-up water in the expansion phase of the test procedure. The test period is three (3) hours. After this test period, a measured amount of make-up water shall be added to return to test pressure. The amount of make-up water shall not exceed the allowable expansion in U.S. gallons shown in the following table:

**THREE HOUR TEST**

<b>Nominal Pipe Size (inches)</b>	<b>Allowance for Expansion (U.S. Gal. Per 100 feet of Pipe)</b>
8	1.5
10	2.1
12	3.4
16	5.0
18	6.5

Under no circumstances shall the total test procedure exceed eight hours at 1.5 times the pipe pressure rating. If the test is not completed within eight hours, the test section shall not be re-tested for eight more hours. Repair and re-testing shall continue until a passing test is obtained.

**3.3 FILTRATION TEST (USING AIR)**

- A. The CONTRACTOR shall furnish all facilities and personnel for conducting the test under the observation of the OWNER's Representative. The equipment and personnel shall be subject to the approval of the OWNER's Representative. Joints only may be tested in pipe 36 inches in diameter or larger, at the option of the CONTRACTOR.

- B. Immediately following the pipe cleaning, the pipe installation shall be tested with low pressure air. Air shall be slowly supplied to the plugged pipe installation until the internal air pressure reaches five pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe. At least two minutes shall be allowed for temperature stabilization before proceeding further.
- C. The pipeline shall be considered acceptable when tested at an average pressure of four psi greater than the average pressure of any ground water that may submerge the pipe if the section under test does not lose air at a rate greater than 0.0030 cubic feet per minute per square foot of internal surface.
- D. The requirements of this Specification shall be considered satisfied if the time required for the pressure to decrease from 4.5 psi to 3.5 psi above average ground water pressure is greater than that shown using the following formula:

$$T = 28.33 D$$

Where T = time in seconds

D = pipe diameter in inches

- E. Pressure gauges should be incremented in not more than one-half pound increments for accurate tests.
- F. Braces shall be required to hold plugs in place and to prevent the sudden release of the compressed air. Due to the large forces that could be exerted by an escaping plug during the testing of the pipe, no one shall be allowed in the manholes in which plugs have been placed while tests are being conducted. The CONTRACTOR's testing equipment shall have a pressure relief device that will prohibit the pressure in the pipeline from exceeding ten pounds per square inch.

3.4 EXFILTRATION TEST (USING WATER)

- A. Where groundwater is below the pipe to be tested, a minimum of head of eight feet of water above the crown at the upper end of the test section shall be maintained for a period of four hours, during which time it will be presumed that full absorption of the pipe body has taken place, and thereafter for a further period of one hour for the actual test of leakage. During this one hour period, the measured loss shall not exceed the rate given below:

Type of Pipe	Allowable Exfiltration Rate
PVC	E = 0.0004 DL

E = Allowable leakage in gallons per hour

D = Nominal inside diameter of pipe in inches

L = Length of pipe being tested in feet

- B. Where groundwater is above any pipe to be tested, the minimum head of the test will be raised to provide an elevation head of eight feet above the groundwater.

- C. The maximum length of sewer in any test section shall be 500 feet.

3.5 INFILTRATION TEST

- A. Infiltration testing may be allowed at the OWNER's Representative option when the natural ground water table is above the crown of the higher end of the test section and the external water pressure exerted on the pipe is equivalent to the exfiltration test. The maximum allowable limit for infiltration shall be as determined by the formulas defined in the above section Exfiltration Test (Using Water).

3.6 PRESSURE SEWER TEST

- A. The CONTRACTOR shall, in the presence of the ENGINEER, test all pressure sewer pipe to a test pressure of 100 pounds per square inch and maintain the pressure a minimum of one hour. The CONTRACTOR shall make all necessary arrangements to provide water for testing pipelines.
- B. Leakage shall not be in excess of five gallons per inch of pipe diameter per one thousand (1,000) feet of pipe per day. Where leakage is in excess of the specified rate, the CONTRACTOR shall make all repairs necessary to reduce the amount of leakage to a quantity within the specified rate. The testing and repair process shall be repeated until the installation is accepted. In addition, the CONTRACTOR shall repair all visible leaks.

**END OF SECTION**

PROJECT NO. 2009-10

SECTION 02402  
SANITARY SEWER MANHOLES  
AND CLEANOUTS

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## **PART 1 – GENERAL**

### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division I Specification Sections, apply to this Section.

### **1.2 SUMMARY**

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing sanitary sewer manholes and cleanouts complete, in place as shown on the Drawings.

### **1.3 SUBMITTALS**

- A. Manholes: Shop Drawings showing method of construction and reinforcement, invert elevations, and overall dimensions.
- B. Frames and Grates: Catalogue cuts and materials certification.

## **PART 2 - PRODUCTS**

### **2.1 MANHOLES**

- A. All manholes shall consist of precast concrete sections, including integral base section, riser sections, cones, and flat slab tops and shall conform to ASTM C 478 and the dimensions shown on the Drawings. All precast sections shall have joints sealed with “RAM-NEK” or “RUB-R-NEK” gasketing material, or approved equal, installed as specified by the manufacturer. Cones shall be eccentric. Manhole steps shall be cast in all precast manhole sections. Pipe penetration gaskets shall be cast into all precast manholes. Grade rings shall be standard product, manufactured particularly for use in manhole construction, sized to fit the cones on which they are placed, and the wall thickness shall be not less than that of the cones. Grade rings shall be not less than two inches high, nor more than four inches high. Grade rings shall be Infra-Riser® or approved equal.
- B. Portland cement concrete cast in place shall conform to Section 03302 – Concrete Structures.

### **2.2 FRAMES, COVERS AND STEPS**

- A. Manhole frames and covers shall be watertight, of ductile iron, and conform to the design and dimensions shown on the Drawings. Ductile iron castings shall conform to the requirements of AASHTO M 103. Grade shall be optional unless otherwise designated. Contact surfaces between frames and covers shall be machined to provide a uniform contact surface. When watertight locking devices are specified, the CONTRACTOR shall submit Shop Drawings for approval by the OWNER’s Representative.

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- B. All manhole covers shall have the word "SEWER" cast into the top in letters approximately three inches high.
- C. Manhole steps shall be constructed of polypropylene conforming to ASTM D4101, and shall meet current state and federal safety standards.
- D. Frames and covers shall be ductile iron, conforming to ASTM A 48, Class 30. The cover shall be designed for the appropriate classification of traffic and shall have the word "SEWER" cast into the top with prominent letters. Bearing surfaces between the frame and cover shall be machined to smooth, plane surfaces. Frames and covers shall be Inland Foundry No. 743, or approved equal.

### 2.3 MISCELLANEOUS

- A. All pipes, bends and fittings used in cleanouts, drop connections, and pipe stubs for future connections to manholes shall conform to Section 02401 – Sanitary Sewer Pipe.
- B. Bentonite-Cement sealing plaster shall consist of two parts bentonite, one part Type 3 cement, and one part sand, with sufficient water to obtain workable consistency.
- C. Mortar shall consist of one part portland cement to two parts clean, well-graded sand which will pass a No. 4 screen. Admixtures may be used not exceeding the following percentages of weight of cement; hydrated lime, 10%; diatomaceous earth or other inert material, 5%. Consistency of mortar shall be such that it will readily adhere to the surface. Mortar mixed for longer than thirty minutes shall not be used. A non-shrink mortar may be submitted for approval as a substitute.
- D. Grout shall be a non-shrink type approved by the OWNER's Representative.
- E. Pipe penetrations for PVC pipe shall be "Kor-N-Seal Cavity O-Ring," or approved equal, as manufactured by NPC Inc., or "Link Seal Modular Seal, LS-475-5-316," or approved equal. Pipe penetrations for HDPE pipe shall be "Link Seal Modular Seal, LS-475-5-316," or approved equal.
- F. Manhole exterior joint waterproofing shall be a Miradri system as manufactured by Carlisle CCW, including Carlisle – CCW 704 primer, CCW Miradri 861 Membrane, and CCW 704 mastic, or approved equal that includes a membrane and adhesive system for positive water exclusion. The membrane shall cover the full height of the manhole.

## PART 3 – EXECUTION

### 3.1 CONSTRUCTION

- A. Portland cement concrete cast in place shall conform to the requirements of Division 3 – Concrete. Concrete shall not be placed under water. Running water shall not be permitted over newly poured concrete.

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- B. Manholes shall be constructed in a dry excavation on a 12-inch compacted (95%) base of 3-Inch minus shot rock. The excavation shall be kept dry until the concrete or mortar has developed sufficient strength to prevent rupture by groundwater pressure.
  - C. Manhole inverts shall be formed as shown on the Drawings, either by laying pipe through and cutting out the top portion before completion of the base of the manholes, or by forming U-shaped channels in the concrete base section. Cut edges of pipe laid through the manhole shall be fully covered by concrete when the manhole invert is complete. The finished invert shall be smooth and true to grade. No mortar or broken pieces of pipe shall be allowed to enter the sewers.
  - D. Precast base sections shall be set on a level base, as shown on the Drawings. Provisions shall be made to prevent flotation of the manhole.
  - E. All lifting holes shall be plugged with Bentonite-Cement sealing plaster and sealed with a Miradri System patch, or approved equal, to a minimum of six inches from the edges of the opening, as required to prevent leakage.
  - F. After completion of the manhole, all plugs shall be completely removed from the sewers and all loose material shall be removed from the manhole.
  - G. Service connections shall not be installed into manholes unless otherwise shown on the Drawings or directed by the OWNER's Representative. Where service connections into manholes are allowed, the top of the service sewer pipe shall be 0.2 feet higher than the top of the downstream main sewer pipe. The manhole invert shall be channeled for the service connection sewers in the same manner as for main sewers.
  - H. Connection to existing manholes shall be made in such a manner that the modified manhole is equal to a new manhole in appearance and performance. A channel, approximately two inches larger all around than the connecting pipe, shall be cut into the existing manhole base. The new pipe shall be connected as shown on the Drawings. The rough-cut channel shall be finished to its final smooth and uniform shape with mortar. The existing sewer(s) shall be maintained in service and the fresh concrete and mortar surface shall be protected from the flowing sewage for a minimum of 24 hours.
  - I. The joint exterior waterproofing system shall be installed as recommended by the system manufacturer and as shown on the Drawings.
  - J. All manholes will be visually inspected by the OWNER's Representative; there shall be no evidence of leakage of water into any manhole from outside sources or any imperfections which may allow such leakage.
  - K. At least 25% of the completed manholes, as selected by the OWNER's Representative, shall be tested for water-tightness by the CONTRACTOR. The test shall be made, with all connecting pipes plugged, by filling the manhole with clean water to within two inches of the bottom of the cast iron frame. The leakage rate shall not exceed three gallons per day per foot of depth, or fifty gallons per day, whichever is less, over a test



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period of not less than two hours when the water table is not an adverse factor. For every manhole that fails to meet the test, four additional manholes shall be tested.

- L. If the water table is an adverse factor, the manhole shall be pumped completely dry, all pipes plugged, and then be checked for infiltration. The leakage rate shall not exceed three gallons per day per foot of depth, or fifty gallons per day, whichever is less, over a test period of not less than two hours.
- M. Cleanouts shall be constructed as shown on the Drawings. The frame shall be jointed to the riser pipe so that groundwater will be prevented from entering the sewer. Cleanouts shall be tested for watertightness along with the sewers to which they are connected.
- N. The CONTRACTOR shall repair all imperfections and leaks disclosed by either visual inspection or testing. The method of repair shall be subject to the OWNER's Representative approval.

### 3.2 CONNECT TO EXISTING MANHOLE

- A. CONTRACTOR shall remove or plug existing pipe as applicable, drill hole at new location required for installation of sewer under this contract, install pipe, seal the pipe penetration, form channeled inverts, install drop connections as required, and backfill as required.

**END OF SECTION**

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SECTION 02501  
STORM SEWER PIPE

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## PART 1 - GENERAL

### 1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing pipe culverts and storm drains, in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the Drawings or established by the ENGINEER.
- B. This WORK includes furnishing and installing connecting bands, branch connections, elbows and end sections required to complete the culvert or drain structure.

### 1.2 SUBMITTALS.

- A. Storm Sewer Pipe: Material Certifications.

## PART 2 - PRODUCTS

### 2.1 CORRUGATED POLYETHYLENE PIPE

- A. Corrugated polyethylene pipe (CPP) shall be high density corrugated polyethylene, smooth interior pipe, and shall be manufactured in conformity with the latest AASHTO M-294, Type S Specification, and shall meet the requirements of ASTM D3350 Cell Classification 324420C, or ASTM D1248 type III, Class C, Category 4, Grade P33.
- B. Pipe shall be joined with "Hancor, Inc. Hi-Q Sure-Lok" (bell-and-spigot) joint, or approved equal, meeting the requirements of AASHTO M294. The bell shall be an integral part of the pipe and provide a minimum pull-apart strength of 400 lbs.
- C. The bell-and-spigot joint shall incorporate a gasket making it silt-tight. Gaskets shall be installed in the bell by the pipe manufacturer.
- D. Fittings shall conform to AASHTO M294. Fabricated fittings shall be welded on the interior and exterior at all junctions.

### 2.3 UNDERGROUND MARKING TAPE

- A. Underground Marking Tape shall be yellow, at least 4-inches wide, 4-mil thick, polyethylene tape with a metallic backing capable of being traced with locators. The tape shall have black letters with the following wording: "Caution: Storm Sewer Line Buried Below", or similar. The marking tape shall be installed 12-inches above the top of all storm sewer mains and services.

**PART 3 - EXECUTION**

3.1 GENERAL

- A. Excavation, Bedding, and Backfill shall conform to the requirements of Section 02203 - Trenching. All corrugated polyethylene pipe shall have a minimum cover of 12”.
- B. The pipe laying shall begin at the downstream end of the pipe. The lower segment of the pipe shall be in contact with the shaped bedding throughout its full length. Bell or groove ends of rigid pipe and outside circumferential laps of flexible pipe shall be placed facing upstream.
- C. Joints shall be made with rubber gaskets, or any other approved type, as may be specified.
- D. Storm sewer pipe shall be inspected before any backfill is placed. Any pipe found to be substantially out of alignment, unduly settled, or damaged shall be taken up and relaid or replaced.
- E. Installation of all pipe shall conform to the manufacturers' recommended procedures. These Specifications and the Drawings shall take precedence over the manufacturers' recommendations in the event of conflict, if more restrictive.
- F. All cut corrugations on CPP pipe shall be cleared of all water and completely grouted to prevent the accumulation of water.

**END OF SECTION**

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SECTION 02607  
PIPE INSULATION

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**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing pipe insulation for water pipe and service pipe at locations shown on the Drawings and as directed by the ENGINEER.

**PART 2 - PRODUCTS**

2.1 RIGID INSULATION

- A. Rigid insulation shall be rigid board closed cell polystyrofoam material containing a flame retardant additive specifically designed for underground pipe or pavement installations, equivalent to Dow Chemical Company Styrofoam HI, and approved by the ENGINEER.

2.2 SPRAYED-ON INSULATION

- A. Sprayed-on urethane foam insulation applied directly to the pipe exterior with an elastomeric coating, may be approved by the ENGINEER, provided the material has demonstrated a satisfactory performance history in underground installation and has the following physical properties:

Density	2 pcf, Minimum
Compressive Strength (ASTM D 1621)	35 psi, Minimum at 5% Deflective or Yield
Water Absorption (ASTM C 177)	0.25% by Vol. Maximum
Thermal Conductivity (ASTM C 177)	Max. 0.23 BTU Hr. Ft. <sup>2</sup> °F. In. Thickness

**PART 3 - EXECUTION**

3.1 CONSTRUCTION

- A. When water pipes or service pipes have less than five feet of cover to finished grade or vertical clearance at a culvert crossing, either above or below, they shall be insulated as shown on the Drawings.
- B. Rigid insulation shall be a minimum of two feet wide and two inches thick. The length of insulation required shall be as shown on the Drawings or as directed by the ENGINEER. Insulation shall be placed between six and twelve inches from the water pipe or service pipe with the width centered on the longitudinal axis of the water pipe or service pipe as shown on the Drawings.

- C. Sprayed-on urethane foam insulation shall be a minimum of four inches thick and be installed in strict conformance to the manufacturer's recommendations. Precautions to protect CONTRACTOR personnel, Project inspectors, and the public in general shall be taken by the CONTRACTOR in compliance with OSHA Standards and the manufacturer's recommendations.

**END OF SECTION**

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary to perform all surveying and staking necessary for the completion of the Project in conformance with the Drawings and Specifications, including all calculations required to accomplish the WORK.
- B. The WORK shall include the staking, referencing and all other actions as may be required to preserve or restore land monuments and property corners which are situated within the Project area, and to establish monuments as shown on the Drawings.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

3.1 CONSTRUCTION

- A. All surveying involving property lines or monuments shall be done by, or under the direction of, a Registered Land Surveyor licensed to practice in the State of Alaska.
- B. The OWNER will supply information relative to the approximate locations of monuments and corners, but final responsibility for locations, referencing, and restoration shall rest with the CONTRACTOR.
- C. In the event the CONTRACTOR does not replace the survey monuments and property corners disturbed by the CONTRACTOR's operations, the OWNER may, after first notifying the CONTRACTOR, replace the monuments in question and the cost of such replacements shall be deducted from payments to the CONTRACTOR.
- D. The CONTRACTOR shall provide the OWNER with a copy of all surveyor's notes, if requested by the ENGINEER, prior to each Pay Request payment for which payment for Pay Item 2702.1, Construction Surveying, is increased from the previous Pay Request payment.
- E. The CONTRACTOR shall provide the OWNER with a copy of all surveyor's notes, prior to the request for final payment, and include the information on the record drawings.
- F. The CONTRACTOR shall obtain all information necessary for as-built plan production, from actual measurements and observations made by its own workforce, including Subcontractors, and submit this information to the ENGINEER.
- G. The CONTRACTOR shall use competent, qualified personnel and suitable equipment for the layout WORK required and shall furnish all stakes, templates, straightedges and other devices necessary for establishing, checking and maintaining the required points, lines and grades.

- H. The CONTRACTOR shall perform all staking necessary to delineate clearing and/or grubbing limits; all cross sections necessary for determination of excavation and embankment quantities, including intermediate and/or remeasure cross sections as may be required; all slope staking; all staking of culverts and drainage structures, including the necessary checking to establish the proper location and grade to best fit the conditions on site; the setting of such finishing stakes as may be required; the staking of right-of-way; the staking, referencing and other actions as may be required to preserve or restore land monuments and property corners; and all other staking necessary to complete the Project.
- I. Field notes shall be kept in standard bound notebooks in a clear, orderly and neat manner, consistent with standard engineering and surveying practices. The CONTRACTOR's field books shall be available for inspection by the ENGINEER at any time.
- J. All field survey notes, including those which become source documentations from which quantities for payment are computed, shall be recorded by a notekeeper furnished by the CONTRACTOR. The notekeeper shall be thoroughly familiar with generally accepted standards of good survey notekeeping practice.
- K. The ENGINEER may randomly spot-check the CONTRACTOR's surveys, staking and computations at the ENGINEER's discretion. After the survey or staking has been completed, the CONTRACTOR shall provide the ENGINEER with a minimum of 72 hours notice prior to performing any WORK, and shall furnish the appropriate data as required, to allow for such random spot-checking, however, the OWNER assumes no responsibility for accuracy of the WORK.

END OF SECTION

**PART 1 – GENERAL**

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and placing topsoil at the locations shown on the Drawings.

**PART 2 - PRODUCTS**

2.1 MATERIALS

- A. Topsoil furnished by the CONTRACTOR shall consist of a natural friable surface soil without admixtures of undesirable subsoil, refuse, or foreign materials. It shall be reasonably free from roots, hard clay, coarse gravel, stones larger than one inch in any dimension, noxious weeds, tall grass, brush, sticks, stubble or other material which would be detrimental to the proper development of vegetative growth.

Topsoil shall be obtained from naturally well drained sites where topsoil occurs at least 4 inches deep. Topsoil shall not be obtained from bogs or marshes.

- B. Topsoil shall conform to the following grading:

Sieve Sizes	Percent Passing
1-inch	100%
½-inch	95% - 100%
No. 4	75% - 100%
No. 10	60% - 100%
No. 200	10% - 60%

- C. Topsoil shall contain not less than 10%, or more that 23% organic matter, by weight as determined by loss-on-ignition of oven-dried samples in accordance with ATM T-6. Organic material shall be decomposed and free of wood.
- D. The ENGINEER shall be notified on the location from which the CONTRACTOR proposes to furnish topsoil at least 30 calendar days prior to delivery of topsoil to the Project from that location. The topsoil and its source will be inspected and tested by the ENGINEER before approval will be granted for its use.
- E. Topsoil sources lacking organic matter may be used if, prior to delivery to the Project, sufficient organic matter in the form of pulverized peat moss or rich organic soil from other sources is thoroughly mixed with the topsoil to provide a product meeting the above requirements.
- F. Organic material for incorporation into topsoil, if required, shall be partially decomposed fibrous or cellular stems and leaves of any of several species of Sphagnum mosses, or rotted manure. Organic material may require chopping to shredding to insure thorough mixing with the topsoil.



- G. All topsoil shall be fertilized as follows: the application rates of the fertilizer and limestone per 1,000 square feet of ground area of topsoil furnished by the CONTRACTOR shall be determined by the ENGINEER, based on soil analysis tests so that the total natural and applied chemical constituents are as follows:

Nitrogen            1.0 lb. minimum - 1.5 lb. maximum per 1,000 square feet  
Phosphoric Acid 1.0 lb. minimum - 2.0 lb. maximum per 1,000 square feet  
Potassium        1.0 lb. minimum - 2.0 lb. maximum per 1,000 square feet

Limestone requirements shall conform to the following table:

Soil pH	Limestone Tons per Acre
Above 6.0	0
5.0 - 6.0	1.5
Below 5.0	3.0

**PART 3 – EXECUTION**

**3.1 CONSTRUCTION**

- A. All areas within the landfill cap area shall receive an 8-inch depth of topsoil as shown on the Drawings. Beyond the roadway shoulder those areas that are disturbed during construction which are not covered with base course, shall be graded to a neat, uniform gradeline and appearance, as determined by the ENGINEER, and covered with a neat uniform, three inch minimum thickness of topsoil and hydroseeded, unless otherwise shown on the Drawings, or directed by the ENGINEER.
- B. The topsoil shall be evenly spread on the designated areas to a depth, which, after settlement and compaction, shall be eight inches, unless otherwise directed by the ENGINEER. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the WORK, as determined by the ENGINEER. Roadway surfaces shall be kept clean during hauling and spreading operations.
- C. After spreading has been completed, large clods, stones larger than one-inch in any dimension, roots stumps, and other litter shall be raked up and removed.
- D. The final grading of the topsoil prior to hydroseeding shall be to a tolerance that will not permit ponding of water in excess of one inch in depth.

