EXHIBIT 1

149360

AGREEMENT

THIS AGREEMENT is entered into by and between the CITY OF PORTLAND, OREGON, herein called "City," and the METROPOLITAN SERVICE DISTRICT, herein called "METRO."

THE PARTIES RECITE:

a. City is a municipal corporation of the State of Oregon. METRO is a Metropolitan Service District, established under ORS Chapter 268.

b. City presently operates, by ownership and through an agreement for service, the St. Johns Sanitary Landfill, herein called the "Landfill." The Landfill is one of two such sanitary landfills located within the boundaries of METRO and is used by residents and commercial refuse haulers from a large area of the METRO District, both within and without the City limits.

c. City has recently obtained all necessary permits and approvals from Federal, State and local agencies for a 55-acre lateral and 10-foot vertical expansion of the Landfill. City has prepared plans and specifications for both the Landfill expansion and revised operations.

d. ORS 268.310(a) authorizes METRO to provide facilities for the disposal of solid waste.

e. City is willing to transfer operational responsibility, rate regulation, control of the landfill operations, and the authority to

expand the existing Landfill to METRO subject to the terms of this Agreement.

f. Since FY75-76, City has collected a surcharge on refuse deposited in the Landfill for the purpose of accumulating funds to partially offset the cost of landfill final cover, expansion and leachate collection. The total estimated amount of these funds to be available on May 31, 1980 is $1,276,000.

g. METRO is willing to accept the operational responsibility, rate regulation and control of the landfill operations and the authority to expand the existing Landfill from the City subject to the terms of this Agreement.

h. Land Reclamation, Inc./Larry Cooper, a joint venture, is currently operating the Landfill pursuant to an agreement entered into with City, April 14, 1976 and amended January 3, 1979 extending the contract to June 1, 1980.

i. This Agreement is entered into pursuant to ORS 190.003 to 190.110 and 268.300(2).

j. The numbered paragraphs below are referred to herein as Sections.

THE PARTIES THEREFORE AGREE:

1. Transfer. City hereby transfers to METRO and METRO accepts the authority to administer, regulate rates, control, operate, expand and

maintain the Landfill, the subject premises and all improvements located thereon as provided for herein on June 1, 1980. City shall retain the ownership of the property and all rights not expressly transferred.

2. Expansion. METRO shall construct the landfill expansion area in accordance with the plans and specifications prepared by City and included in Exhibit "A." The 55-acre lateral landfill expansion by METRO will commence during 1980 and shall be completed no later than December 31, 1981.

a. Any modification to the landfill expansion plans are subject to approval by the City Engineer.

b. All costs associated with expansion construction shall be the sole liability of METRO. All costs associated with the design of the landfill expansion incurred by City shall be reimbursed by METRO to City in accordance with the provisions of Section 20.

3. Operation

a. METRO shall operate the Landfill in a manner that complies with the requirements of the Department of Environmental Quality of the State of Oregon, the United States Environmental Protection Agency and all other applicable laws and regulations.

b. METRO may operate the Landfill or contract for operation by a third party of its choice provided such contract shall be subject to the provisions of this Agreement.

c. METRO may operate the Landfill gatehouse or contract for operation by a third party of its choice provided such contract shall be subject to the provisions of this Agreement.

d. METRO shall be responsible for all phases of the operation of the Landfill, pay all charges incurred by such operation and establish rates for use thereof, provided, however, that the established rates after July 31, 1982 will not be based in part or in whole on disposal franchise fees charged by any jurisdiction within METRO's district other than METRO. All costs associated with the development of the new operations plan incurred by the City shall be reimbursed by METRO to City in accordance with the provisions of Section 20.

e. METRO shall pay all taxes that may become due upon the subject property.

f. METRO shall consider all complaints resulting from