**END OF SECTION**

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**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for preparing the ground and furnishing and applying seed, fertilizer, lime and mulch as called for in the Contract Documents, all in reasonably close conformity with these Specifications and at locations shown on the Drawings or established by the ENGINEER.
- B. It is the intent of these Specifications that a living vegetative cover will be provided in the areas indicated on the Drawings.
- C. Seed mix to be used will be as specified in PART 2 – PRODUCTS.

**PART 2 - PRODUCTS**

2.1 SEED

- A. Seed shall be furnished separately or in mixture in standard sealed containers clearly labeled with: Seed name; lot number; net weight; percentages of purity and of germination and hard seed; and, percentage of maximum weed seed content. The CONTRACTOR shall furnish the ENGINEER duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six months of date of delivery. This statement shall include: Name and address of laboratory; date of test; lot number for each kind of seed; and results of tests as to name, percentages of purity and germination, and percentage of weed content, for each kind of seed furnished, and, in the case of a mixture, the proportions of each kind of seed.
- B. Seed mix shall conform to the following:

MIX PROPORTION	
TYPE	PROPORTION
Creeping Red Fescue	37%
Climax Timothy	25%
Annual Ryegrass	13%**
Alsike Clover	25%

\* Maximum weed seed content shall be one (1) %.

\*\* Provide additional Annual Rye seed, as required to provide rapid grass cover for protection of lawn areas during inclement fall weather.

2.2 FERTILIZER

- A. Fertilizer shall be a standard commercial grade fertilizer, supplied separately or in mixtures. Fertilizer shall conform to all State and Federal regulations and shall be 10-20-20. The fertilizer shall contain slow release nitrogen in the form of inorganic chemicals amounting to at least 75% of the available nitrogen specified.
- B. Fertilizer shall be furnished in new, clean, sealed, moisture-proof, and properly labeled containers, clearly labeled with the name, weight, and guaranteed analysis of the contents.
- C. Fertilizer for use in a hydraulic sprayer shall be soluble or ground to a fineness that will permit complete suspension of all insoluble particles in the water or slurry.

2.3 LIME

- A. Lime shall be agricultural ground limestone containing not less than 85% dolomite, with 95% passing through a 100-mesh screen, delivered to the site in the original unopened containers labeled to show analysis.
- B. Limestone for use in a hydraulic sprayer shall be soluble or ground to a fineness that will permit complete suspension of all insoluble particles in the water or slurry.

2.4 MULCH

- A. Mulch shall be natural or cooked wood cellulose fiber which shall have the property of dispersing readily in water and shall have no toxic effect when combined with seed or other materials. The homogeneous slurry or mixture shall be capable of application with power spray equipment. A colored dye which is noninjurious to plant growth may be used when specified. Wood cellulose fiber shall be packaged in new, labeled containers, shall have an equilibrium air-dried moisture content of 12% plus or minus three percent at the time of manufacture, and shall have a pH range of 3.5 to 5.0.

**PART 3 - EXECUTION**

3.1 SOIL PREPARATION

- A. After grading, and topsoiling if required, has been completed in conformity with the lines and grades shown on the Drawings or staked by the ENGINEER, and before start of seeding operations, the areas to be seeded shall be cultivated to provide a reasonably firm, but friable seedbed. Cultivation shall be carried to a depth of two-inches, except on slopes steeper than 3:1. Depth of cultivation may be reduced as directed by the ENGINEER. All cultivated areas shall be raked or cleared of stones one inch in diameter and larger. All weeds, plant growth, stick, stumps, and other debris or irregularities which might interfere with the seeding operation, growth of grass, or subsequent maintenance of the grass covered areas, shall be removed.

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3.2 SEEDING SEASONS

- A. All seeding shall be completed after May 1st and prior to August 15th, or the contract deadline, whichever is sooner. Seeding other than the specified dates will be allowed only with prior written permission of the ENGINEER and will be at the CONTRACTOR's own risk. If the seeding fails to produce a uniform and fecund growth, the seeding will be repeated until the required growth is achieved.
- B. Seeding shall not be done during windy conditions, or when climactic conditions or ground conditions would hinder placement or proper growth.

3.3 APPLICATION METHODS

- A. Seed, fertilizer, ground limestone and mulch material shall be placed by one of the following methods.

- 1. Hydraulic Method

- a. Seeding by hydraulic methods shall consist of furnishing a slurry made of seed, fertilizer, ground limestone, wood cellulose fiber mulch, and water, and applying the slurry under pressure to the designated area.
- b. A slurry unit shall consist of a mixture of the following proportionate quantities of water, mulch fiber, seed, fertilizer and ground limestone:

Water	1,000 gallons
Mulch Fiber	200 pounds
Seed	35 pounds
Fertilizer	120 pounds
Ground Limestone	500 pounds

- c. An adequate scale shall be provided by the CONTRACTOR to weigh the mix proportions.
- d. The mixing and application shall be as follows:
  - 1) Fill the tank with water to one-third full and agitate at half speed. Add fertilizer, ground limestone and one-half the required mulch fiber.
  - 2) Fill the tank to two-thirds full and agitate at full speed. Add the remaining mulch fiber.
  - 3) Agitate at full speed and add water until the tank is full, then add the seed. Begin slurry distribution after five minutes of agitation.
- e. After fertilizer and seed are placed in the hydraulic seeder, the mixture shall be completely applied within one hour. Seed remaining in contact with fertilizer for more than one hour shall be rejected and additional seed at the specified rate shall be added at no additional cost.
- f. The slurry mixture shall be spread uniformly at the application rate, as

directed by the ENGINEER, upon the areas designated. Application rates shall be one slurry unit per 5,000 to 10,000 square feet, as directed by the ENGINEER

- g. Hydraulic seeding equipment shall be capable of maintaining a continuous agitation so that a homogeneous mixture can be applied through a spray nozzle. The pump shall be capable of producing sufficient pressure to maintain a continuous, non-fluctuating spray capable of reaching the extremities of the seeding area with the pump unit located on the roadbed. Sufficient hose shall be provided to reach areas not practical to seed from the nozzle unit situated on the roadbed.

7. Dry Method

- a. Mechanical spreaders, seed drills, landscape seeders, cultipacker seeders, fertilizer spreaders, or other mechanical spreading equipment approved by the ENGINEER may be used when seed and fertilizer are to be applied in dry form.
- b. Fertilizer, and ground limestone if required, shall be spread separately at the specified rates and then incorporated in one operation to a minimum depth of two (2) inches. Weather and soil conditions permitting, seeded areas shall be compacted, within 24 hours from the time the seeding is completed, by cultipacker, roller, or other equipment approved by the ENGINEER.
- c. Compacting equipment shall be operated at right angles to the slope. Compaction shall not be performed when the soil is in such condition that it will be picked up by the compacting equipment, nor shall heavy soils be compacted at all if so directed by the ENGINEER.
- d. Hand-operated seeding devices may be substituted provided that the rate of application for both seed and nutrient is twice that of dry mechanical methods, and that the end result required is attained. Hand-operated seeding devices may be used only upon prior written approval of the ENGINEER.

3.4 MAINTENANCE OF SEEDED AREAS

- A. The CONTRACTOR shall protect seeded area against traffic by warning signs or barricades, as approved by the ENGINEER. Surfaces gullied or otherwise damaged following seeding shall be repaired by re-grading, re-seeding, and re-mulching, as directed by the ENGINEER, and the CONTRACTOR shall otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the WORK.
- B. The seeded areas shall be watered by the CONTRACTOR as required for proper germination and growth. Equipment used in watering shall be capable of reaching all seeded areas from the traveled way.

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SECTION 02710  
SEEDING

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3.5 INSPECTION AND ACCEPTANCE

- A. Acceptance of seeded areas shall be based on a uniform stand of vegetation at the time of final inspection. Areas failing to show a uniform stand after germination shall be scarified and reseeded as herein specified..

END OF SECTION

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SECTION 02714  
FILTER CLOTH

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**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, material, tools, and equipment necessary for furnishing and installing filter cloth in accordance with the Drawings and Standard Details, or as directed by the ENGINEER.

**PART 2 - PRODUCTS**

2.1 CLOTH

- A. Filter cloth shall be composed of plastic yarn fabricated into a pervious sheet with distinct pores or openings.
- B. The plastic yarn shall consist of a long-chain synthetic polymer composed of at least 85% by weight of propylene, ethylene, or vinylidene-chloride and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure. The cloth shall be calendared or otherwise finished so that the yarns will retain their relative position with respect to each other. The edges of the cloth shall be selvaged or otherwise finished to prevent the outer yarn from pulling away from the cloth.
- C. Type A filter cloth, woven or non-woven, shall meet the following requirements:  
  
Grab Tensile Strength (ASTM D 1682) 90 lbs. min.  
Bursting Strength (ASTM D 751) 100 psi min.  
Equivalent Opening Size (EOS) 40 minimum, 100 maximum
- D. Type B filter cloth, woven or non-woven, shall meet the following requirements:  
  
Grab Tensile Strength (ASTM D 1682) 200 lbs. min.  
Bursting Strength (ASTM D 751) 500 psi min.
- E. Type C filter cloth, woven or non-woven, shall meet the following requirements:  
  
Grab Tensile Strength (ASTM D 1682) 200 lbs. min.  
Grab Tensile Elongation (ASTM D 1682) 30% maximum  
Bursting Strength (ASTM D 751) 290 psi min. 50  
Trapezoid Tear Strength (ASTM D 1117) lbs. min. 75 lbs.  
Puncture Strength (ASTM D 751)\* Water min.  
Permeability (AASHTO M 288)\*\* 0.001 cm/sec. min.

\*Using 5/16" flat-tipped pod

\*\*5 cm. Constant head

2.2 SEAMS

- A. Seams, when required, shall be sewn with thread of material meeting the chemical requirements given above for plastic yarn. The sheets for filter cloth shall be sewn together at the factory or another approved location to form sections not less than two feet wide. Seams shall be tested in accordance with ASTM D 1682, using one inch square jaws and 12 inches per minute constant rate of traverse. The strengths shall be not less than 90 pounds in any principal direction.

2.3 ACCEPTANCE REQUIREMENTS

- A. All brands of plastic filter cloth and all seams to be used will be accepted on the basis of a certification. The CONTRACTOR shall furnish the ENGINEER a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the cloth. The mill certificate or affidavit shall attest that the cloth meets the chemical, physical, and manufacturing requirements stated in this Section.

2.4 SHIPMENT AND STORAGE

- A. During all periods of shipment and storage, the cloth shall be protected from direct sunlight, ultraviolet rays, temperatures greater than 140° F, mud, dirt, dust, and debris. To the extent possible, the cloth shall be wrapped in a heavy-duty protective covering.

**PART 3 - EXECUTION**

3.1 CONSTRUCTION

- A. Filter cloth shall be placed in the manner and at the locations shown on the Drawings or as directed by the ENGINEER. At the time of installation, cloth shall be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.
- B. The surface upon which the filter cloth is to be placed shall be free of projections or depressions, and rocks, roots, and other sharp objects which may cause the filter cloth to be punctured. The filter cloth shall be placed without stretching and shall lie smoothly in contact with the soil or wall surface. When overlapping of strips is necessary, the joints shall be overlapped a minimum of two feet. End overlaps shall be made in the direction of flow.
- C. The cloth shall be protected at all times during construction from contamination or from damage during its installation or during placement of subsequent covering; contaminated or damaged cloth shall be replaced at the CONTRACTOR's expense, or if the ENGINEER permits, torn fabric may be patched. The aggregate material shall be cleaned from the fabric, and the torn area shall be overlain with fabric with a minimum three foot overlap around the edges of the torn area. Care shall be taken that the patch remains in place when material is placed over the affected area.



- D. The WORK shall be scheduled so that not more than 30 Days elapse between the placement of the cloth and the time it is covered with specified material.
- E. Type A filter cloth shall be utilized in all installations except under riprap or gabions, or for subgrade reinforcement.
- F. Type B filter cloth shall be utilized under riprap or gabions.
- G. Type C filter cloth shall be utilized for subgrade reinforcement.
- H. Following placement of the fabric on the prepared surface, material of the type shown on the Drawings shall be back-dumped on the previously spread fabric or ground adjacent to the fabric and carefully pushed or spread onto the fabric by a dozer or other machinery. A minimum depth of one foot, or the depth shown on the Drawings, shall be maintained at all times between the fabric and the wheels or tracks of the construction equipment. At no time shall equipment operate on the unprotected fabric. The material shall be spread in the direction of the fabric overlap. Special care shall be taken to maintain a proper overlap and fabric continuity.

**END OF SECTION**

PROJECT NO. 2009-10

SECTION 02717  
STORM AND SANITARY  
STRUCTURE REMOVAL

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**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools, and equipment necessary for removing and disposal of existing storm drain pipe, leachate pipe, and storm drain manholes as shown on the Drawings or as directed by the ENGINEER.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

3.1 GENERAL

- A. Storm Drain Structures designated on the Drawings to be removed, shall be removed and backfilled with suitable material. Structures to be disposed shall be removed from the Project and disposed in a legal manner.

**END OF SECTION**

PROJECT NO. 2009-10

SECTION 02718  
SIGN ASSEMBLY

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**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools, and equipment necessary for installing new sign assemblies as shown on the Drawings.

1.2 SUBMITTALS

- A. Sign panel material, size and legend certification.

**PART 2 - PRODUCTS**

2.1 GENERAL

- A. All materials shall conform to the requirements of the Sign Assembly detail as shown on the Drawings.
- B. All sign panels shall be constructed of engineer grade sheeting, or better.
- C. Telspar post material shall be square, perforated, welded steel tubing with perforations on all four sides. Size of Telspar tubing shall be as described on the Drawings.

**PART 3 - EXECUTION**

3.1 GENERAL

- A. Sign assemblies shall be installed at locations as shown on the Drawings and as approved by the ENGINEER. The landfill sign shall be set on a two-post support system.
- B. Sign posts shall be set plumb and signs set level on the telspar posts.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1 SCOPE

- A. The WORK under this section includes providing all labor, materials, tools and equipment necessary for furnishing and installing a geosynthetic clay liner described herein. All materials used shall meet the requirements of this specification, and all WORK shall be performed in accordance with the procedures provided herein and the Contract Drawings.

### 1.2 DEFINITIONS

- A. For the purposes of this specification guideline, the following terms are defined below:
- B. Geosynthetic Clay Liner (GCL). A manufactured hydraulic barrier consisting of clay bonded to a layer or layers of geosynthetics.
- C. Geomembrane. An essentially impermeable geosynthetic composed of one or more geosynthetic sheets.
- D. Geotextile. Any permeable geosynthetic comprised solely of textiles.
- E. Minimum Average Roll Value. For geosynthetics, the value calculated as the typical value minus two (2) standard deviations from documented quality control test results for a defined population from one specific test method associated with one specific property.
- F. Overlap. Where two adjacent GCL panels contact, the distance measuring perpendicular from the overlying edge of one panel to the underlying edge of the other.
- G. Typical Value. The mean value calculated from documented manufacturing quality control test results for a defined population obtained from one test method associated with one specific property.

### 1.3 SUBMITTALS

- A. With the bid, the Contractor shall furnish the following information:
  - 1. Conceptual description of the proposed plan for placement of the GCL panels over the area of installation.

GCL Manufacturer's Quality Control (MQC) Plan for documenting compliance to Sections 2.1 and 2.2 of these specifications.

GCL manufacturer's historical data for reinforced GCL of a) 10,000-hour creep shear testing per Section 2.1 D and b) seam flow data at 2 psi confining pressure per Section 2.1 E.

A copy of GCL manufacturer's ISO quality Certificate of Registration.

- B. At the Engineer's or Owner's request the Contractor shall furnish:
  - 1. A representative sample of the GCLs.
  - 2. A project reference list for the GCL(s) consisting of the principal details of at least ten projects totaling at least 10 million square feet (100,000 square meters) in size.
- C. Upon shipment, the Contractor shall furnish the GCL manufacturer's Quality Assurance/Quality Control (QA/QC) certifications to verify that the materials supplied for the project are in accordance with the requirements of this specification.
- D. As installation proceeds, the Contractor shall submit certificates of subgrade acceptance, signed by the Contractor and Construction Quality Assurance (CQA) Inspector (see Sections 1.6 and 3.3) for each area that is covered by the GCL.

#### 1.4 QUALIFICATIONS

- A. GCL Manufacturer must have produced at least 10 million square feet (1 million square meters) of GCL, with at least 8 million square feet (800,000 square meters) installed.
- B. The GCL Installer must either have installed at least 1 million square feet (100,000 square meters) of GCL, or must provide to the Engineer satisfactory evidence, through similar experience in the installation of other types of geosynthetics, that the GCL will be installed in a competent, professional manner.

#### 1.5 CONSTRUCTION QUALITY ASSURANCE (CQA)

- A. The Owner and Engineer shall provide a third-party inspector for CQA of the GCL installation. The inspector shall be an individual or company who is independent from the manufacturer and installer, who shall be responsible for monitoring and documenting activities related to the CQA of the GCL, throughout installation. The inspector shall have provided CQA services for the installation of the proposed or similar GCL for at least 5 completed projects totaling not less than 1 million square feet (100,000 square meters).
- B. Testing of the GCL, as necessary to support the CQA effort, shall be performed by a third party laboratory retained by the Contractor and independent from the GCL manufacturer and installer. The laboratory shall have provided GCL CQA testing of the proposed or similar GCL for at least 5 completed projects totaling not less than 1 million square feet (100,000 square meters).
- C. CQA shall be provided in accordance with the GCL CQA Manual provided by the engineer.

## PART 2 - PRODUCTS

- A. The GCLs shall consist of a layer of natural sodium bentonite clay encapsulated between two geotextiles and shall comply with all of the criteria listed in this Section.
- B. Prior to using an alternate GCL, the Contractor must furnish independent test results demonstrating that the proposed alternate material meets all requirements of this specification. The Contractor also must obtain prior approval of the alternative GCL by the Project Engineer.

### 2.1 MATERIALS

- A. Acceptable reinforced GCL products are Bentomat® DN, as manufactured by CETCO, 1350 West Shure Drive, Arlington Heights, Illinois 60004 USA (847-392-5800), or an engineer-approved equal. Acceptable unreinforced GCL products are Claymax 200R, as manufactured by CETCO, or an engineer-approved equal.
- B. Areas requiring reinforced GCL will be furnished with Bentomat® DN. Areas of the project requiring unreinforced GCL will be furnished with Claymax® 200R. The delineation of these areas shall be agreed by the Installer and the Engineer prior to installation.
- C. The reinforced GCL and its components shall have the properties shown in the Bentomat DN Certified Properties table. The unreinforced GCL and its components shall have the properties shown in the Claymax 200R Certified Properties table.
- D. The reinforced GCL shall have 10,000 hour test data for large-scale constant-load (creep) shear testing under hydrated conditions. The displacement shall be 0.07 in. (1.8 mm) or less at a constant shear load of 250 psf (12 kPa) and a normal load of 500 psf (24 kPa).
- E. The reinforced GCL shall have seam test data from an independent laboratory showing that the seam flow with a grooved cut in one of the nonwoven geotextiles is less than  $1 \times 10^{-8}$  m<sup>3</sup>/m<sup>2</sup>/s at 2 psi hydraulic pressure.
- F. The minimum acceptable dimensions of full-size GCL panels shall be 150 feet (45.7 m) in length. Short rolls [(those manufactured to a length greater than 70 feet (21 m) but less than a full-length roll)] may be supplied at a rate no greater than 3 per truckload or 3 rolls every 36,000 square feet (3,500 square meters) of GCL, whichever is less.
- G. A 6-inch (150 mm) overlap guideline shall be imprinted on both edges of the upper geotextile component of the GCL as a means for providing quality assurance of the overlap dimension. Lines shall be printed in easily visible, non-toxic ink.

## 2.2 PRODUCT QUALITY DOCUMENTATION

The GCL manufacturer shall provide the Contractor or other designated party with manufacturing QA/QC certifications for each shipment of GCL. The certifications shall be signed by a responsible party employed by the GCL manufacturer and shall include:

- A. Certificates of analysis for the bentonite clay used in GCL production demonstrating compliance with the parameters swell index and fluid loss shown in the Bentomat DN and Claymax 200R Certified Properties tables.
- B. Manufacturer's test data for finished GCL product(s) of bentonite mass/area, GCL tensile strength and GCL peel strength (reinforced only) demonstrating compliance with the index parameters shown in the Bentomat DN and Claymax 200R Certified Properties tables.
- C. GCL lot and roll numbers supplied for the project (with corresponding shipping information).

Manufacturer's test data for finished GCL product(s), including GCL index flux, permeability and hydrated internal shear strength data, which demonstrate compliance with the performance parameters shown in the Bentomat DN and Claymax 200R Certified Properties tables, are available upon request of the manufacturer.

## 2.3 PRODUCT LABELING

- A. Prior to shipment, the GCL manufacturer shall label each roll, identifying:
  - 1. Product identification information (Manufacturer's name and address, brand product code).
  - 2. Lot number and roll number.  
  
Roll length, width and weight.

## 2.4 PACKAGING

- A. The GCL shall be wound around a rigid core whose diameter is sufficient to facilitate handling. The core is not necessarily intended to support the roll for lifting but should be sufficiently strong to prevent collapse during transit.
- B. All rolls shall be labeled and bagged in packaging that is resistant to photodegradation by ultraviolet (UV) light.

BENTOMAT® DN CERTIFIED PROPERTIES

MATERIAL PROPERTY	TEST METHOD	TEST FREQUENCY ft <sup>2</sup> (m <sup>2</sup> )	REQUIRED VALUES
Bentonite Swell Index <sup>1</sup>	ASTM D 5890	1 per 50 tonnes	24 mL/2g min.
Bentonite Fluid Loss <sup>1</sup>	ASTM D 5891	1 per 50 tonnes	18 mL max.
Bentonite Mass/Area <sup>2</sup>	ASTM D 5993	40,000 ft <sup>2</sup> (4,000 m <sup>2</sup> )	0.75 lb/ft <sup>2</sup> (3.6 kg/m <sup>2</sup> ) min
GCL Grab Strength <sup>3</sup>	ASTM D 6768	200,000 ft <sup>2</sup> (20,000 m <sup>2</sup> )	50 lbs/in (88 N/cm) MARV
GCL Peel Strength <sup>3</sup>	ASTM D 6496	40,000 ft <sup>2</sup> (4,000 m <sup>2</sup> )	3.5 lbs/in (6.1 N/cm) min
GCL Index Flux <sup>4</sup>	ASTM D 5887	Weekly	1 x 10 <sup>-8</sup> m <sup>3</sup> /m <sup>2</sup> /sec max
GCL Hydraulic Conductivity <sup>4</sup>	ASTM D 5887	Weekly	5 x 10 <sup>-9</sup> cm/sec max
GCL Hydrated Internal Shear Strength <sup>5</sup>	ASTM D 5321 ASTM D 6243	Periodic	500 psf (24 kPa) typ @ 200 psf

Bentomat DN is a reinforced GCL consisting of a layer of sodium bentonite between two nonwoven geotextiles, which are needlepunched together.

Notes

- 1 Bentonite property tests performed at a bentonite processing facility before shipment to CETCO's GCL production facilities.
- 2 Bentonite mass/area reported at 0 percent moisture content.
- 3 All tensile strength testing is performed in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. Upon request, tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.
- 4 Index flux and permeability testing with deaired distilled/deionized water at 80 psi (551kPa) cell pressure, 77 psi (531 kPa) headwater pressure and 75 psi (517 kPa) tailwater pressure. Reported value is equivalent to 925 gal/acre/day. This flux value is equivalent to a permeability of 5x10<sup>-9</sup> cm/sec for typical GCL thickness. Actual flux values vary with field condition pressures. The last 20 weekly values prior the end of the production date of the supplied GCL may be provided.
- 5 Peak values measured at 200 psf (10 kPa) normal stress for a specimen hydrated for 48 hours. Site-specific materials, GCL products, and test conditions must be used to verify internal and interface strength of the proposed design.



CLAYMAX® 200R CERTIFIED PROPERTIES

MATERIAL PROPERTY	TEST METHOD	TEST FREQUENCY ft <sup>2</sup> (m <sup>2</sup> )	REQUIRED VALUES
Bentonite Swell Index <sup>1</sup>	ASTM D 5890	1 per 50 tonnes	24 mL/2g min.
Bentonite Fluid Loss <sup>1</sup>	ASTM D 5891	1 per 50 tonnes	18 mL max.
Bentonite Mass/Area <sup>2</sup>	ASTM D 5993	40,000 ft <sup>2</sup> (4,000 m <sup>2</sup> )	0.75 lb/ft <sup>2</sup> (3.6 kg/m <sup>2</sup> ) min
GCL Grab Strength <sup>3</sup>	ASTM D 6768	200,000 ft <sup>2</sup> (20,000 m <sup>2</sup> )	40 lbs/in (70 N/cm) MARV
GCL Peel Strength <sup>3</sup>	ASTM D 6496	N/A	N/A
GCL Index Flux <sup>4</sup>	ASTM D 5887	Weekly	1 x 10 <sup>-8</sup> m <sup>3</sup> /m <sup>2</sup> /sec max
GCL Hydraulic Conductivity <sup>4</sup>	ASTM D 5887	Weekly	5 x 10 <sup>-9</sup> cm/sec max
GCL Hydrated Internal Shear Strength <sup>5</sup>	ASTM D 5321 ASTM D 6243	Periodic	100 psf (4.8 kPa) typical

Claymax 200R is an unreinforced GCL consisting of a layer of sodium bentonite between two nonwoven geotextiles, which are continuously adhered together.

Notes

- 1 Bentonite property tests performed at a bentonite processing facility before shipment to CETCO's GCL production facilities.
- 2 Bentonite mass/area reported at 0 percent moisture content.
- 3 All tensile strength testing is performed in the machine direction using ASTM D 6768. Upon request, tensile results can be reported per modified ASTM D 4632 using 4 inch grips.
- 4 Index flux and permeability testing with deaired distilled/deionized water at 80 psi (551kPa) cell pressure, 77 psi (531 kPa) headwater pressure and 75 psi (517 kPa) tailwater pressure. Reported value is equivalent to 925 gal/acre/day. Actual flux values vary with field condition pressures. The last 20 weekly values prior the end of the production date of the supplied GCL may be provided.
- 5 Peak value measured at 200 psf (10 kPa) normal stress for a specimen hydrated for 48 hours. Site-specific materials, GCL products, and test conditions must be used to verify internal and interface strength of the proposed design.

2.5 ACCESSORY BENTONITE

- A. The granular bentonite sealing clay used for overlap seaming, penetration sealing and repairs shall be made from the same natural sodium bentonite as used in the GCL and shall be as recommended by the GCL manufacturer. Seaming of GCLs shall be conducted in accordance with the manufacturer's guidelines for each particular GCL. Please refer to the installation guidelines for Bentomat /Claymax GCLs.

**PART 3 - EXECUTION**

3.1 SHIPPING AND HANDLING

- A. The manufacturer assumes responsibility for initial loading the GCL. Shipping will be the responsibility of the party paying the freight. Unloading, on-site handling and storage of the GCL are the responsibility of the Contractor, Installer or other designated party.
- B. A visual inspection of each roll should be made during unloading to identify if any packaging has been damaged. Rolls with damaged packaging should be marked and set aside for further inspection. The packaging should be repaired prior to being placed in storage.
- C. The party responsible for unloading the GCL should contact the Manufacturer prior to shipment to ascertain the appropriateness of the proposed unloading methods and equipment.

3.2 STORAGE

- A. Storage of the GCL rolls shall be the responsibility of the installer. A dedicated storage area shall be selected at the job site that is away from high traffic areas and is level, dry and well drained.
- B. Rolls should be stored in a manner that prevents sliding or rolling from the stacks and may be accomplished by the use of chock blocks. Rolls should be stacked at a height no higher than that at which the lifting apparatus can be safely handled (typically no higher than four).
- C. All stored GCL materials and the accessory bentonite must be covered with a plastic sheet or tarpaulin until their installation.
- D. The integrity and legibility of the labels shall be preserved during storage.

3.3 EARTHWORK

- A. Any earthen surface upon which the GCL is installed shall be prepared and compacted in accordance with the project specifications and drawings. The surface shall be smooth, firm, and unyielding, and free of:
1. Vegetation.
  2. Construction Debris.
  3. Sticks.
  4. Sharp rocks.
  5. Void spaces.
  6. Ice.
  7. Abrupt elevation changes.
  8. Standing water.
  9. Cracks larger than one-quarter inch (6 mm) in width.
  10. Any other foreign matter that could contact the GCL.
- B. Subgrade surfaces consisting of granular soils or gravels may not be acceptable due to their large void fraction and puncture potential. In applications where the GCL is the only barrier, subgrade soils should have a particle-size distribution at least 80 percent finer than the #60 sieve (0.25 mm). In other applications, subgrade soils should range between fines and 1 inch (25 mm).
- C. Immediately prior to GCL deployment, the subgrade shall be final-graded to fill in all voids or cracks and then smooth-rolled to provide the best practicable surface for the GCL. At completion of this activity, no wheel ruts, footprints or other irregularities shall exist in the subgrade. Furthermore, all protrusions extending more than one-half inch (12 mm) from the surface shall either be removed, crushed or pushed into the surface with a smooth-drum compactor.
- D. On a continuing basis, the project CQA inspector shall certify acceptance of the subgrade before GCL placement.
- E. It shall be the installer's responsibility thereafter to indicate to the ENGINEER any change in the condition of the subgrade that could cause the subgrade to be out of compliance with any of the requirements listed in this Section.
- F. At the top of sloped areas of the job site, an anchor trench for the GCL shall be excavated or an equivalent runout shall be utilized in accordance with the project plans and specifications and as approved by the CQA Inspector. When utilizing an anchor trench design, the trench shall be excavated and approved by the CQA Inspector prior to GCL placement. No loose soil shall be allowed at the bottom of the trench and no sharp corners or protrusions shall exist anywhere within the trench.

### 3.4 GCL PLACEMENT

- A. Unreinforced GCL shall be placed on the flatter areas of the site; reinforced GCL shall be placed on the more steeply sloped areas. The Installer and ENGINEER shall review and agree upon which GCL shall be placed on these areas prior to installation.
- B. GCL rolls should be delivered to the working area of the site in their original packaging. Immediately prior to deployment, the packaging should be carefully removed without damaging the GCL. The orientation of the GCL (i.e., which side faces up) should be in accordance with the Engineer's recommendations.
- C. Equipment, which could damage the GCL, shall not be allowed to travel directly on it. If the installation equipment causes rutting of the subgrade, the subgrade must be restored to its originally accepted condition before placement continues.
- D. Care must be taken to minimize the extent to which the GCL is dragged across the subgrade in order to avoid damage to the bottom surface of the GCL. A temporary geosynthetic subgrade covering commonly known as a slip sheet or rub sheet may be used to reduce friction damage during placement.
- E. The GCL panels shall be placed parallel to the direction of the slope.
- F. All GCL panels should lie flat on the underlying surface, with no wrinkles or fold, especially at the exposed edges of the panels.
- G. Only as much GCL shall be deployed as can be covered at the end of the working day with soil, a geomembrane, or a temporary waterproof tarpaulin. The GCL shall not be left uncovered overnight. If the GCL is hydrated when no confining stress is present, it may be necessary to remove and replace the hydrated material. The ENGINEER, CQA inspector, and GCL supplier should be consulted for specific guidance if premature hydration occurs.
- H. In general, seams shall be oriented parallel to the line of the maximum slope, i.s., the seam shall run down the slope. In corners and odd geometric locations, the total length of the field seam should be minimized. If at all possible, seams should not be located at low points in the subgrade unless geometry requires seaming to be done at these locations. When the textured geomembrane is installed over the GCL, a temporary geosynthetic covering known as a slip sheet or rub sheet should be used to minimize friction during placement and to allow the textured geomembrane to be more easily moved into its final position.

### 3.5 ANCHORAGE

- A. As directed by the project drawings and specifications, the end of the GCL roll shall be placed in an anchor trench at the top of the slope or an equivalent runout design shall be utilized. When utilizing an anchor trench design, the front edge of the trench should be rounded so as to eliminate any sharp corners. Loose soil should be removed from the floor of the trench. The GCL should cover the entire trench floor but does not extend up the rear trench wall.

### 3.6 SEAMING

- A. The GCL seams are constructed by overlapping adjacent panel edges and ends. Care should be taken to ensure that the overlap zone is not contaminated with loose soil or other debris.
- B. Longitudinal seams should be overlapped a minimum of 6 inches (150 mm) for Bentomat DN and 12 inches (300 mm) for Claymax. If the GCL is manufactured with a grooved cut in the nonwoven geotextile that allows bentonite to freely extrude into the longitudinal overlap, then no bentonite-enhanced seam is required for this overlap. If the GCL does not have a grooved cut in one of the nonwoven geotextiles in the longitudinal overlap, then longitudinal bentonite-enhanced seams are required as described below.
- C. End-of-roll overlapped seams should be constructed with a minimum overlap of 24 inches (600 mm) for Bentomat DN and 48 inches (1,200 mm) for Claymax. Seams at the ends of the panels should be constructed such that they are shingled in the direction of the grade to prevent the potential for runoff flow to enter the overlap zone. End-of-roll overlapped seams for all reinforced GCL seams require bentonite-enhanced seams as described below.
- D. Bentonite-enhanced seams are constructed between the overlapping adjacent panels described above. The underlying edge of the longitudinal overlap is exposed and then a continuous bead of granular sodium bentonite is applied along a zone defined by the edge of the underlying panel and the 6-inch (150 mm) line. A similar bead of granular sodium bentonite is applied at the end-of-roll overlap. The granular bentonite shall be applied at a minimum application rate of one quarter pound per lineal foot (0.4 kg/m).

### 3.7 DETAIL WORK

- A. The GCL shall be sealed around penetrations and embedded structures embedded in accordance with the design drawings and the GCL Manufacturer.
- B. Cutting the GCL should be performed using a sharp utility knife. Frequent blade changes are recommended to avoid damage to the geotextile components of the GCL during the cutting process.

### 3.8 DAMAGE REPAIR

- A. If the GCL is damaged (torn, punctured, perforated, etc.) during installation, it may be possible to repair it by cutting a patch to fit over the damaged area. The patch shall be obtained from a new GCL roll and shall be cut to size such that a minimum overlap of 12 inches (300 mm) is achieved around all of the damaged area. Granular bentonite or bentonite mastic should be applied around the damaged area prior to placement of the patch. It may be desirable to use an adhesive to affix the patch in place so that it is not displaced during cover placement.

### 3.9 COVER PLACEMENT

- A. Cover soils shall be free of angular stones or other foreign matter that could damage the GCL. Cover soils should be approved the project Engineer with respect to particle size, uniformity and chemical compatibility. Cover soils with high concentrations of calcium (e.g., limestone, dolomite) are not acceptable.

- B. Soil cover shall be placed over the GCL using construction equipment that minimizes stresses on the GCL. A minimum thickness of 1 foot (300 mm) of cover should be maintained between the equipment tires/tracks and the GCL at all times during the covering process. This thickness recommendation does not apply to frequently trafficked areas or roadways, for which a minimum thickness of 2 feet (600 mm) is required.
- C. Soil cover should be placed in a manner that prevents the soil from entering the GCL overlap zones. Cover soil shall be pushed up slopes, not down slopes, to minimize tensile forces on the GCL.
- D. Although direct vehicular contact with the GCL is to be avoided, lightweight, low ground pressure vehicles (such as 4-wheel all-terrain vehicles) may be used to facilitate the installation of any geosynthetic material placed over the GCL. The GCL supplier or CQA engineer should be contacted with specific recommendations on the appropriate procedures in this situation.
- E. When a textured geomembrane is installed over the GCL, a temporary geosynthetic covering known as a slip sheet or rub sheet should be used to minimize friction during placement and to allow the textured geomembrane to be more easily moved into its final position.
- F. Claymax must be covered with a geomembrane and/or 12" of cover material within 8 hours of deployment to prevent the potential for shrinkage by desiccation.
- G. Cyclical wetting and drying of GCL covered only with geomembrane can cause overlap separation. Soil cover should be placed promptly whenever possible. Geomembranes should be covered with a white geotextile and/or operations layer without delay to minimize the intensity of wet-dry cycling. If there is the potential for unconfined cyclic wetting and drying over an extended period of time, the longitudinal seam overlaps should be increased based on the ENGINEER's recommendations.
- H. To avoid seam separation, the GCL should not be put in excessive tension by the weight or expansion of textured geomembrane on steep slopes. The ENGINEER should be consulted about the potential for GCL tension to develop.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 DESCRIPTION**

- A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing a leachate collection piping system for collecting leachate in the City and Borough of Wrangell Landfill including perforated leachate collection pipe, pipe fittings, leachate collection cleanouts, pipe bedding material, backfill, earthwork and all appurtenant work, complete and operable, in accordance with the requirements of the Contract Documents and as shown on the Drawings.

### **1.2 SUBMITTALS**

- A. Material certification for the HDPE perforated leachate collection piping shall be submitted to the ENGINEER in accordance with Section 01300, "Contractor Submittals."
- B. Pipe bedding gradation report including material source location.
- C. Filter Cloth material certification.
- D. Record drawings of the leachate pipes showing location of the pipes, the slope of the pipes and the elevation of pipe inverts at the ends of all runs of pipe.

## **PART 2 - PRODUCTS**

### **2.1 LEACHATE COLLECTION PIPING**

- A. High-Density Polyethylene (HDPE) pipe shall conform to ASTM D 3550 designation PE 3408. The pipe shall have a maximum Standard Dimension Ratio (SDR) of 11.0. All HDPE shall have a standard iron pipe size (IPS) outside diameter.
- B. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions or other injurious defects. It shall be uniform in color, opacity, density, and other physical properties.
- C. HDPE pipe shall have an ASTM D-3350 material Cell Classification of no less than 335434C.
- D. The pipe shall be marked at five foot intervals with a coded number which identifies the manufacturer, SDR size, PPI rating, manufacturing standard reference and production code from which data and place of manufacturer can be determined.
- E. When HDPE pipe is connected to ductile iron pipe, a flange adapter shall be used. A flange-coupling adapter shall be used on the ductile iron pipe. HDPE flange adapters shall be manufactured by the same manufacturer as the pipe using the same resin as the pipe. Each flange adapter shall be furnished with a ductile iron convoluted back-up ring drilled to match the standard ANSI bolt pattern for the nominal diameter of pipe used.

- F. Connection of the pipe and fittings shall be performed by the thermal butt fusion system. HDPE pipe lengths, fittings, and flange adapter connections to be fused shall be of the same type, grade and class of polyethylene compound and supplied by the same raw material supplier.
- G. Pipe perforations shall be 3/8-inch in diameter spaced at 6-inches on center as shown on the drawings.

2.2 PIPE BEDDING AND BACKFILL

- A. Pipe bedding material consisting of a gravel material shall be used to surround the pipes and shall provide protection from crushing, deflection, deformation and clogging. The pipe bedding material shall have a hydraulic conductivity that is equal to or exceeds that of the leachate collection layer. The bedding material shall meet the following gradation requirement:

<u>Sieve Designation</u>	<u>Percent Passing</u>
2-inch	100
No. 4	0-10
No. 200	0-3

- B. Backfill for the leachate collection system shall be as described in Section 02203-Trenching.

2.3 GEOTEXTILE SEPARATION FABRIC

- A. Geotextile separation fabric shall meet the requirements of Type A Filter Cloth as described in Section 02714 – Filter Cloth.

**PART 3 - EXECUTION**

3.1 GENERAL

- A. Leachate collection pipe trenches shall be excavated to the dimensions and grade shown on the Drawings or as directed by the ENGINEER. A nominal two inch layer of granular backfill material shall be placed and compacted in the bottom of the trench for its full width and length.
- B. Filter cloth, if called for on the Drawings, shall be placed as shown on the Drawings.
- C. Perforated pipe shall be placed with the perforations down as shown on the Drawings.
- D. After the pipe installation has been inspected and approved, granular backfill material shall be placed and compacted to a height of 12 inches above the top of pipe. The remainder of the granular backfill material shall then be placed and compacted in six inch maximum layers to the required height.



- E. Any remaining portion of trench above the granular backfill shall be filled with either granular or impervious material, as may be specified, and thoroughly compacted. Compaction shall be as specified in Section 02203 - Trenching.

**END OF SECTION**

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools, and equipment necessary for furnishing and installing submersible, non-clog, leachate pumps with submersible explosion proof electric motors, wet wells, valve vaults, site work, miscellaneous piping and fittings, guard posts and all appurtenant work, complete and operable, in accordance with the requirements of the Contract Documents and as shown on the Drawings.
- B. The CONTRACTOR shall assume full responsibility for furnishing and the functional operation of the complete leachate pump system. The CONTRACTOR shall coordinate the assembly and fabrication of the pumps, control panels, wet wells, valve vaults, hatch lids, pumping etc. to ensure the completed assembly meets the requirements of the pump manufacturer. All pumps shall be manufactured by ITT Flygt. The pump station arrangement shown on the Drawings is based on ITT Flygt pumps and equipment.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01300 Contractor Submittals
- B. Section 02201 Clearing and Grubbing.
- C. Section 02202 Excavation and Embankment
- D. Section 02203 Trenching
- E. Section 02204 Base Course
- F. Section 02401 Sanitary Sewer Pipe
- G. Section 02402 Sanitary Sewer Manholes and Cleanouts
- H. Section 02709 Topsoil
- I. Section 02710 Seeding
- J. Section 03301 Structural Concrete
- K. Section 03302 Minor Concrete Structures
- L. Division 16 Electrical

1.3 CONTRACTOR SUBMITTALS

- A. Shop Drawings: Shop drawings of all pumps shall be submitted to the ENGINEER in accordance with Section 01300 – Contractor Submittals. Shop drawings shall contain the following information:
1. Pump name, identification number and specification number.
  2. Performance curve and pump data.
  3. The CONTRACTOR shall require the manufacturer to indicate points on the head versus capacity curves, and the limits recommended for stable operation between which the pumps may be operated without surge, cavitations and vibration. The stable operating range shall be as wide as possible based on actual hydraulic and mechanical tests.
  4. Pump detailed description and specification.
  5. Electrical data shall be submitted in accordance with the requirements of Division 16. These submittals shall include control and wiring diagrams, an elevation of the proposed Local Control Panel showing panel mounted devices, details of enclosure type, single line diagram of power distribution and current draw of the panel. Provide a list of all terminals to receive inputs or to transmit outputs from the Local Control Panel.
  6. Assembly and installation drawings including shaft size, seal, coupling, anchor bolt plan, part nomenclature, material list, outline dimensions and shipping weights.
  7. List any exceptions taken or deviations to the Contract Documents.
- B. O & M Manuals: Prior to start-up the CONTRACTOR shall furnish to the OWNER complete operations and maintenance manuals for each pump station in accordance with Section 01300, "Contractor Submittals."
- C. Tools: Special tools necessary for maintenance and repair of the pumps and one pressure grease gun for each type of grease required for pumps and motors shall be furnished as part of the WORK hereunder; such tools shall be suitably stored in metal tool boxes, and identified with the pump station name by means of stainless steel or solid plastic name tags attached to the box.
- D. Spare Parts: The CONTRACTOR shall obtain from the pump manufacturer a list of suggested spare parts of all items of each pump, motor, and drive, subject to wear, such as seals, packing, gaskets, nuts, bolts, washers, wear rings and bearings.

- E. Maintenance: Printed instructions relating to proper maintenance, including lubrication, and parts lists indicating the various parts by name, number, and diagram where necessary, shall be furnished in duplicate with each unit or set of identical units in each pumping station.
- F. Field Procedures: Instructions for field procedures for erection, adjustments, inspection, and testing shall be provided prior to installation of the pumps.

#### 1.4 GUARANTEES, WARRANTIES

- A. The CONTRACTOR shall furnish to the OWNER the manufacturer's written guarantees, that the pumping equipment will operate with the published efficiencies, heads, and flow ranges and meet these specifications. The CONTRACTOR shall also furnish the manufacturer's warranties as published in its literature and as specified.
- B. The CONTRACTOR shall furnish a prorated manufacturer's warranty, in writing, in which the mechanical seals, impeller, pump housing, wear rings, ball bearings, and rotor and stator are guaranteed for 18 months against defects in materials and workmanship and guaranteed on a prorated basis against defects in materials and workmanship for at least 5 years or 10,000 operating hours as contained in the standard manufacturers warranty provided by ITT Flygt.

#### 1.5 SPARE PARTS

- A. Parts to be Furnished: The following spare parts shall be furnished with the pumps:
  - 1. One set of mechanical shaft seals for each pump.
  - 2. One set of wear rings for each pump.
  - 3. One set of O-rings for each pump.
- B. The parts shall be labeled and the label shall contain the name of the part and the pump station for which it was provided.

#### 1.6 FACTORY TESTING AND SHIPMENT

- A. The following procedures shall be included with the factory test prior to shipment:
  - 1. Verification of the pump characteristic curves by testing at 1/4, 1/2, 3/4, and full flow and recording the measured head and motor current for each flow.
  - 2. Verification of cavitation-free service and absence of motor overheating during conditions simulating the actual operating conditions after installation, whether submerged or non-submerged.
  - 3. Verification of the watertightness of each pump seal at a minimum submergence of 65 feet for 30 minutes.

4. All parts shall be properly lubricated and protected so that no damage or deterioration will occur even during a prolonged delay from the time of shipment until installation is completed and the pumps are ready for operation.
5. Finished ferrous surfaces not painted shall be properly protected to prevent rust and corrosion.
6. Each pump shall be properly crated to protect the units against damage during shipment. The finished surfaces of all exposed flanges shall be protected by strong wooden blind flanges.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Wherever it is specified that a single manufacturer shall be responsible for the compatible and successful operation of the various components of any pumping equipment, it shall be understood to mean that the CONTRACTOR shall furnish only such pumping equipment as the designated single manufacturer will certify is suitable for use with its equipment and with the further understanding that this in no way constitutes a waiver of any specified requirements.
- B. All manufactured items provided under this Section shall be new, of current manufacture, and shall be the products of reputable manufacturers specializing in the manufacture of such products; such manufacturers shall have had previous experience in such manufacture and shall, upon request of the ENGINEER, furnish the names of not less than 5 successful installations of its equipment of comparable nature to that offered under this contract.
- C. All combinations of manufactured equipment which are provided under these specifications shall be entirely compatible, and the CONTRACTOR and the designated single manufacturer shall be responsible for the compatible and successful operation of the various components of the units conforming to specified requirements. Each unit of pumping equipment shall incorporate all basic mechanisms, coupling, electric motor or engine drive and unit mounting. All necessary mountings and appurtenances shall be included.
- D. Where 2 or more units of the same type and/or size of pumping equipment are required, such units shall all be produced by the same manufacturer.

### 2.2 PUMPS

- A. General

1. The pumps shall be controlled by local starters, with the addition of a low water cut-off float switch and high water alarm. Coordinate the starters and cut-off switches with the requirements of Division 16.
  2. Each pump shall be capable of continuous cyclical operation at full load with a water level of 11 inches above the invert of the wet well, without cavitation or overheating of the motor. The maximum expected ambient temperature inside the wet well is 70 degrees F.
  3. Each pump, with its cable and appurtenances, shall be able to withstand continuous submergence to a minimum depth of 65 feet, when running or off, without leakage.
  4. Each pump shall be able to operate for short periods at zero static suction head without causing any damage to any part of the unit.
- B. Pump Construction. Construction of submersible non-clog pumps shall conform to the following requirements:
1. Connections: Machined quick disconnect type, for withdrawal of unit from above, without disconnecting pipe. When lowered into place, the pump shall automatically connect and lock into the discharge pipe. The pump discharge shall be fitted with a standard ASA 125 lb. flange, faced and drilled. All fasteners exposed to the pumped liquid shall be 300 series stainless steel.
  2. Pump Design: Single stage, centrifugal type, close-coupled to sealed electric motor, for operation in a wet pit, without external cooling.
  3. Impeller: Two-port or 3-port non-clog type with replaceable wear rings in casing. Impellers shall be dynamically balanced.
  4. Bearings: Permanently lubricated, heavy-duty axial and radial ball or roller bearings, top and bottom, with a minimum L-10 life of 50,000 hours, at continuous, maximum load and speed, supported by detailed calculations, to be submitted with the shop drawings.
  5. Seals: Independent tandem mechanical shaft seals, oil lubricated with moisture detector probes, alarm, and test circuits.
  6. Oil Chamber: To supply oil for lubrication and cooling of the shaft seals. Oil shall be a food grade product or other environmentally friendly lubricating oil.
  7. Support: Cast discharge elbow with machined face, anchored to sump floor. The discharge elbow shall include a hydraulically sealed discharge flange.
  8. Cables: Each pump shall be furnished with the necessary cables for power connection, moisture detection, and overload protection, sheathed, coded, and

suitable for submersible pumps, and of sufficient length for direct connection to the terminal boxes. All cables shall be connected to the pumps and tested at the factory. Cables shall be oversized sized to handle a 30 hp motor.

9. Lifting Devices: Each pump shall be furnished with 316 stainless steel guide rails, brackets and lifting chain of adequate strength to facilitate easy removal of pumps.

C. Leachate Pump Station

- |     |   |                       |
|-----|---|-----------------------|
| 1.  | Design capacity @   | 400 gpm               |
| 2.  | Design Head (TDH)   | 75 feet               |
| 3.  | Maximum Flow @  | 600 gpm               |
| 4.  | Minimum Head (TDH)  | 61 feet               |
| 5.  | Shutoff head  | 110 ft (minimum)      |
| 6.  | Liquid to be pumped                                       | Landfill Leachate     |
| 7.  | Specific gravity of liquid                                | 1.01                  |
| 8.  | Liquid temperature  | 40-60 degrees F       |
| 9.  | Power supply  | 480 V, 3 phase, 60 Hz |
| 10. | Horsepower  | 10 Hp                 |
| 11. | Pump Speed  | 1,740 rpm             |
| 12. | Number of Pumps   | 2                     |
| 13. | Flygt Model NP3153.185, Impeller 464 with 253mm diameter, |                       |
| 14. | Discharge base elbow outlet                               | 4" flanged ANSI/AWWA  |

D. Materials:

1. Pump, volute, oil casing, sliding bracket, motor frame: Cast iron, ASTM A 48, Class 25.
2. Impeller: Cast iron, ASTM A-48.
3. Pump shaft: Type 303 stainless steel.
4. Exposed bolts, nuts, washers: Type 316 or 304 stainless steel.

5. Mechanical seals: Two mechanical seals mounted in tandem with an oil chamber between the seals. The rotating seal faces shall be tungsten-carbide and the stationary seal faces shall be tungsten-carbide.
6. Wear rings: Alloy 230 brass ASTM B-43, held by 300 series stainless steel fasteners. The wear rings shall be easily replaceable in the field.

### 2.3 MOTOR

- A. Approval: The pumping system, including the motor and wiring, shall be approved by a nationally approved testing agency for explosion-proof service. The system shall be rated Class I, Division 1, Group C and D service as determined by the National Electrical Code and approved by a nationally recognized testing agency (UL, FM or equal) at the time of bidding of the project. The CONTRACTOR shall include in his bid a copy of certificate of approval.
- B. Insulation: Pump motors shall be designed for cyclical duty in hazardous locations. The stator windings and stator leads shall be moisture-resistant, triple varnished and insulated according to Class F or Class H, capable of withstanding temperature rise of up to 155° C. The allowable temperature rise of the motor at full load condition shall not exceed 80° C.
- C. Stator: The stator, rotor and bearings shall be mounted in a sealed submersible type housing. The stator windings shall have moisture resistant Class F insulation rated for not less than 155 degrees C.
- D. Rating: The motor shall be non-overloading throughout the pump curve without employing the service factor. The combined service factor shall be 1.15 or greater.
- E. Junction Box: The motor shall have a junction box capable of being sealed completely from the stator casing to prevent leakage through the junction box into the stator housing should a motor cable be damaged.
- F. Cable Entry: The cable entry water seal design shall be such that it ensures a watertight and submersible seal.
- G. Cooling System: Each pump/motor shall be provided with an adequately designed cooling system so that they may be operated continuously when either partially or completely non-submerged in the liquid being pumped.
- H. Motor Protection: Integral thermal sensors in the motors, one for each phase, shall be provided to monitor stator temperatures. These sensors shall be used in conjunction with and supplemented by an external motor over-current protection to be installed at the control panel. Each pump motor shall also be provided with moisture (leak) sensor.



- I. Electrical Power Cord: The electrical power cord shall be STW-A, water resistant 600V, 60°C, UL or CSA approved and applied dependent on amperage draw (i.e., for 30 hp motors) for size.

#### 2.4 CONTROLS

- A. The CONTRACTOR shall provide two complete control systems housed in a NEMA 4 or 4X pump control panel with hinged, gasketed door and all necessary components as shown on the Electrical Drawings and in accordance with the requirements of Division 16 Electrical
- B. Operation of the pump shall be controlled by duplex pump controller located as shown on the drawings. Duplex pump controllers shall be ITT Flygt's MultiTrode indicating duplex pump controller, Model MT2PC which shall be mounted on the door of the pump control panel and integrated to provide a complete, reliable, fully functional submersible pump control system as indicated on the Electrical Drawings and Division 16 of these specifications.
- C. Wet well liquid level sensors shall be multi-sensored conductive liquid level probes specifically designed for use in monitoring liquid levels in untreated leachate pump station wet wells. Level probes shall be standard probes complete with 316 stainless steel mounting bracket and integral probe, cleaning device and multi-stranded cable. Probe cable shall be of sufficient length to afford a continuous unspliced run between the sensor and the pump control panel (PCP). Probe shall have a minimum length of 60 inches and shall have a total of 10 independent sensors, with sensors spaced approximately 6 inches apart and located at the control elevations shown on Drawings. Sensors shall be fabricated from high-grade non-corroding stainless steel alloy. Probe casings shall be fabricated from uPVC extruded tubing. Sensors shall have a nominal diameter of 1-1/4 inches. The level probes shall be provided with intrinsically safe barriers. The liquid level sensors shall be ITT Flygt's MultiTrode conductive liquid level sensors. Intrinsically safe barriers shall be ITT Flygt's multitrode intrinsically safe barrier Model MT SB-10.
- D. The pump control panel (PCP) shall be provided with all panel mounted devices indicated on the electrical drawings. PCP's shall house controls and wiring for the submersible pump operation, including motor starters, transformers, disconnects and fuses, necessary voltage barriers, panel-mounted devices, electric alternator, terminal strips, relays, and appurtenances as required. The main disconnect shall be a flange mounted operator.

#### 2.5 WET WELLS, VALVE VAULTS AND APPURTENANCES

- A. Portland cement concrete cast in place shall have a minimum 28-day compressive strength of 3000 psi.

- B. All precast concrete sections, including flat slab tops for the wet well and valve vault for each pump station, shall comply with the requirements of Section 02402 – Sanitary Sewer Manholes and Cleanouts and with the manhole details as shown on the Drawings.
- C. Lever and Spring Operated Horizontal Swing Check Valves shall be Clow F-5381 or equal.
- D. Mechanical Joint Couplings with Megalugs shall be Clow F-1012 or equal.
- E. Eccentric Plug Valves shall be Clow F-5412 or approved equal with handwheel operator for valves located in vaults and for above grade service. Provide 2-inch square nut for direct buried service.
- F. Valve boxes shall be cast or ductile iron and be sized to extend from the ground surface to the valve. Cover shall be labeled to match pipeline.
- G. Manhole Covers and Frames shall comply with the requirements of Section 02402 – Sanitary Sewer Manholes and Cleanouts.
- H. Hatches for wet wells shall be equal to ITT Flygt Safe-Hatch rated for a H-20 loading. Hatches shall be designed to comply with OSHA Standard 1910-23 to provide personnel fall-through protection and OSHA Standard 1910-146 for controlling access to confined space entry. Hatches shall be fabricated from 6061 T6 aluminum and shall seal air-tight in closed position. Hatch hinges, hinge pin, and hardware shall be 316 stainless steel. Hatch doors shall be outfitted with a combined pneumatic and spring assisted lifting device; these devices shall be fabricated from stainless steel or other appropriate durable corrosion resistant material. Fall through protection shall be provided by 5-inch by 5-inch open aperture aluminum grating which shall be fabricated from 6061 T6 aluminum. Two hinged aluminum grate doors shall be provided. Grate doors shall be provided with a permanent hinge system that will lock the grating in the 90 degree position once opened. Grating shall be painted with OSHA type safety orange paint. Grating doors shall feature a locking device to provide a second level of protection against unauthorized entry to the confined space. The grating system shall allow visual inspection of the pumps and adjustment and cleaning the liquid level sensor without need for personnel to enter the confined space. Hatches shall be “Safe Hatch” as manufactured by ITT Flygt or approved equal.
- I. Valve vault drain valve shall be an elastomer type check valve. The inner elastomer tube shall be neoprene, which shall be reinforced with a synthetic fabric of nylon or polyester. The outer jacket cover shall be EDPM. The valve shall be Tideflex check valves Type TF-2 as manufactured by Red Valve Company, Inc. or approved equal. The check valve shall feature a flangeless type connection and shall slip over the plain end of the drain pipe. The check valve shall be fixed to the end of the drain pipe by use of two all stainless steel hose clamps.

2.6 MISCELLANEOUS

- A. Bentonite-Cement sealing plaster shall consist of two parts Bentonite, one part Type 3 cement, and one part sand, with sufficient water to obtain workable consistency.
- B. Mortar shall consist of one part Portland cement to two parts clean well graded sand which will pass a No. 4 screen. Admixtures may be used not exceeding the following percentages of weight of cement; hydrated lime, 10%; diatomaceous earth, or other inert material 5%. Consistency of mortar shall be such that it will readily adhere to the surface. Mortar mixed for longer than thirty minutes shall not be used. A non-shrink mortar may be submitted for approval as a substitute.
- C. Grout shall be a non-shrink type approved by the ENGINEER.
- D. Concrete and reinforcing steel shall comply with the requirements of Sections 03301 – Structural Concrete and 03302 – Concrete Structures.
- E. Bar screens shall be provided as shown on the Drawings. Bar screens shall be fabricated from Aluminum Alloy 6061T6.
- F. Wetwell ladders shall be provided as shown on the plans for each wetwell.

2.7 PIPE AND FITTINGS

- A. Piping shall be flanged ductile iron in accordance with AWWA C 115/ANSI A21.15 with Class 125 flanges. Thickness shall be Class 53 and pipe shall be cement mortar lined in accordance with AWWA C104. Bituminous coating shall be in accordance with AWWA C110.
- B. Fittings shall be flanged, either ductile iron or cast iron, in accordance with AWWA C110. Fittings shall be cement mortar lined in accordance with AWWA C104.
- C. Vent piping shall be 4" diameter galvanized Schedule 40 steel pipe. Fittings may be either threaded or welded.
- D. All nuts and bolts for flanged fittings and rigid grooved type mechanical couplings in wet wells and valve vaults shall be 300 series stainless steel.
- E. Mechanical couplings rigid grooved type shall be Victaulic Style 31 couplings or approved equal and shall comply with the requirements of ANSI/AWWA C-606.

2.8 ELECTRICAL

- A. All electrical equipment shall comply with the requirements of Division 16.

### PART 3 - EXECUTION

#### 3.1 GENERAL

- A. The pumps, piping and controls shall be installed in accordance with the manufacturer's instructions and recommendations at the locations shown. Installation shall include furnishing the required oil and grease for initial operation in accordance with the manufacturer's recommendations. Anchor bolts shall be set only after the discharge piping has been properly installed, to ensure exact fit with embedded piping components.
- B. Manholes, piping and appurtenances shall be installed consistent with methods and requirements of the Contract Documents as a whole.
- C. Piping to be installed in accordance with accepted industry standards. Run piping parallel to walls of wet wells and vaults as shown on the plans. Completed installation to present a neat and orderly appearance. Coordinate wall penetrations to ensure placement of piping can be accomplished as shown and specified.
- D. Support piping as shown on the plans. Allow adequate clearance for placement of flange nuts and bolts.
- E. Flange bolts shall be tightened so the gasket is uniformly compressed and sealed. Bolt threads and nut-bearing surfaces shall be lubricated before tightening. Do not distort flanges.
- F. Holes for embedded bolts shall be installed with care so that multiple or oversized holes are not drilled. In the event that holes are not drilled properly in accordance with the manufacturer's recommendation, repairs shall be made with non-shrink grout in a manner that the full integrity of the structure is achieved as intended.

#### 3.2 COATING

- A. All ferrous surfaces and passages of pumps, motors, and supports, in contact with the process fluid, shall be epoxy-coated with the pump manufacturer's equivalent coating.
- B. All wet well and valve vault piping shall be prepared and coated with one coat of Tnemec #66 to a DFT of 4.0 to 6.0 mils and then finish coated with Tnemec #69 to a DFT of 6 to 8 mils. Surfaces shall be prepared to SSPC-SP6 or better in accordance with the manufacturer's recommendation.

#### 3.3 MANHOLES

- A. Installation of manholes for the submersible pumps shall be in accordance with Section 02402 - Sanitary Sewer Manholes. Bedding and backfill for wet wells and valve vaults shall be 3-inch minus shot rock with a minimum thickness of 12 inches.

- B. Concrete used for pads around the inlet cover shall be as specified in Sections 03302 - Minor Concrete Structures. Base material for the concrete pads shall be D-1 Base Course with a minimum thickness of 6 inches. Dimensions of the concrete entrance pads shall be as shown on the Drawings.

### 3.4 FIELD TESTS OF PUMPS

- A. All pumping units shall be field tested after installation, in accordance with the Contract Documents, to demonstrate satisfactory operation, without causing excessive noise, vibration, cavitation, and overheating of the bearings. The field testing shall be performed in the presence of an experienced field representative of the manufacturer of each major item of equipment, who shall supervise the following tasks and shall certify in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted, and readied for operation:
1. Start-up, check, and operate the equipment under normal operating conditions.
  2. Pump performance shall be documented by obtaining concurrent readings, showing motor voltage, amperage, pump suction head, and pump discharge head. Each power lead to the motor shall be checked for proper current balance.
  3. Electrical and instrumentation testing shall conform to the requirements of Division 16 Electrical.

The field testing shall be witnessed by the OWNER or its representative. In the event any of the pumping equipment fails to meet the above test requirements, it shall be modified and retested in accordance with the requirements of these Specifications. The CONTRACTOR shall then certify in writing that the equipment has been satisfactorily tested, and that all final adjustments thereto have been made. Certification shall include date of final acceptance test, as well as a listing of all persons present during tests, and resulting test data. The costs of all work performed in this Paragraph by factory trained representatives shall be borne by the CONTRACTOR. The OWNER will pay for costs of power and water. When available, the OWNER'S operating personnel will provide assistance in the field testing

**END OF SECTION**

**PART 1 - GENERAL**

1.1 DESCRIPTION OF WORK

- A. Reconstruct Landfill Perimeter Road will consist of reconstructing the road at the locations shown on the Drawings and as described in these specifications. The WORK shall include all labor, equipment, tools, and materials necessary to reconstruct the existing landfill perimeter road as shown on the Drawings or as directed by the ENGINEER.

**PART 2 - PRODUCTS**

2.1 MATERIALS

- A. Shot rock shall conform to Section 02202 requirements.
- B. Base Course, grading D-1 shall conform to Section 02204 requirements.
- C. Construction staking shall follow Section 02702 requirements.

**PART 3 - EXECUTION**

3.1 GENERAL

- A. The existing perimeter roadway shall be reconstructed to the width and location as shown on the Drawings.
- B. Soft or weak areas encountered during proof rolling shall have the material over-excavated and shot rock material placed and compacted to create a stable roadway.

**END OF SECTION**

**PART 1 - GENERAL**

1.1 DESCRIPTION OF WORK

- A. Landfill gas (LFG) vents shall be installed at the locations shown on the Drawings and as described in these specifications. The WORK will include all labor, equipment, tools and materials necessary to install the LFG vents as shown on the Drawings or as directed by the ENGINEER.

1.2 SUBMITTALS

- A. Material certification for the HDPE perforated landfill gas vent piping shall be submitted to the ENGINEER in accordance with Section 01300, "Contractor Submittals".
- B. Bentonite material certification.
- C. Vent installation records including vent length, depth, location of seals and horizontal and vertical locations.

**PART 2 - PRODUCTS**

2.1 MATERIALS

- A. The vents shall be 4-inch diameter, flush-threaded, HDPE conforming to ASTM 2447.
- B. Lateral vents shall be 4-inch diameter HDPE, SPR 17 with 3/4-inch diameter holes, as shown on the Drawings.
- C. 4-Inch minus shot rock.
- D. Bentonite: 3/8-inch bentonite pellets.

**PART 3 - EXECUTION**

3.1 INSTALLATION

- A. LFG vents shall be installed at the locations shown on the Drawings. LFG vents shall be installed after regrading and compacting of the existing landfill waste and after placement of the 8-inch gas/drainage rock by digging a trench to the depth indicated on the Drawings. Vent pipes shall be installed in the trenches and backfilled in accordance with the Drawings. Vent pipes shall be contained entirely within the gas/drainage rock layer without protruding into layers above or below gas/drainage rock layer. The drainage/gas layer and vegetative cover layer shall be constructed in a manner that does not damage the LFG vents. Pipe penetration will be installed in the GCL for each LFG vent in accordance with Section 02730 Geosynthetic Clay Liner and in accordance with the Drawings. Vents shall be covered with a mesh screen as shown on the Drawings.

3.2 TESTING

- A. Pending the completion of the vents, each vent shall be monitored using an FID and/or a CGI that has been calibrated in accordance with the manufacturer's recommendations. The inlet tubing of the FID or CGI shall be placed over each vent. The FID or CGI shall be allowed to draw the subsurface soil vapors through the unit for at least 3 minutes. The vent number, vent depth, sampling date and time, monitoring instrumentation used, TOC concentration, vent pressure (acquired prior to testing with an FID or GCI), barometric pressure, and the technician's name will be recorded and submitted to the Contracting Officer upon completion of the testing.

**END OF SECTION**



**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. The WORK under this Section includes providing all labor, materials, tools, and equipment necessary for furnishing and installing underground conduit, electrical wire, control panels, pump controls, testing, breakers, as directed by the ENGINEER to make a complete and functioning electrical system for the leachate pump station.
- B. The WORK under this Section also includes coordinating with the City and Borough of Wrangell and the local electrical utility company on providing electrical service to the leachate pump station. The Contractor will be responsible for providing required electrical engineering drawings for providing power to the leachate pump station.

**PART 2 - PRODUCTS**

2.1 GENERAL

- A. The Contractor shall engage a electrical engineer to prepare electrical engineering design plans for providing electrical service to the leachate pump station. The work shall be prepared by a electrical engineer currently registered in the State of Alaska as a performance based technical specification. Electrical engineering design plans shall be submitted to the Owner for review and approval.
- B. Material certification submittals for the conduit, wire, panels, transformers and other electrical items as specified by the electrical engineer. Submittals shall be made to the electrical engineer with approval copies furnished to the Owner.

**PART 3 - EXECUTION**

3.1 GENERAL

- A. All WORK shall be performed in accordance with 2008 National Electrical Code and local codes.
- B. Contractor shall be responsible for sizing conduit, grounding, conductor type/size, load calculations, panel schedules, fuses, breaker sizing, coordinating with the pump manufacturer the voltage and phase of power required to make a complete and functional system.
- C. The Contractor shall show by demonstration in service that all circuits and devices are in operating condition. Tests shall be such that each item of control equipment will function not less than five times. Equipment shall be placed in service only after completion of required tests and evaluation of the test results have been completed.

**END OF SECTION**

# Appendix C

PROJECT NO. 2009-10

**City and Borough of Wrangell  
 Groundwater Monitoring Plan**

The City and Borough of Wrangell shall sample groundwater from three groundwater monitoring wells quarterly, submit for analysis and report to the Alaska Department of Conservation (DEC).

Inspection results shall be reported in the following format:

Inspection Personnel	Date and Time of Inspection	Date Submitted for Analysis	Date Submitted to ADEC
	Well #1 Well #2 Well #3		
	Well #1 Well #2 Well #3		
	Well #1 Well #2 Well #3		
	Well #1 Well #2 Well #3		
	Well #1 Well #2 Well #3		
	Well #1 Well #2 Well #3		
	Well #1 Well #2 Well #3		
	Well #1 Well #2 Well #3		

PROJECT NO. 2009-10

**City and Borough of Wrangell  
 Gas Monitoring Plan**

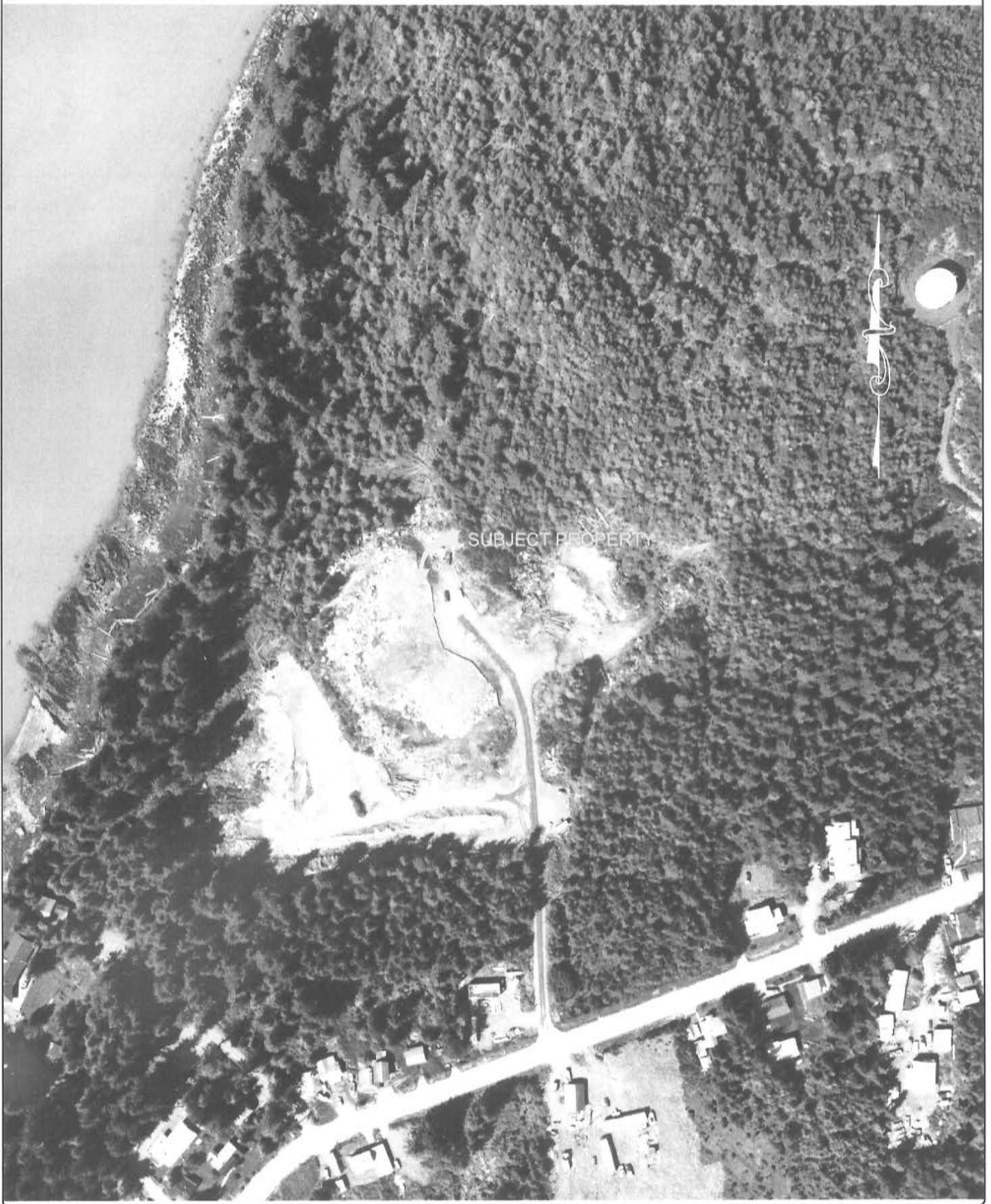
The City and Borough of Wrangell shall ensure that the concentration of methane gas generated by the facility does not exceed 25 percent of the lower explosive limit for methane on the site, and in facility structures, excluding gas control system components; and the lower explosive limit for methane at the facility property boundary. Monitoring shall be performed quarterly and routinely to ensure that the maximum allowable concentrations are not exceeded.

If methane gas levels exceeding the limits of this section are detected, the City and Borough of Wrangell owner or operator shall immediately notify the department by telephone and in writing, and shall take all necessary steps to reduce or dissipate the concentrations of methane to ensure the public health, safety, and welfare. In addition, If methane gas levels exceeding the limits of this section are detected, the City and Borough of Wrangell owner or operator shall within 60 days after detection implement a long-term remediation plan for the methane gas releases, place a copy of the plan in the operating record, and submit written notification to the department that the plan has been implemented.

Inspection results shall be reported in the following format:

Inspection Personnel	Date of Inspection	Highest Level Detected at Property Boundary	Highest Level Detected Over Landfill Facility	Highest Level Detected in Facility Building

# Appendix D



DWN: J.D.M.  
CKD: J.M.P.  
DATE: FEB. 2009  
SCALE: 1" = 200'

R&M  
**R & M ENGINEERING, INC.**  
ENGINEERS      GEOLOGISTS      SURVEYORS

SITE AERIAL PHOTOGRAPH  
PHOTO DATE: 8-18-91  
WRANGELL SOLID  
WASTE LANDFILL

810504.DWG  
GRID:  
PROJ.NO: 081336  
DWG.NO: 1 OF 1



DWN: J.D.M.  
 CKD: J.M.P.  
 DATE: FEB. 2009  
 SCALE: 1" = 250'

**R & M ENGINEERING, INC.**  
 ENGINEERS      GEOLOGISTS      SURVEYORS

SITE AERIAL PHOTOGRAPH  
 PHOTO DATE: 6-3-03  
 WRANGELL SOLID  
 WASTE LANDFILL

030603.DWG  
 GRID:  
 PROJ.NO: 081336  
 DWG.NO: 1 OF 1

# Appendix E



**CITY AND BOROUGH OF WRANGELL  
LANDFILL CLOSURE**

**ENGINEERING DESIGN FILE**

Prepared by: R&M Engineering, Inc.  
6205 Glacier Highway  
Juneau, Alaska 99801

Prepared for: City and Borough of Wrangell  
P.O. Box 531  
Wrangell, Alaska 99929

Date: March 6, 2009

## **Table of Contents**

1. Landfill Closure Design Criteria
2. Leachate Estimated Flow Rates
3. Leachate Collection Pipe Sizing
4. Leachate Pump Analysis/Sizing/Pump Curves
5. Leachate Force Main Pipe Sizing
6. Landfill Slope Stability Calculations
7. Miscellaneous Product Information – GCL, HDPE Pipe, Lift Station, Pump Curves,

# LANDFILL CLOSURE DESIGN CRITERIA

The Wrangell Landfill Closure Plan design criteria is based on the following:

- Final landfill slopes will be graded at 3 horizontal to 1 vertical slopes;
- Landfill precipitation based on a 25-year storm event for 24 hours;
- Placement of a Geosynthetic Clay Liner will be used to ensure that surface water will not come into contact with the landfill waste material;
- Stormwater runoff from the closed landfill areas will be diverted around the perimeter of the landfill;
- Landfill gas and water monitoring and;
- Long term stable and erosion resistant slope vegetation applications.

## LEACHATE ESTIMATED FLOW RATES

- NEARBY CITY : WRANGELL, AK
- LATITUDE : 56.29
- EVAPORATIVE ZONE DEPTH : 10"
- MAX LEAF AREA INDEX : 5
- GROWING SEASON START DAY : 152 (JUNE 1 - AUGUST 31)
- GROWING SEASON END DAY : 244
- AVERAGE WIND SPEED : 6.5 MPH

Q1 RELATIVE HUMIDITY : 80%

Q2 RELATIVE HUMIDITY : 76%

Q3 RELATIVE HUMIDITY : 84%

Q4 RELATIVE HUMIDITY : 82%

- PRECIPITATION → DEFAULT → ALASKA → ANNETTE

- TEMPERATURE → SYNTHETIC → ALASKA → ANNETTE

NUMBER OF YEARS FOR SYNTHETIC DATA GENERATION = 5

USE DEFAULT NORMAL MEAN MONTHLY TEMPERATURE = YES

- SOLAR RADIATION → SYNTHETIC → ALASKA → ANNETTE

NUMBER OF YEARS FOR SYNTHETIC DATA GENERATION = 5

STATION LATITUDE = 55.03

Title HELP WEATHER DATA

Project WRANGELL LANDFILL

CLOSURE PLAN



R&M ENGINEERING, INC.  
6205 Glacier Highway  
Juneau, Alaska 99801

Project No. 081336

Date: 12-29-08

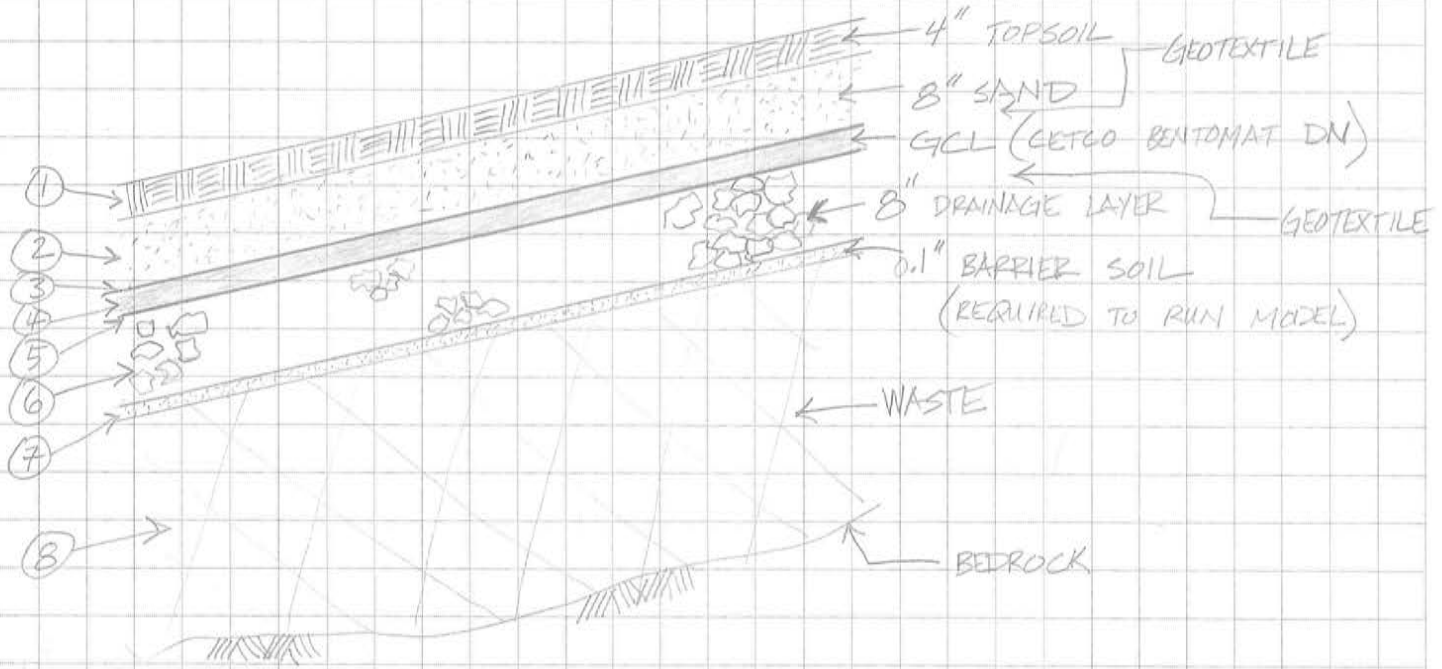
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Sheet

1 of 4

WRANGELL LANDFILL

- LANDFILL AREA = 5.4 ACRES
- PERCENT OF AREA WHERE RUNOFF IS POSSIBLE = 100%
- DO YOU WANT TO SPECIFY INITIAL MOISTURE STORAGE = N



LAYER	TYPE	THICKNESS	SOIL TEXTURE	POROSITY	FIELD CAPACITY	WILTING POINT	INITIAL MOISTURE
1	1	4"	9	DEFAULT			→
2	2	8"	3	"			
3	2	0.2"	20	"			
4	3	0.25"	17	"			
5	2	0.2"	20	"			
6	2	8"	21	"			
7	3	0.1"	3	"			
8	1	180" (15')	18	"			

Title HELP SOIL/DESIGN DATA Project WRANGELL LANDFILL CLOSURE PLAN	 R&M ENGINEERING, INC. 6205 Glacier Highway Juneau, Alaska 99801	Project No. 081336	Sheet 2 of 4
		Date: 12-29-08 Drawn: KP	

- HELP MODEL PREDICTS 0.04% OF PRECIPITATION PERCOLATES THE WASTE TO BECOME LEACHATE.

- PREDICTED AVERAGE AND PEAK FLOWS - HELP MODEL

	%	VOLUME	DAILY FLOW RATE	DAILY FLOW RATE
			GPD	GPM
ANNUAL / 31.52" (DAILY AVERAGE FLOW)	0.04%	1640 ft <sup>3</sup>	13	0.01
PEAK DAY / 4.00" (1-YR., 24-HR. STORM)	0.04%	31.4 ft <sup>3</sup>	237	0.16
PEAK DAY / 7.00" (25-YR., 24-HR. STORM)	0.04%	54.9 ft <sup>3</sup>	411	0.29

1.5"  $\phi$  SDR 15.5 HDPE

INSIDE  $\phi = 1.635" = 0.13625'$

$$A = \frac{\pi}{4} (0.13625)^2 = 0.01458 \text{ SF}$$

$$Q = 20 \text{ GPM} = 0.04456 \text{ CFS}$$

VELOCITY  $V = \frac{Q}{A} = 3.05 \text{ FT/SEC}$

FRICTION SLOPE:

$$h_f = 2.87 n^2 \frac{V^2}{(ID)^{4/3}} = 2.87 (0.010)^2 \frac{(3.05)^2}{(0.13625)^{4/3}} = 0.0381 \text{ FT/FT}$$

ASSUME MINOR LOSSES EQUAL TO 15% OF FRICTION LOSSES.

TOTAL LOSSES AT Q = 20 GPM:

$$H_f = 1.15 \times h_f \times L = 1.15 \times 0.0381 \times 675' = 29.6'$$

Title	HELP MODEL		Project No. 081336	Sheet
Project	WRANGELL LANDFILL		Date: 12-29-08	3 of 4
	CLOSURE PLAN	R&M ENGINEERING, INC. 6205 Glacier Highway Juneau, Alaska 99801	Drawn: KP	

PUMP SELECTION:

$$\text{STATIC HEAD, } H_{st} = 98.06' - 22.5' = 75.6'$$

TOTAL DYNAMIC HEAD

$$\text{TDH} = H_{st} + H_f = 75.6' + 29.6' = 105.2'$$

Title	 R&M ENGINEERING, INC. 6205 Glacier Highway Juneau, Alaska 99801	Project No. 081336	Sheet
Project WRANGELL LANDFILL		Date:	
CLOSURE PLAN		Drawn: KP	4 of 4



4"  $\phi$  SDR 17 IPS HDPE  
INSIDE  $\phi = 3.939" = 0.328'$

$$A = \frac{\pi}{4} (0.328')^2 = 0.08455 \text{ S.F.}$$

G.P.M. to C.F.S.

$$448.83 \text{ G.P.M.} = 1 \text{ C.F.S.}$$

$$Q = 150 \text{ G.P.M.} = 0.334 \text{ C.F.S.}$$

$$\text{VELOCITY } V = Q/A = 3.95 \text{ F.S.}$$

FRICTION SLOPE:

$$h_f = 2.87 \text{ ft}^2 \frac{V^2}{(ID)^{4.75}} = 2.87 (0.010)^2 \frac{(3.95)^2}{(0.328)^{4.75}} = 0.020 \text{ FT/FT}$$

ASSUME MINOR LOSSES EQUAL TO 15% OF FRICTION LOSSES:

TOTAL LOSSES AT  $Q = 150 \text{ G.P.M.}$ :

$$H_p = 1.15 \times H_f \times L = 1.15 \times 0.020 \times 675' = 15.5'$$

$$\text{T.D.H.} = 75.6' + 15.5' = 91.1'$$

Title LIFT STATION HEAD CALCS.

Project WRANGELL LANDFILL

CLOSURE PLAN



R&M ENGINEERING, INC.  
6205 Glacier Highway  
Juneau, Alaska 99801

Project No. 081336

Date: 3-9-09

Drawn: JDM

Sheet

1 of 1

## **LEACHATE COLLECTION PIPE SIZES**

# Landfill HDPE Pipe and Fittings

Landfill  
HDPE  
Pipe and  
Fittings

Successful landfill management requires the skill and technology of experts in the business. ISCO Industries is geared to work with landfills. HDPE & PVC pipe, fittings, valves, and custom fabrications. ISCO Industries can even find you the custom items you require for your complex projects. We carry hose, quick disconnects, sample ports, Fernco couplings, gauges, and many other items. There are many advantages to using ISCO for your landfill materials and service needs:

- Largest inventory of pipe, fittings, valves, and other items.
- Fusion equipment available for rental or purchase.
- Quality and expedient custom fabrications.
- Drawings for quality assurance on submittals
- Field technicians for fusion services; pipe fusion or liner repairs
- Knowledgeable sale representatives in your area

Special fabrication is required in most landfill projects. Our plants have the most modern pipe perforation equipment in the industry. We can make manholes up to 120 inches in diameter. Our plants make fittings and all types of special fabrications. With multiple locations, we can provide more of what you want, when you want it.

Below and on the following pages are pictures of various types of HDPE fabricated products. Please keep in mind, "If you can design it, ISCO can fabricate it." Our HDPE fabrication capabilities are endless. We have been a leader in this industry since 1976.

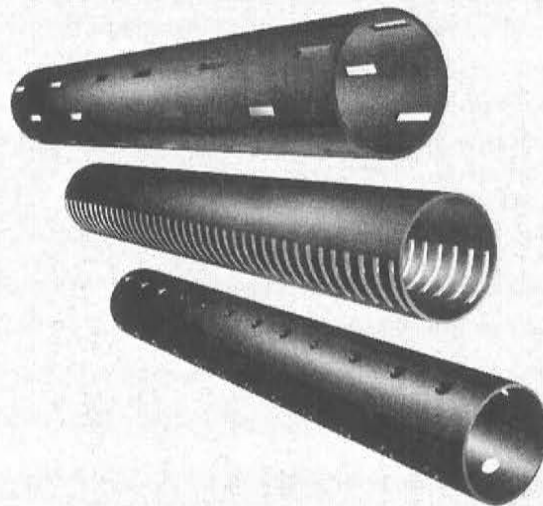


Figure 1: Prefabricated Perforated and Slotted Pipe

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- Custom HDPE Fabrication
- HDPE Fittings
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- Buttress-Loc Sewer Liners

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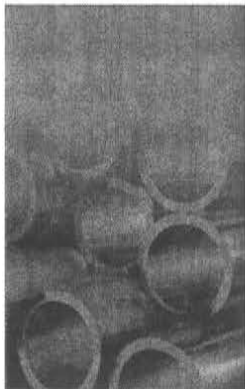
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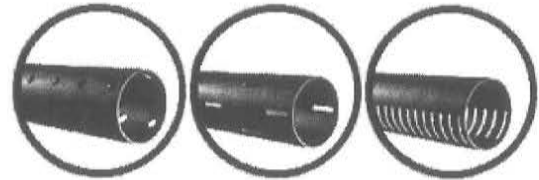


**HDPE Fittings**

**HDPE PERFORATED PIPE**

Perforated Pipe I.P.S.

[< Return to HDPE PERFORATED PIPE](#)



Size	SDR11	SDR 17
2"	ISFF02PP11IPS	ISFF02PP17IPS
3"	ISFF03PP11IPS	ISFF03PP17IPS
4"	ISFF04PP11IPS	ISFF04PP17IPS
6"	ISFF06PP11IPS	ISFF06PP17IPS
8"	ISFF08PP11IPS	ISFF08PP17IPS
10"	ISFF10PP11IPS	ISFF10PP17IPS
12"	ISFF12PP11IPS	ISFF12PP17IPS
16"	ISFF16PP11IPS	ISFF16PP17IPS
18"	ISFF18PP11IPS	ISFF18PP17IPS
24"	ISFF24PP11IPS	ISFF24PP17IPS

Drawing or description of perforation or slotting pattern is necessary. Additional size and SDR may be available.

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HDPE Pipe

# High-Density Polyethylene Pipe

## Introduction

ISCO Industries, LLC is the largest high-density polyethylene pipe distributor in North America. ISCO can serve your needs anywhere in the USA and internationally. ISCO offers a complete package of HDPE piping products. Butt fusion machines are offered for sale or rental. Fusion technicians are available to provide on-site training or assistance to your project. Please call 1-800-345-ISCO for all your HDPE piping needs.

## Some of The Characteristics of HDPE Pipe are:

Economical	Flexible and Coilable
Corrosion Resistant	Heat Fused
Zero Leak-Rate	Mechanically Joined (As Needed)
Hydraulically Smooth	Strong and Ductile
Fatigue and Surge Resistant	Weather Resistant
Long Design Life	Impact Resistant
Tappable	Freeze Resistant
Chemically Resistant	Durable
Easily Installed	Abrasion Resistant
Small to Large Diameters	Inert
Non-Toxic, Non-Tasting	Self Restrained Pipe (Monolithic)
Lightweight	Listed and Approved
Reliable	

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## Important Standards for High Density Polyethylene (HDPE) Pipe

Standards important for HDPE pipe relate to the resin the pipe is made from and the standards related to manufacturing sizes and tolerances. The American Society of Testing Materials (ASTM) standard for resin from which the pipe is made is **ASTM D 3350-05**, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials. This standard defines the physical properties of the resin that the pipe is made from.

### Pipe dimensions and manufacturing requirements:

**ASTM F 714-05** Standard Specification for Polyethylene (PE) Pipe (SDR-PR) Based on Outside Diameter. This standard is used for most large diameter HDPE pipe (4" to 63") applications other than gas pipe.

**ASTM D 2513-05** Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing and Fittings. Polyethylene pipe and other plastic for natural gas distribution are described in great detail in this standard.

**ASTM D 3035-03a** Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter. Most HDPE water tubing (1/2 inch to 3") is made to the dimensions in this standard. While pipe sizes up to 24" are provided, very little large diameter pipe is made to this standard.

### Installation Standards:

**ASTM D 2321-05** Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications

**ASTM D 2774-04** Standard Practice for Underground Installation of Thermoplastic Pressure Piping

**ASTM F 1962** Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit under Obstacles, Including River Crossings

**ASTM F 585-94** Standard Practice for Insertion of Flexible Polyethylene Pipe into Existing Sewers

### American Water Works Association Standards

**ANSI/AWWA C 901-2005** Polyethylene Pressure Pipe and Tubing, .5 in (13 mm) Through 3 in. (76 mm) for Water Services

**ANSI/AWWA C 906-2006** Polyethylene Pipe and Fittings, 4 in (100 mm) Through 63 In (1,575 mm) for Water Distribution

### Pipe Joining Standards:

**ASTM F 2620** – Standard Practice for Heat Fusion of Polyethylene Pipe and Fittings

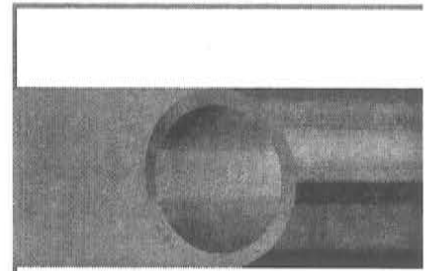
**ASTM D 2657** – Standard Practice of Heat Fusion Joining of Polyolefin Pipe and Fittings

**ASTM F 1290** – Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings

### Fitting Standards

**ASTM D 3261** Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Butt Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing

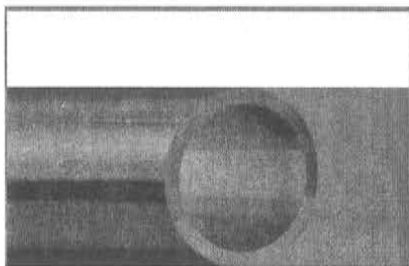
**ASTM F 1055** Standard Specification for Electrofusion Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing



HDPE Pipe

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## HDPE Pipe

### Specifications for HDPE Pipe

The physical properties of high-density polyethylene pipe are described using ASTM D 3350-05, "Standard Specification for Polyethylene Plastic Pipe and Fittings Materials". Recently this standard was changed. The two key areas changed are, density and slow crack growth. In the 05 version, the cell classifications for density were increased from four cells to seven cells defining the density ranges for various resins.

New high performance bimodal resins, PE 4710 resins, have higher PENT test values. Slow crack grow properties can now be defined using eight cells.

As of December 2006, most HDPE pipe is made from resin with a cell classification of PE 345464C. The pipe is labeled as PE3408/3608. The physical properties for PE 345464C are:

PROPERTY VALUE	SPECIFICATION	UNIT	NOMINAL VALUE
Material Designation	PPI / ASTM		PE3408
Material Designation	PPI / ASTM		PE 3408/3608
Cell Classification	ASTM D 3350		345464C
Density (3)	ASTM D 1505	g/cm <sup>3</sup>	0.941-943
Melt Index (4)	ASTM D 1238	gm/ 10 min	0.05 -.11
Flexural Modulus (5)	ASTM D 790	psi	110,000 to 140,000
Tensile Strength (4)	ASTM D 638	psi	3,200
<b>Slow Crack Growth</b>			
ESCR	ASTM D 1693	hours in 100% igepal	>5,000
PENT (6)	ASTM F 1473	hours	>100
HDB @ 73 deg F (4)	ASTM D 2837	psi	1,600
UV Stabilizer (C)	ASTM D 1603	%C	2 to 2.5%

The density provided is without carbon black. Typical HDPE pipe has a density of .955 to .957 with carbon black.

### Types of Polyethylene Pipe

All polyethylene (PE) is not the same. In ASTM D 3350-05, low density PE is defined as having a density range of 0.919 to 0.925 g/cc; medium density has a range of 0.926 to 0.940 g/cc and high density is defined with a range from 0.941 to 0.955. All densities are without carbon black.

Density influences key properties in polyethylene materials. As the density increases, the tensile strength increases; also chemical resistance increases.

Medium density PE resins have been used for gas distribution. This original selection was made based on superior slow crack growth properties of medium density resins. Medium density pipe is designated as PE 2406 and PE 2708.

Today new bimodal resins are being used in gas distribution because of higher pressure ratings plus superior slow crack growth. These resins are designated PE 3408, PE 3608, PE 3708, PE 3710 and PE 4710.

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**Slow Crack Growth**

The Pent test is used to determine stress crack resistance for PE resins. The PENT test is conducted in accordance with ASTM F 1473, "Standard Test Method for Notch Tensile Test to Measure the Resistance to Slow Crack Growth of Polyethylene Pipes and Resins". This test uses a solid sample of material which is notched and tested.

The PENT test is a good test of slow crack growth. Scratches and gouges can cause crack propagation. Materials with high PENT numbers are less likely to fail because of slow crack growth.

Traditional PE 3408/3608 resins have PENT test values of about 100 hours. New bimodal resins used to make PE 3710 and PE 4710 pipes have values ranging from 600 hours to several thousand hours.

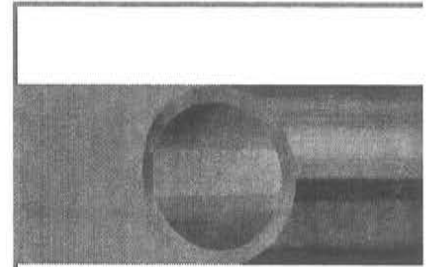
**Physical Properties of PE 4710**

HDPE pipe with a designation of PE 4710 is made from resin with a cell classification of PE 445474C or PE 445574C. We suggest using a specification calling for a minimum cell classification of PE 445474 C or higher. Both cell classifications can be used if specified in this way. The pipe is labeled as PE 4710. The physical properties for PE 445474C are provided below:

PROPERTY VALUE	SPECIFICATION	UNIT	NOMINAL VALUE
Material Designation	PPI / ASTM		PE 4710
Cell Classification	ASTM D 3350		445474 C
Density	(4) ASTM D 1505	g/cm3	0.947-955
Melt Index	(4) ASTM D 1238	gm/ 10 min	<.15
Flexural Modulus	(5) ASTM D 790	psi	110,000 to 160,000
Tensile Strength	(5) ASTM D 638	psi	3500-4000
<b>Slow Crack Growth</b>			
ESCR	ASTM D 1693	hours in 100% igepal	>5,000
PENT	(7) ASTM F 1473	hours	>500
HDB @ 73 deg F	(4) ASTM D 2837	psi	1,600
UV Stabilizer	(C) ASTM D 1603	%C	2 to 2.5 %

The density provided is without carbon black. Typical PE 4710 HDPE pipe has a density of 0.956 to 0.964 with carbon black.

To be called a PE 4710, the pipe and resin has substantiation at 50 years.



HDPE Pipe

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# PE 3608/3408 IPS HDPE PIPE SIZES

Nominal Size	DR 7 ( 267psi )			DR 7.3 ( 254psi )			DR 9 ( 200psi )			DR 11 ( 160psi )			DR 13.5 ( 128psi )			DR 15.5 ( 110psi )			
	Actual O.D.	Min. wall	Average I.D.	Weight lb/ff	Min. wall	Average I.D.	Weight lb/ff	Min. wall	Average I.D.	Weight lb/ff	Min. wall	Average I.D.	Weight lb/ff	Min. wall	Average I.D.	Weight lb/ff	Min. wall	Average I.D.	Weight lb/ff
3/4"	1.05"	0.150"	0.732"	0.184	0.144"	0.745"	0.178	0.117"	0.803"	0.150	0.095"	0.848"	0.125	---	---	---	---	---	---
1"	1.315"	0.188"	0.917"	0.289	0.180"	0.933"	0.279	0.146"	1.005"	0.234	0.120"	1.062"	0.197	---	---	---	---	---	---
1 1/4"	1.66"	0.237"	1.157"	0.460	0.227"	1.178"	0.444	0.184"	1.269"	0.372	0.151"	1.340"	0.312	---	---	---	---	---	---
1 1/2"	1.90"	0.271"	1.325"	0.603	0.260"	1.348"	0.582	0.211"	1.452"	0.488	0.173"	1.534"	0.409	---	---	---	---	---	---
2"	2.375"	0.339"	1.656"	0.943	0.325"	1.685"	0.762	0.264"	1.816"	0.762	0.216"	1.917"	0.639	0.176"	2.002"	0.531	0.153"	2.050"	0.467
3"	3.500"	0.500"	2.440"	2.047	0.479"	2.484"	1.656	0.389"	2.676"	1.656	0.318"	2.825"	1.367	0.259"	2.950"	1.153	0.226"	3.021"	1.015
4"	4.500"	0.643"	3.137"	3.384	0.616"	3.193"	2.737	0.500"	3.440"	2.737	0.409"	3.633"	2.294	0.333"	3.793"	1.906	0.290"	3.885"	1.678
5"	5.375"	0.768"	3.747"	4.830	0.736"	3.814"	4.663	0.597"	4.109"	3.903	0.489"	4.339"	3.272	0.398"	4.531"	2.718	0.347"	4.640"	2.396
5"	5.563"	0.795"	3.878"	5.172	0.762"	3.947"	4.182	0.618"	4.253"	4.182	0.506"	4.491"	3.505	0.412"	4.689"	2.912	0.359"	4.802"	2.564
6"	6.625"	0.946"	4.619"	7.336	0.908"	4.701"	5.932	0.736"	5.064"	5.932	0.602"	5.348"	4.971	0.491"	5.585"	4.130	0.427"	5.719"	3.637
7"	7.125"	1.018"	4.967"	8.195	0.976"	5.056"	8.200	0.792"	5.447"	6.863	0.648"	5.752"	5.750	0.528"	6.006"	4.779	0.460"	6.150"	3.985
8"	8.625"	1.232"	6.013"	12.433	1.182"	6.120"	10.054	0.958"	6.593"	10.054	0.784"	6.963"	8.425	0.639"	7.271"	7.001	0.556"	7.445"	6.164
10"	10.750"	1.536"	7.494"	19.314	1.473"	7.628"	15.618	1.194"	8.218"	15.618	0.977"	8.678"	13.089	0.796"	9.062"	10.875	0.694"	9.280"	9.576
12"	12.750"	1.821"	8.889"	27.170	1.747"	9.047"	21.970	1.417"	9.747"	21.970	1.159"	10.293"	18.412	0.944"	10.748"	15.298	0.823"	11.006"	13.471
14"	14.000"	2.000"	9.760"	32.758	1.918"	9.934"	26.489	1.556"	10.702"	26.489	1.273"	11.302"	22.199	1.037"	11.801"	18.445	0.903"	12.085"	16.242
16"	16.00"	2.286"	11.154"	42.786	2.192"	11.353"	34.598	1.778"	12.231"	34.598	1.455"	12.916"	28.994	1.185"	13.487"	24.092	1.032"	13.812"	21.214
18"	18.00"	2.571"	12.549"	54.151	2.466"	12.773"	43.788	2.000"	13.760"	43.788	1.636"	14.531"	36.696	1.333"	15.173"	30.491	1.161"	15.538"	26.849
20"	20.00"	2.857"	13.943"	66.853	2.740"	14.192"	54.059	2.222"	15.289"	54.059	1.818"	16.145"	45.304	1.481"	16.859"	37.643	1.290"	17.265"	33.146
22"	22.00"	3.143"	15.337"	80.170	3.014"	15.611"	65.412	2.444"	16.818"	65.412	2.000"	17.760"	54.818	1.630"	18.545"	45.548	1.419"	18.991"	40.107
24"	24.00"	3.429"	16.731"	96.267	3.288"	17.030"	92.988	2.667"	18.347"	77.845	2.182"	19.375"	65.237	1.778"	20.231"	54.206	1.548"	20.717"	47.731
26"	26.00"	---	---	---	3.562"	18.449"	110.192	2.889"	19.876"	92.050	2.364"	20.989"	76.563	1.926"	21.917"	63.617	1.677"	22.444"	56.018
28"	28.00"	---	---	---	---	---	---	3.111"	21.404"	106.750	2.545"	22.604"	88.795	2.074"	23.603"	73.781	1.806"	24.170"	64.967
30"	30.00"	---	---	---	---	---	---	3.333"	22.933"	121.633	2.727"	24.218"	101.934	2.222"	25.289"	84.697	1.935"	25.897"	74.580
32"	32.00"	---	---	---	---	---	---	3.556"	24.462"	139.452	2.909"	25.833"	116.670	2.370"	26.975"	96.367	2.065"	27.623"	84.855
34"	34.00"	---	---	---	---	---	---	---	---	---	3.091"	27.447"	130.930	2.519"	28.661"	109.332	2.194"	29.350"	96.209
36"	36.00"	---	---	---	---	---	---	---	---	---	3.273"	29.062"	146.780	2.667"	30.347"	121.960	2.323"	31.076"	107.995
42"	42.00"	---	---	---	---	---	---	---	---	---	---	---	---	3.111"	35.404"	166.800	2.710"	36.255"	146.176
48"	48.00"	---	---	---	---	---	---	---	---	---	---	---	---	3.556"	40.462"	217.895	3.097"	41.435"	175.891
54"	54.00"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3.484"	46.614"	242.649
63"	62.99"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

**NOTE:**

- Items highlighted in Blue indicates standard stocking items that are more readily available.
- Pressures are based on using water at 23°C (73°F).
- Average inside diameter calculated using nominal OD and minimum wall plus 6% for use in estimating fluid flows. Actual ID will vary.
- Service factors should be utilized to compensate for the effect of liquids other than water, and for other temperatures.
- Other piping sizes or DR's may be available upon request.
- Standard Lengths: 40' for 2"-24' / 50' for 26" and larger / Coils available for 3/4"-6" (8" by special order)

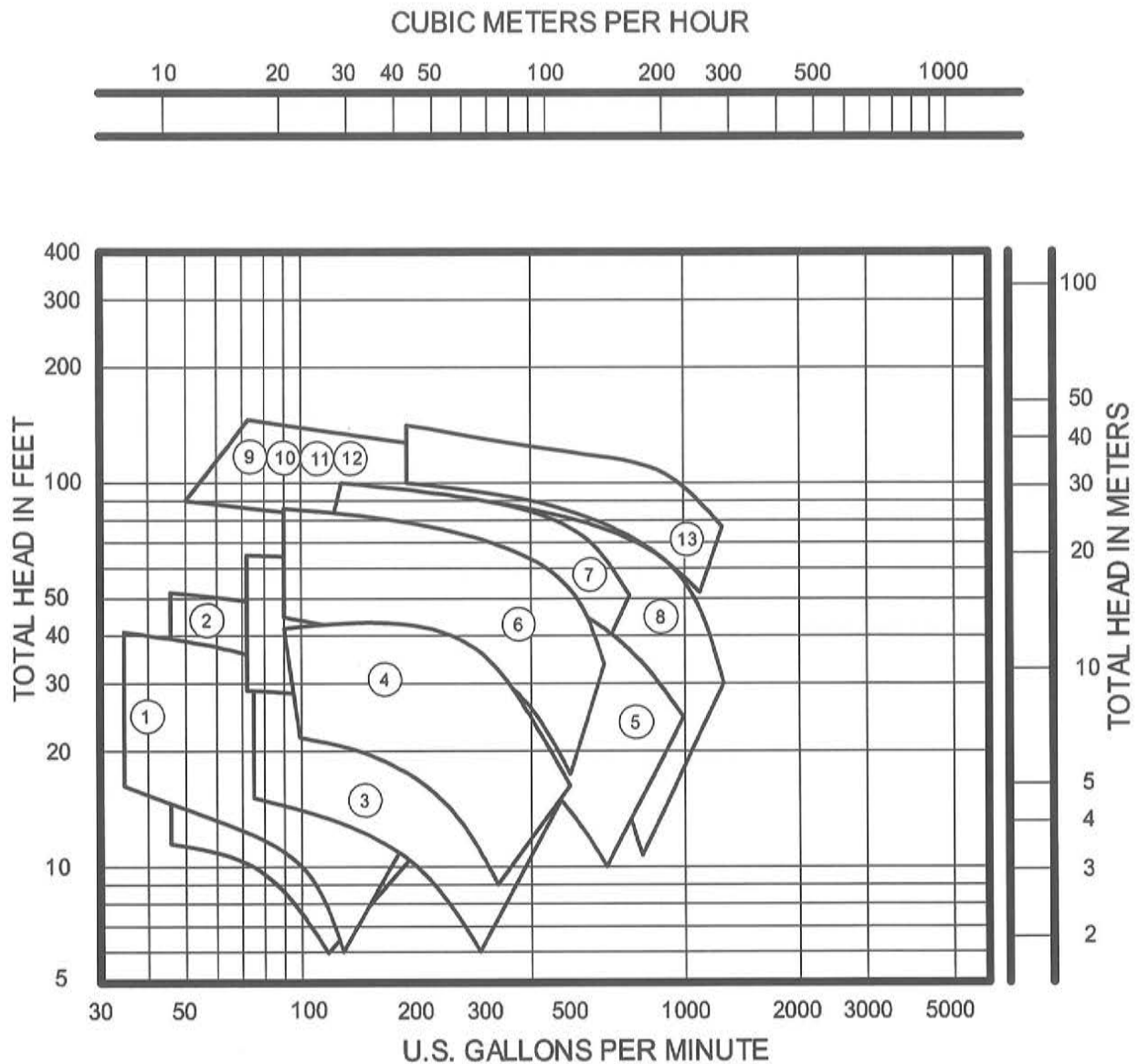
# PE 3608/3408 IPS HDPE PIPE SIZES

Pressure Rating		DR 17 ( 100psi )			DR 19 ( 89psi )			DR 21 ( 80psi )			DR 26 ( 65psi )			DR 32.5 ( 50psi )		
Nominal Size	Actual O.D.	Min. wall	Average I.D.	Weight lb/lf	Min. wall	Average I.D.	Weight lb/lf	Min. wall	Average I.D.	Weight lb/lf	Min. wall	Average I.D.	Weight lb/lf	Min. wall	Average I.D.	Weight lb/lf
3/4"	1.050"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1"	1.315"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1 1/4"	1.660"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1 1/2"	1.900"	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2"	2.375"	0.140"	2.079"	0.429	---	---	---	---	---	---	---	---	---	---	---	---
3"	3.500"	0.206"	3.064"	0.932	---	---	---	---	---	---	---	---	---	---	---	---
4"	4.500"	0.265"	3.939"	1.540	0.237"	3.998"	1.387	0.214"	4.046"	1.262	0.173"	4.133"	1.030	0.138"	4.206"	0.831
5"	5.375"	0.316"	4.705"	2.197	0.283"	4.775"	1.980	0.256"	4.832"	1.801	0.207"	4.937"	1.470	0.165"	5.024"	1.186
5"	5.563"	0.327"	4.869"	2.353	0.293"	4.942"	2.120	0.265"	5.001"	1.929	0.214"	5.109"	1.574	0.171"	5.200"	1.270
6"	6.625"	0.390"	5.799"	3.338	0.349"	5.886"	3.007	0.315"	5.956"	2.736	0.255"	6.085"	2.233	0.204"	6.193"	1.801
7"	7.125"	0.419"	6.236"	3.860	0.375"	6.330"	3.478	0.339"	6.406"	3.165	0.274"	6.544"	2.582	0.219"	6.660"	2.083
8"	8.625"	0.507"	7.549"	5.657	0.454"	7.663"	5.097	0.411"	7.754"	4.637	0.332"	7.922"	3.784	0.265"	8.062"	3.053
10"	10.750"	0.632"	9.409"	8.788	0.566"	9.551"	7.918	0.512"	9.665"	7.204	0.413"	9.873"	5.878	0.331"	10.049"	4.742
12"	12.750"	0.750"	11.160"	12.362	0.671"	11.327"	11.138	0.607"	11.463"	10.134	0.490"	11.710"	8.269	0.392"	11.918"	6.671
14"	14.000"	0.824"	12.254"	14.905	0.737"	12.438"	13.429	0.667"	12.587"	12.218	0.538"	12.858"	9.970	0.431"	13.087"	8.044
16"	16.00"	0.941"	14.005"	19.467	0.842"	14.215"	17.540	0.762"	14.385"	15.959	0.615"	14.695"	13.022	0.492"	14.956"	10.506
18"	18.00"	1.059"	15.755"	24.638	0.947"	15.992"	22.199	0.857"	16.183"	20.198	0.692"	16.532"	16.480	0.554"	16.826"	13.296
20"	20.00"	1.176"	17.500"	30.418	1.053"	17.768"	27.406	0.952"	17.981"	24.931	0.769"	18.369"	20.346	0.615"	18.695"	16.415
22"	22.00"	1.294"	19.256"	36.805	1.158"	19.545"	33.162	1.048"	19.779"	30.172	0.846"	20.206"	24.619	0.677"	20.565"	19.863
24"	24.00"	1.412"	21.007"	43.801	1.263"	21.322"	39.465	1.143"	21.577"	35.907	0.923"	22.043"	29.299	0.738"	22.434"	23.638
26"	26.00"	1.529"	22.758"	51.406	1.368"	23.099"	46.316	1.238"	23.375"	42.141	1.000"	23.880"	34.385	0.800"	24.304"	27.742
28"	28.00"	1.647"	24.508"	59.618	1.474"	24.876"	53.716	1.333"	25.173"	48.874	1.077"	25.717"	39.879	0.862"	26.174"	32.174
30"	30.00"	1.765"	26.259"	68.439	1.579"	26.653"	61.664	1.429"	26.971"	56.105	1.154"	27.554"	45.779	0.923"	28.043"	36.934
32"	32.00"	1.882"	28.009"	77.869	1.684"	28.429"	70.160	1.524"	28.770"	63.835	1.231"	29.391"	52.086	0.985"	29.913"	42.023
34"	34.00"	2.000"	29.760"	87.907	1.789"	30.206"	79.204	1.619"	30.568"	72.064	1.308"	31.228"	58.814	1.046"	31.782"	47.440
36"	36.00"	2.118"	31.511"	98.553	1.895"	31.983"	88.796	1.714"	32.366"	80.791	1.385"	33.065"	65.922	1.108"	33.652"	53.186
42"	42.00"	2.471"	36.762"	134.141	2.211"	37.314"	120.861	2.000"	37.760"	109.966	1.615"	38.575"	89.727	1.292"	39.260"	72.392
48"	48.00"	2.824"	42.014"	175.205	2.526"	42.644"	157.857	2.286"	43.154"	143.629	1.846"	44.086"	117.194	1.477"	44.869"	94.552
54"	54.00"	3.176"	47.266"	222.547	2.842"	47.975"	199.791	2.571"	48.549"	182.298	2.077"	49.597"	148.324	1.662"	50.478"	119.668
63"	62.99"	---	---	---	---	---	---	3.000"	56.631"	247.800	2.423"	57.854"	202.010	1.938"	58.881"	162.960

**NOTE:**

- Items highlighted in Blue indicates standard stocking items that are more readily available.
- Pressures are based on using water at 23°C (73°F).
- Average inside diameter calculated using nominal OD and minimum wall plus 6% for use in estimating fluid flows. Actual ID will vary.
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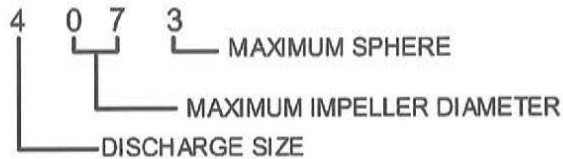
# LEACHATE PUMP ANALYSIS/SIZING/PUMP CURVES



- |            |             |             |             |
|------------|-------------|-------------|-------------|
| 1 - 3062   | Curve 3562  | 8 - 4103L   | Curve 3449  |
| 2 - 4072   | Curve 40342 | 9 - 4103SV  | Curve 36016 |
| 3 - 4072.5 | Curve 40212 | 10 - 4113SV | Curve 36017 |
| 4 - 4073   | Curve 3447  | 11 - 4123SV | Curve 36066 |
| 5 - 4083   | Curve 40343 | 12 - 4133SV | Curve 36004 |
| 6 - 4092.5 | Curve 40140 | 13 - 4123   | Curve 3503A |
| 7 - 4103S  | Curve 3501  |             |             |

### PUMP NOMENCLATURE

EXAMPLE:





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ITT W&WW > Products > Waste & process water > Heavy duty waste & solid handling > Small & medium centrifugal pumps > C3000 > Performance field

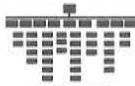
### Performance field

[Performance field](#)

[Technical information](#)

[Methods of installation](#)

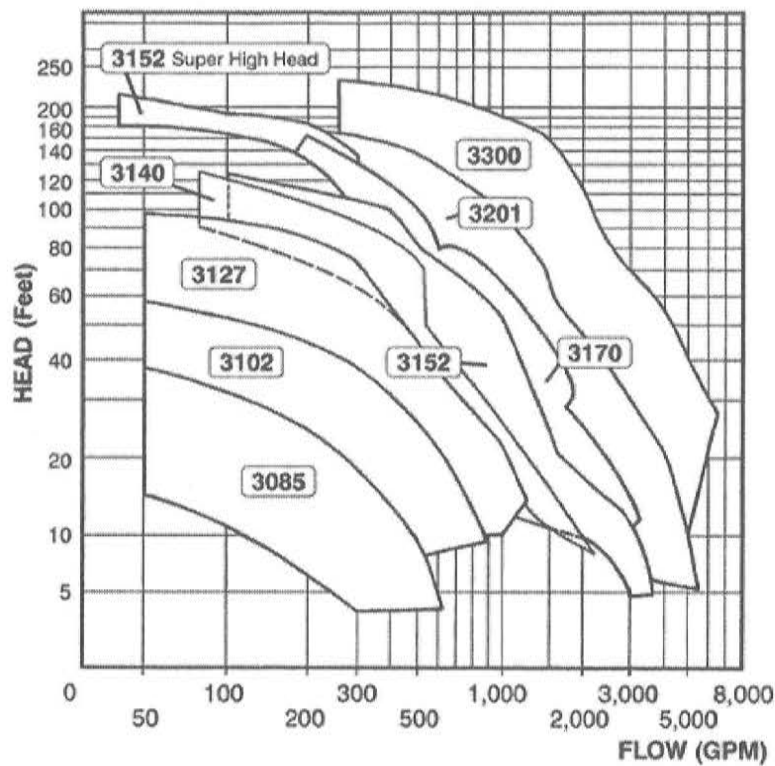
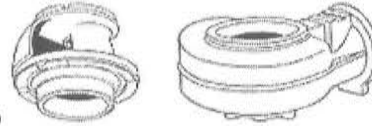
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SITEMAP

#### Hydraulic section C

The C-pumps are equipped with a shrouded single- or multi-channel impeller running in volute. The shape and the size of the channel minimize clogging, and therefore make the pump ideal for waste water containing large solid particles.



[Methods of installation](#)

[Technical information](#)

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## **LEACHATE FORCE MAIN PIPE SIZING**

PURPOSE: DETERMINE IF A 8-INCH DIAMETER PIPE CAN HANDLE THE ESTIMATED QUANTITY OF LEACHATE GENERATED (4300 GPD).

METHODOLOGY: USE MANNING'S EQUATION FOR OPEN CHANNEL FLOW AND  $Q=VA$  TO DETERMINE THE MAXIMUM QUANTITY OF LIQUID THAT A 8-INCH DIAMETER PIPE CAN HANDLE.

FOR FULL FLOW:

$$Q = (0.275) \frac{d^{2.667} S^{0.5}}{n}$$

WHERE:

$Q$  = FLOW (GAL/min)

$n$  = ROUGHNESS COEFFICIENT

$S$  = HYDRAULIC SLOPE (FT/FT)

$d$  = PIPE INSIDE DIAMETER (in)

$$Q = (0.275) \frac{(6.963)^{2.667} (0.02)^{0.5}}{0.009} = 764 \text{ GPM}$$

$$4300 \text{ GPD} \times \frac{1 \text{ DAY}}{24 \text{ HRS}} \times \frac{1 \text{ HR}}{60 \text{ MIN}} = 3.0 \text{ GPM}$$

$764 > 3.0$  OK

Title LEACHATE PIPE CAPACITY

Project WRANGELL LANDFILL

CLOSURE PLAN



R&M ENGINEERING, INC.  
6205 Glacier Highway  
Juneau, Alaska 99801

Project No. 081336

Date: 3-6-09

Drawn: KP

Sheet

1 of

# LANDFILL SLOPE STABILITY CALCULATIONS



EXAMINE INTERFACE BETWEEN THE BOTTOM OF THE GCL AND THE SOIL SUBGRADE.

THE GIROUD AND BEECH METHOD CALCULATES THE AMOUNT OF TENSION PRODUCED IN THE GEOSYNTHETIC SYSTEM AS A RESULT OF THE WEIGHT OF THE SOIL COVER. STABILITY IS PROVIDED ONLY BY INTERFACE FRICTION AND TOE BUTTRESSING AS EXPRESSED IN THE FOLLOWING EQUATION:

$$\alpha = \frac{\gamma_c T_c^2}{\sin 2B} \left[ \left( \frac{2H \cos B}{T_c} - 1 \right) \left( \frac{\sin(B - \phi_i)}{\cos \phi_i} \right) - \frac{\sin \phi_c}{\cos(B + \phi_c)} \right]$$

WHERE:

- $\alpha$  = GEOSYNTHETIC TENSION (KN/M)
- $\gamma_c$  = UNIT WEIGHT OF SOIL (KN/m<sup>3</sup>) = 120  $\frac{lb}{ft^3}$  = 18.8  $\frac{KN}{m^3}$
- $T_c$  = THICKNESS OF COVER SOIL (M) = 1 ft = 0.305 M
- $B$  = SLOPE ANGLE (DEG.) = 3:1 = 18.5°
- $H$  = HEIGHT OF SLOPE (M) = 118' MAX. = 36 M
- $\phi_i$  = MIN. INTERFACE FRICTION ANGLE IN THE SYSTEM (DEG.) = 32°
- $\phi_c$  = FRICTION ANGLE OF THE SOIL COVER (DEG.) = 30°

$$\alpha = \frac{18.8(0.305)^2}{\sin 2(18.5)} \left[ \left( \frac{2(36) \cos 18.5}{0.305} - 1 \right) \left( \frac{\sin(18.5 - 32)}{\cos 32} \right) - \frac{\sin 30}{\cos(18.5 + 30)} \right]$$

$$= 2.906 [(222.867)(-0.275) - 0.016] = -178.1 \text{ KN/M}$$

THE NEGATIVE RESULT INDICATES STABILITY BECAUSE THERE IS NO TENSION ON THE GCL.

Title COVER SLOPE STABILITY	 <b>R&amp;M ENGINEERING, INC.</b> 6205 Glacier Highway Juneau, Alaska 99801	Project No. 081336	Sheet
Project WRANGELL LANDFILL		Date: 2-19-09	1 of 2
(GIROUD & BEECH METHOD)		Drawn: KP	

TO EVALUATE WHETHER THERE IS A SUITABLE FACTOR OF SAFETY, MOBILIZED FRICTION ANGLES,  $\phi_{cm}$  AND  $\phi_{im}$ , ARE USED IN PLACE OF ACTUAL FRICTION ANGLES:

$$\tan \phi_{cm} = \frac{\tan \phi_c}{FS} = \frac{\tan 30}{1.5}$$

$$\phi_{cm} = 21.0^\circ$$

$$\tan \phi_{im} = \frac{\tan \phi_i}{FS} = \frac{\tan 32}{1.5}$$

$$\phi_{im} = 22.6^\circ$$

USING A FACTOR OF SAFETY = 1.5, THE MOBILIZED FRICTION ANGLES ARE  $\phi_{cm} = 21.0^\circ$  AND  $\phi_{im} = 22.6^\circ$ .

RECALCULATING THE ECL TENSION USING THE MOBILIZED FRICTION ANGLES:

$$\begin{aligned} \alpha &= 2.906 \left[ (222.867) \left( \frac{\sin(18.5 - 22.6)}{\cos 22.6} \right) - \frac{\sin 21}{\cos(18.5 + 21)} \right] \\ &= 2.906 \left[ (222.867) (-0.077) - 0.464 \right] = -51.2 \text{ KN/m} \end{aligned}$$

THE RESULT IS STILL NEGATIVE WHICH INDICATES THAT THE SLOPE IS STILL STABLE AND THERE IS A FACTOR OF SAFETY GREATER THAN 1.5.

Title COVER SLOPE STABILITY		Project No. 081336	Sheet
Project WRANGLER LANDFILL		Date: 2-19-09	
(GIROND & BEECH METHOD)	R&M ENGINEERING, INC. 6205 Glacier Highway Juneau, Alaska 99801	Drawn: KP	2 of 2

# MISCELLANEOUS PRODUCT INFORMATION



## COMPARISON OF COMPACTED CLAY AND GCLs FOR COMPOSITE LANDFILL CAP APPLICATIONS

COMPACTED CLAY	GCLs
More material required (resulting in more equipment, more noise, more dust)	Far less material required
Installation time is usually longer	Very rapid installation
Installation is extremely weather-sensitive	Installs in a variety of weather conditions
Difficult to control quality of raw materials	Made with pure, processed bentonite
Difficult to control quality of installation; rigid CQA program required	Pre-manufactured product, rigidly controlled, much less CQA needed
Hydraulic performance is severely compromised by desiccation	Hydraulic performance is severely compromised by desiccation after several wet/dry cycles
Cannot withstand differential settlement without cracking	Can undergo settlement with no impact on permeability
Significant freeze/thaw effects	Unaffected by freeze/thaw cycles
Difficult to achieve necessary compaction on soft landfill surface	No compaction required
Heavy construction equipment required	Only light equipment required
Substantial liner construction experience is essential for proper performance	Inexperienced field crews can be trained to install properly
Test pad typically required	No test pad needed
Difficult to repair	Easy to repair using patches
Thickness results in increased space requirements	Very thin and occupies little space
Unpredictable costs	Completely predictable cost
Preferential flow paths likely	No preferential flow paths possible
If not available on site, clay soils must be delivered (resulting in excess noise, road deterioration, traffic, air pollution)	One truckload of Bentomat is enough to cover 3/4 acre
Additional water must be added during construction	Installed dry, no additional water needed

The claims presented above have been substantiated with field and laboratory data. Contact CETCO for more specific information.









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## GCL PRODUCT SELECTOR

**DESIGN BY FUNCTION.  
SELECT YOUR NEXT GCL ... LOGICALLY.**

	Bentomat <sup>®</sup> 200R	Bentomat <sup>®</sup> ST	Bentomat <sup>®</sup> SDN	Bentomat <sup>®</sup> DN	Bentomat <sup>®</sup> CL	Bentomat <sup>®</sup> CLT
Application Type	<b>SOLID WASTE CONTAINMENT</b>				<b>LIQUID CONTAINMENT</b>	
Typical Maximum Slope	<10H:1V 	<3H:1V 	<3H:1V 	>3H:1V 	<3H:1V 	>3H:1V 
Hydraulic Head**	LOW	LOW	LOW	LOW	HIGH or LOW	HIGH or LOW
Permeability*	$5 \times 10^{-9}$ cm/sec	$5 \times 10^{-9}$ cm/sec	$5 \times 10^{-9}$ cm/sec	$5 \times 10^{-9}$ cm/sec	$5 \times 10^{-10}$ cm/sec	$5 \times 10^{-10}$ cm/sec
Functional Requirements	Economical Applications	Standard Applications	More Demanding Applications	Most Demanding Applications	Standard Liquid Containment Applications	More Demanding Liquid Containment Applications
*High typically greater than one foot				ASTM D 5887 @5PSI Confining Pressure		
For more information visit: <a href="http://www.cetco.com">www.cetco.com</a>						

**BENTOMAT® DN CERTIFIED PROPERTIES**

MATERIAL PROPERTY	TEST METHOD	TEST FREQUENCY ft <sup>2</sup> (m <sup>2</sup> )	REQUIRED VALUES
Bentonite Swell Index <sup>1</sup>	ASTM D 5890	1 per 50 tonnes	24 mL/2g min.
Bentonite Fluid Loss <sup>1</sup>	ASTM D 5891	1 per 50 tonnes	18 mL max.
Bentonite Mass/Area <sup>2</sup>	ASTM D 5993	40,000 ft <sup>2</sup> (4,000 m <sup>2</sup> )	0.75 lb/ft <sup>2</sup> (3.6 kg/m <sup>2</sup> ) min
GCL Grab Strength <sup>3</sup>	ASTM D 6768	200,000 ft <sup>2</sup> (20,000 m <sup>2</sup> )	50 lbs/in (88 N/cm) MARV
GCL Peel Strength <sup>3</sup>	ASTM D 6496	40,000 ft <sup>2</sup> (4,000 m <sup>2</sup> )	3.5 lbs/in (6.1 N/cm) min
GCL Index Flux <sup>4</sup>	ASTM D 5887	Weekly	1 x 10 <sup>-8</sup> m <sup>3</sup> /m <sup>2</sup> /sec max
GCL Hydraulic Conductivity <sup>4</sup>	ASTM D 5887	Weekly	5 x 10 <sup>-9</sup> cm/sec max
GCL Hydrated Internal Shear Strength <sup>5</sup>	ASTM D 5321 ASTM D 6243	Periodic	500 psf (24 kPa) typ @ 200 psf

**Bentomat DN is a reinforced GCL consisting of a layer of sodium bentonite between two nonwoven geotextiles, which are needlepunched together.**

**Notes**

<sup>1</sup> Bentonite property tests performed at a bentonite processing facility before shipment to CETCO's GCL production facilities.

<sup>2</sup> Bentonite mass/area reported at 0 percent moisture content.

<sup>3</sup> All tensile strength testing is performed in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. Upon request, tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.

<sup>4</sup> Index flux and permeability testing with deaired distilled/deionized water at 80 psi (551kPa) cell pressure, 77 psi (531 kPa) headwater pressure and 75 psi (517 kPa) tailwater pressure. Reported value is equivalent to 925 gal/acre/day. This flux value is equivalent to a permeability of 5x10<sup>-9</sup> cm/sec for typical GCL thickness. Actual flux values vary with field condition pressures. The last 20 weekly values prior the end of the production date of the supplied GCL may be provided.

<sup>5</sup> Peak values measured at 200 psf (10 kPa) normal stress for a specimen hydrated for 48 hours. Site-specific materials, GCL products, and test conditions must be used to verify internal and interface strength of the proposed design.

*CETCO has developed an edge enhancement system that eliminates the need to use additional granular sodium bentonite within the overlap area of the seams. We call this edge enhancement, SuperGroove™, and it comes standard on both longitudinal edges of Bentomat® DN. It should be noted that SuperGroove™ does not appear on the end-of-roll overlaps and recommend the continued use of supplemental bentonite for all end-of-roll seams.*

## BENTOMAT® & CLAYMAX® PANEL & ROLL SPECIFICATIONS

### Panel Specifications

PRODUCTS	DIMENSIONS WIDTH x LENGTH	AREA	EFFECTIVE AREA
BENTOMAT® ST	15 ft x 150 ft (4.6 m x 45.7 m)	2,250 ft <sup>2</sup> (209 m <sup>2</sup> )	2,145 ft <sup>2</sup> (200 m <sup>2</sup> )
BENTOMAT SDN	14.5 ft x 150 ft (4.4 m x 45.7 m)	2,175 ft <sup>2</sup> (202 m <sup>2</sup> )	2,071 ft <sup>2</sup> (193 m <sup>2</sup> )
BENTOMAT DN	14.5 ft x 150 ft (4.4 m x 45.7 m)	2,175 ft <sup>2</sup> (202 m <sup>2</sup> )	2,071 ft <sup>2</sup> (193 m <sup>2</sup> )
BENTOMAT CL	15 ft x 150 ft (4.6 m x 45.7 m)	2,250 ft <sup>2</sup> (209 m <sup>2</sup> )	2,070 ft <sup>2</sup> (193 m <sup>2</sup> )
BENTOMAT CLT	15 ft x 150 ft (4.6 m x 45.7 m)	2,250 ft <sup>2</sup> (209 m <sup>2</sup> )	2,070 ft <sup>2</sup> (193 m <sup>2</sup> )
BENTOMAT 200R	15 ft x 150 ft (4.6 m x 45.7 m)	2,250 ft <sup>2</sup> (209 m <sup>2</sup> )	2,145 ft <sup>2</sup> (200 m <sup>2</sup> )
CLAYMAX 200R (Lovell)	15 ft x 150 ft (4.6 m x 45.7 m)	2,250 ft <sup>2</sup> (209 m <sup>2</sup> )	2,040 ft <sup>2</sup> (190 m <sup>2</sup> )

### Roll Specifications

PRODUCTS	DIMENSIONS Length x Diameter (Avg.)	NOMINAL WEIGHT	ROLLS / TRUCKLOAD
BENTOMAT ST	16 ft x 24 in (4.9 m x 610 mm)	2,650 lbs (1204 kg)	17 rolls per truckload
BENTOMAT SDN	16 ft x 24 in (4.9 m x 610 mm)	2,650 lbs (1204 kg)	16 rolls per truckload
BENTOMAT DN	16 ft x 24 in (4.9 m x 610 mm)	2,700 lbs (1227 kg)	16 rolls per truckload
BENTOMAT CL	16 ft x 25 in (4.9 m x 635 mm)	2,750 lbs (1250 kg)	15 rolls per truckload
BENTOMAT CLT	16 ft x 26 in (4.9 m x 660 mm)	2,950 lbs (1340 kg)	15 rolls per truckload
BENTOMAT 200R	16 ft x 24 in (4.9 m x 610 mm)	2,650 lbs (1204 kg)	17 rolls per truckload
CLAYMAX 200R (Lovell)	16 ft x 20 in (4.9 m x 510 mm)	3,000 lbs (1363 kg)	15 rolls per truckload

#### Unloading and handling equipment for all GCL products:

- Spreader bar and core pipe: Spreader bar 17 ft (5.2 m) long; core pipe 20 ft (6.1 m) long, nominal pipe size, XXH.
- A solid 3.5 in. (90 mm) O.D. x 14.5 ft (4.4 m) solid steel pipe stinger attachment for a forklift.
- Slings: 2 Polyester slings are required, approximately 12 ft (3.7 m) long x 2 in (50 mm) wide each.
- Vehicle needed: Front end loader or forklift (are typical).

#### Standard Roll Specifications:

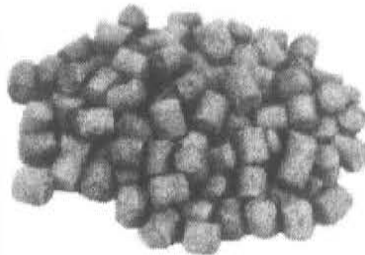
- Packaging: U.V. resistant polyethylene sleeve.

# **BENTONITE COMPRESSED TABLETS**

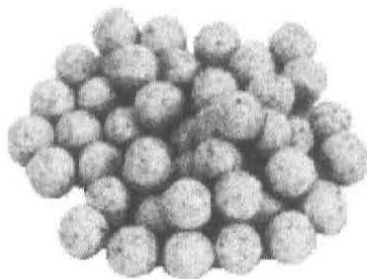
**DEAN BENNETT SUPPLY  
DENVER, COLORADO  
800-621-4291**

## **CETCO'S BENTONITE TABLETS**

[Download Bentonite Tablets Page 80](#)



Cetco's regular bentonite tablets are a pre-formed compressed tablet made from high swelling sodium bentonite. Stocked in Denver in 3/8" size. These tablets will form a flexible, permanent, non-toxic seal in monitoring well applications where water flow and hydrostatic pressures are involved. Cetco's tablets will swell 10 to 15 times their dry volume when hydrated with fresh water and will not shrink or crack over time. The smaller the annular space ( ie: the distance from the outside of the casing to the bore hole wall ) the smaller the diameter of tablets that should be used. Tablets will provide you with an in place expansive bentonite seal for your most sensitive monitoring well applications. Tablets can be placed in either a wet or dry bore hole with the same ease as pea gravel. Cetco's tablets are packaged in 5 gallon pails ( 50 lbs per pail ) and are palletized and shrink wrapped 36 pails to a full pallet.



**PURITY:** Montmorillonite content of about 90% minimum - - contains small portions of Feldspar, Biolite, Selenite, ect. Tablets have a 2.3 to 2.5 specific gravity, a pH of 8.5 to 10.5 and a dry bulk density of 82 lbs per cubic foot. The smaller your annular space ( distance from the outside of the casing and the borehole wall ) the smaller the diameter of tablet you should use.

## **3/8" Cetco Coated Bentonite Tablets**

Now you can pour bentonite pellets easily in the bore hole with standing water without the problems such as bridging from premature swelling. Cetco coated bentonite tables combines the best of a high yielding virgin western bentonite ( for expansion of up to 12 times dry volume size ) and the coating treatment for a delayed hydration allows the Cetco coted tablets to be poured or pumped into standing water up to 150' before they start to swell up. This method reduces waste, time, and handling costs associated with the semi-liquid methods presently used. Cetco coated tablets are stocked in 3/8" size, in 50 pound 5 gallon size pails.



## QUANTITY PRICING for BENTONITE TABLETS

Packaged in 50 lbs Pails	Per Pails
3/8" Regular Tablets	\$ 55.95
3/8" Coated Tablets	\$ 94.95

**Baroid's Bentonite Tablets will provide an in place expansive bentonite seal in your most sensitive monitoring well applications. They can be placed in either a wet or dry bore hole with the same ease as pea gravel.**

### Baroid Bentonite Tablet Reference Table

Weight of Bentonite Tablets required for a bore hole seal per 1 foot of depth in pounds.  
Use figure for bore hole times depth to find full hole quantity. Then deduct the amount calculated for the casing used in the well. This will get you the quantity you need to order.

Size	2"	3"	4"	5"	6"	7"	8"	9"	10"
3/8"	1.72	3.88	6.88	10.76	15.50	21.08	27.52	34.88	43.05
1/2"	1.77	4.00	7.11	11.11	16.00	21.77	28.44	36.00	44.44

### DO NOT CONFUSE TABLETS WITH BENTONITE CHIPS

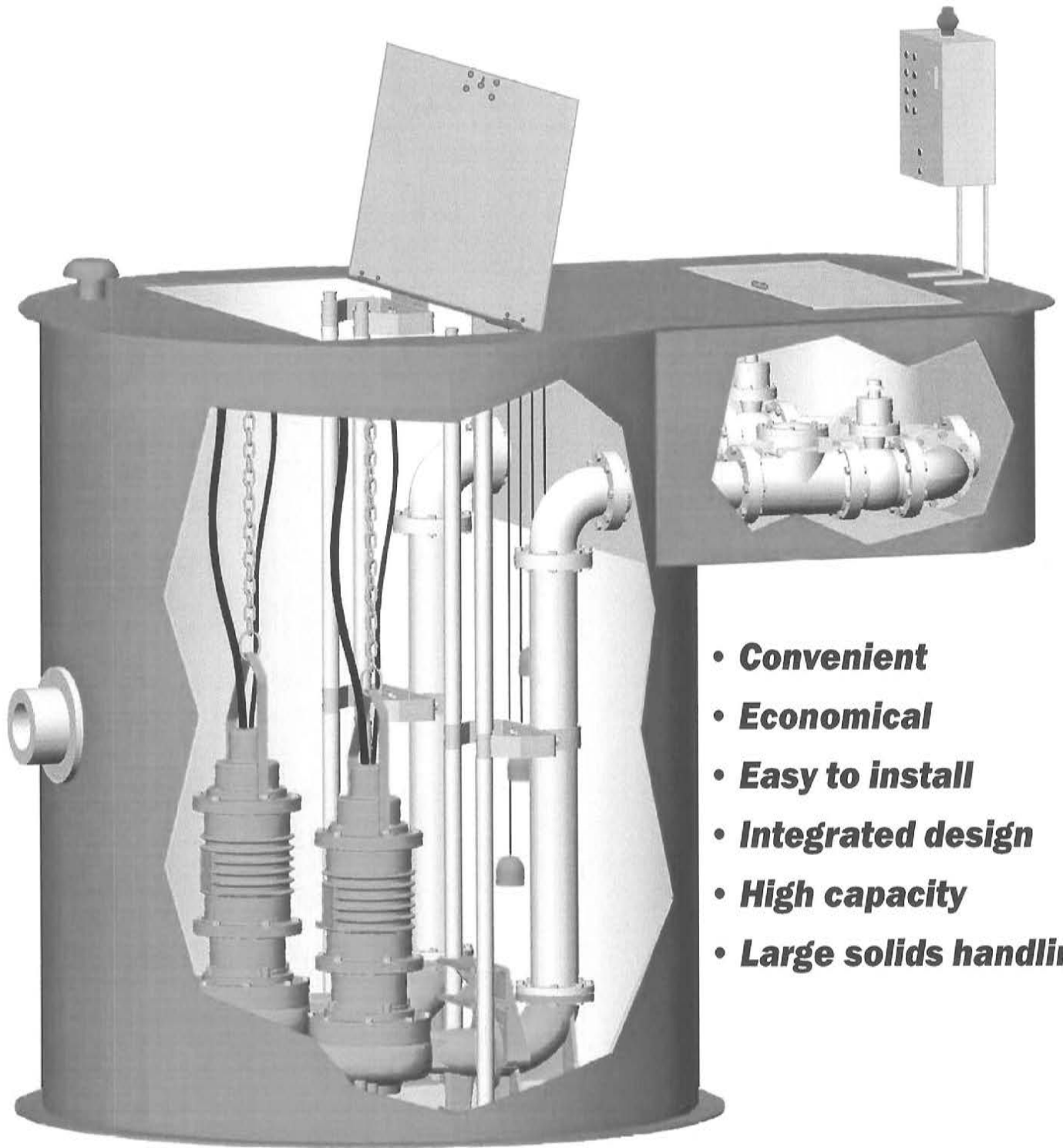
Tablets are compressed and will swell to a greater volume than chips. Being more uniform in size and shape, tablets are less likely to bridge or hang up in the well. Tablets start to hydrate or swell slower than bentonite chips do, when dropped through standing water. Therefore, they will drop to the desired depth where they will create the proper seal between the borehole and the casing being sealed in place.

### MONITORING SUPPLIES INDEX

Prices effective August 20, 2008

# ***Easy-Lift***<sup>®</sup>

## ***Package Lift Stations***

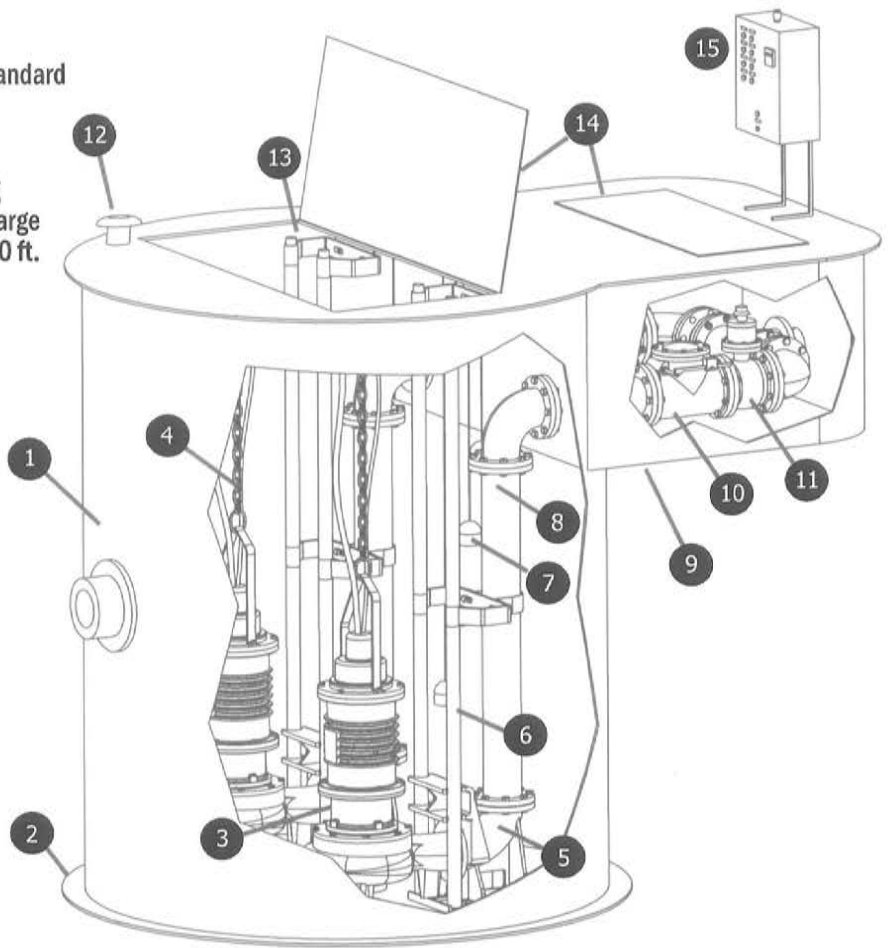


- ***Convenient***
- ***Economical***
- ***Easy to install***
- ***Integrated design***
- ***High capacity***
- ***Large solids handling***

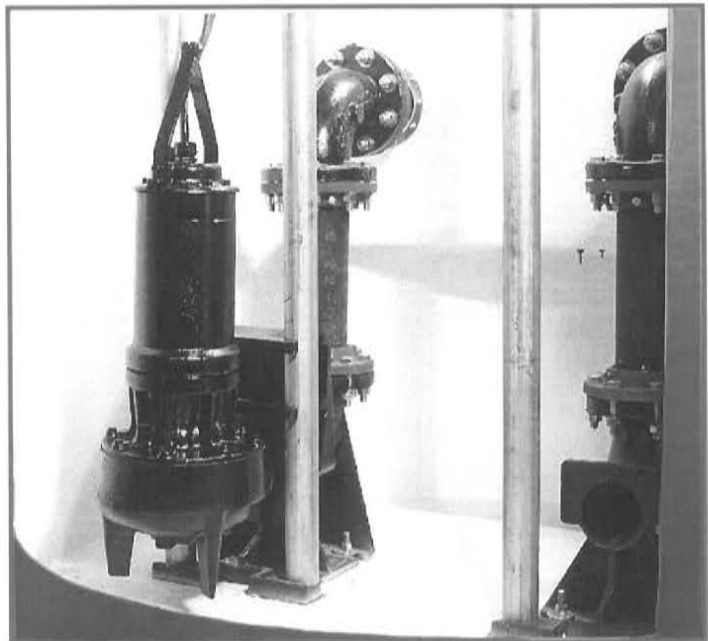
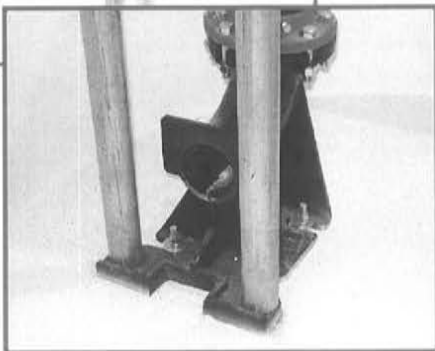
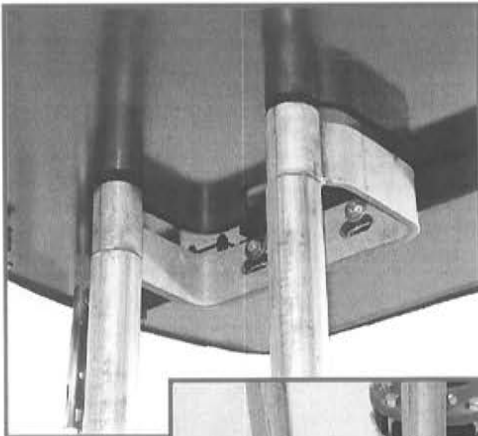
***Sewage • Stormwater • Industrial Waste • Process Waste***

# Features...

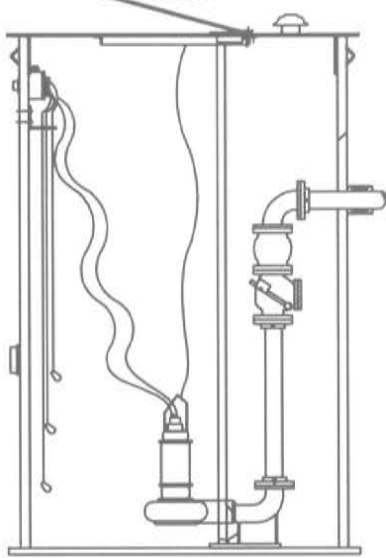
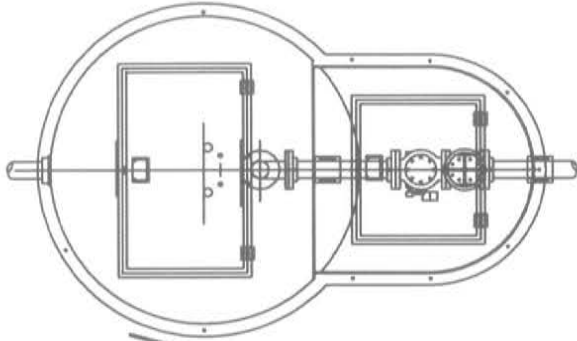
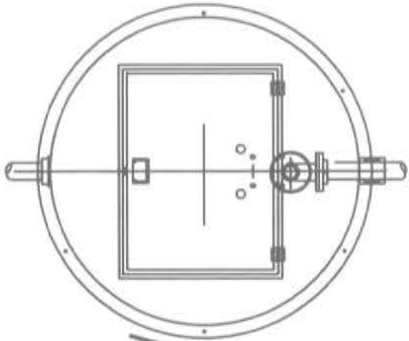
- 1 - Rugged fiberglass basin assembly for durability and corrosion resistance; simplex and duplex systems standard
- 2 - Integral bottom plate / anti-flotation flange
- 3 - Solids-handling submersible pump (IP68); FM listing available for Class 1, Groups C & D; 3" and 4" discharge sizes rated for capacities to 1300 GPM; Heads to 150 ft.
- 4 - Stainless steel pump lifting chain
- 5 - Rugged cast-iron guiderail base elbow
- 6 - Stainless steel guiderail(s)
- 7 - Direct-acting, sealed polypropylene-encapsulated level control switches
- 8 - Discharge pipe; available in PVC, ductile iron, stainless steel or galvanized steel
- 9 - Outside valve box (optional); includes drain and check valve assembly (not illustrated)
- 10 - Cast iron check valve, full-port design, includes external lever and adjustable weight; provides indication of "open" or "closed" position
- 11 - Cast iron plug valve, full-port design, 1/4-turn type for quick and easy operation
- 12 - Wet-well vent (optional)
- 13 - Rugged stainless steel upper guiderail bracket; intermediate brackets supplied as required for deep basins
- 14 - Access covers; available in fiberglass, steel or aluminum
- 15 - Pump control panel; available with NEMA 3R or NEMA 4X enclosure; U.L. 508 listed; includes a wide variety of standard and optional features
- 16 - NEMA 4X Junction Box (not illustrated)



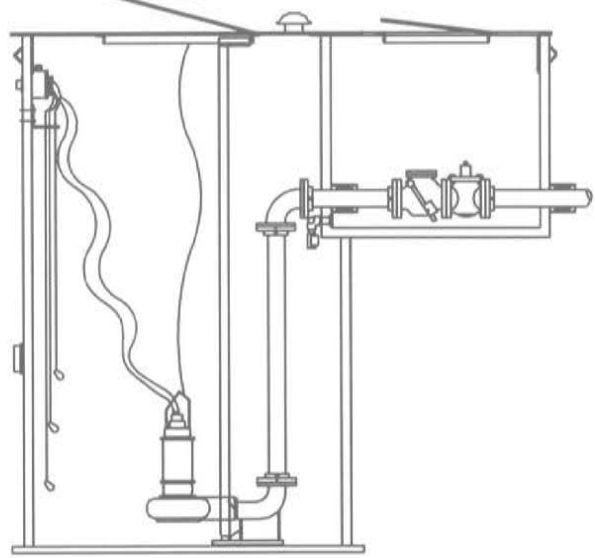
## Quality construction throughout !



# Basic configurations...



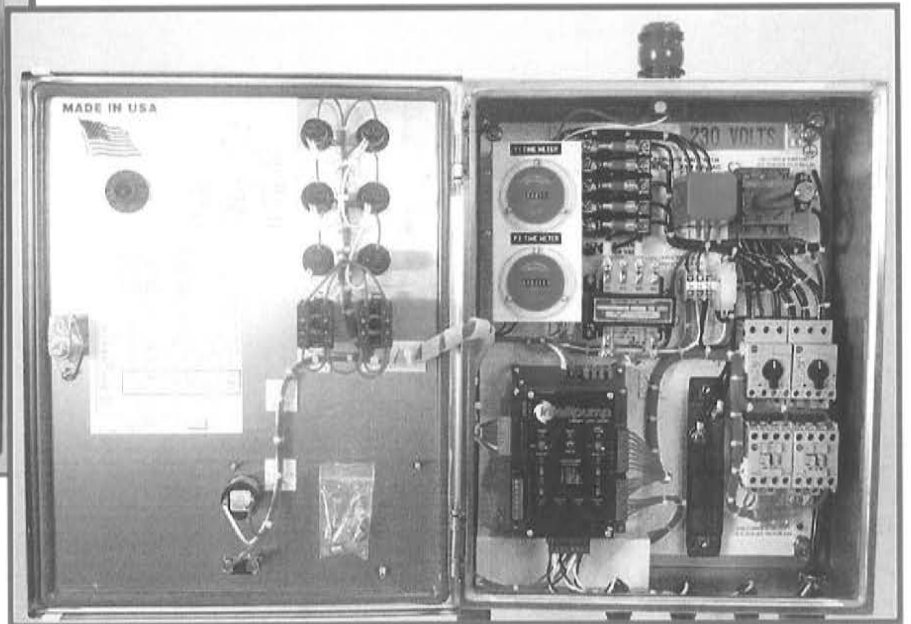
Standard design



Optional valve box design



**Compact control panel systems packed with the features operators want !**



# Standard size charts...

Main Basin

Basin Depth	Basin Diameter					
	36 "	48 "	60 "	72 "	84 "	96 "
	Simplex Only		Simplex or Duplex			
48 "	X	X	X			
60 "	X	X	X	X		
72 "	X	X	X	X		
84 "	X	X	X	X	X	
96 "	X	X	X	X	X	X
108 "	X	X	X	X	X	X
120 "	X	X	X	X	X	X
132 "	X	X	X	X	X	X
144 "	X	X	X	X	X	X
156 "	X	X	X	X	X	X
168 "	X	X	X	X	X	X
180 "	X	X	X	X	X	X

Optional Valve Box

Width	Depth
48 "	48 "
48 "	60 "
48 "	72 "

## Typical Bill of Material for Duplex system with optional Valve Box...

QTY	DESCRIPTION	QTY	DESCRIPTION
2	Submersible Solids-Handling Pumps*	2	Upper Guiderail Mounting Bracket
1	Fiberglass Basin with "D" type attached Valve Box; including Lifting Lugs (4) and Anti-Flotation Flange	2	Guiderails
1	Basin Cover*	2	Pump Lifting Chain*
1	2" Electrical Fitting*	2	Discharge Pipe
1	Duplex NEMA 4X Junction Box and fittings*	2	Check Valve
1	Level Control Bracket (SS)*	2	Plug Valve
4	Level Control Switch*	1	Link Seal
1	Inlet Fitting (Adapt-A-Flex)*	1	Vent (Mushroom Type)*
2	Guiderail Base Elbow	1	Valve Box Drain & Check Valve Assembly
		1	Duplex Pump Control Panel*

\* Shipped loose for field installation



**Yeomans  
Chicago  
Corporation**

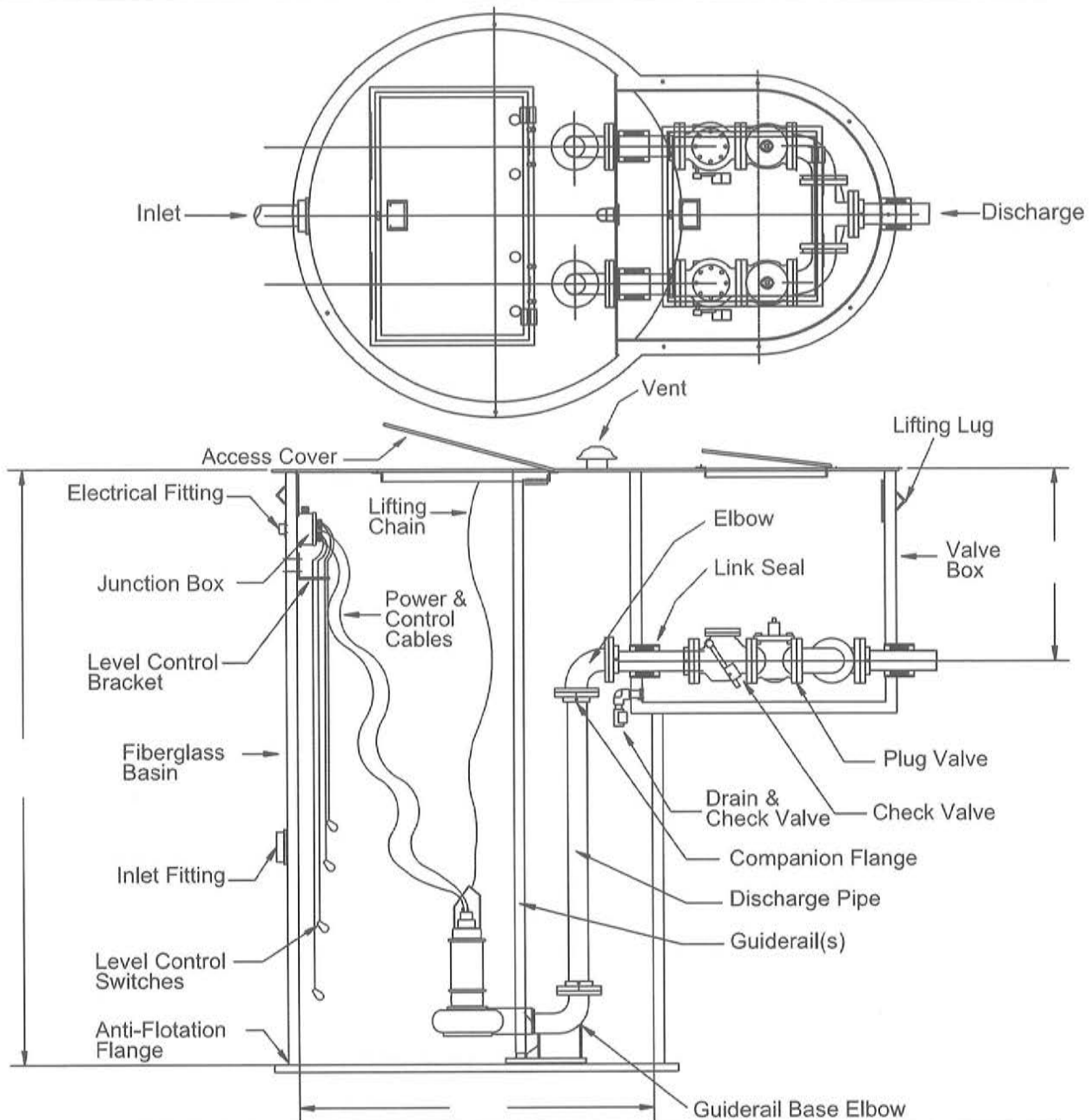
3905 Enterprise Court  
P.O. Box 6620  
Aurora, IL 60598-0620  
PH: 630-236-5500  
FX: 630-236-5511  
URL: [www.yccpump.com](http://www.yccpump.com)

ISO 9001:2000 Certified



# Easy-Lift® Package Lift Stations

## DUPLEX - SUBMERSIBLE SOLIDS-HANDLING with VALVE BOX



QTY	DESCRIPTION	QTY	DESCRIPTION
2	Model _____ Submersible Solids-Handling Pump*	2	Guiderrail Base Elbow (cast iron)
	Rated Capacity: _____ GPM at _____ Feet TDH	2	Upper Guiderrail Mounting Bracket (SS)
	_____ RPM, _____ HP, _____ HZ, _____ VOLTS	2	Guiderrail(s) (SS) (Single "V" bar for 3" pumps / Dual guide pipes for 4" pumps)
1	Fiberglass Basin w/ "D" type attached Valve Box; including Lifting Lugs (4) and Anti-Flotation Flange	2	Pump Lifting Chain* (SS)
1	_____ Basin Cover (3)	2	Discharge Pipe: _____ PVC _____ DI _____ SS _____ Galv. Stl.
1	2" Electrical Fitting*	2	Check Valve (cast iron)
1	NEMA 4X Junction Box and fittings*	2	Plug Valve (cast iron)
1	Level Control Bracket (SS)*	3	Link Seal
4	Level Control Switch*	1	Vent (Mushroom Type)*
1	Inlet Fitting (Adapt-A-Flex)* Size: _____ 4" _____ 6"	1	Valve Box Drain & Check Valve Assembly

**Notes and Clarifications:**

- 1- Fill in all blanks and mark desired Inlet Fitting size.
- 2- Items marked with asterisk (\*) are shipped loose for field installation.
- 3- Hinged type cover illustrated. Solid fiberglass type optional on basins 72" diameter and smaller.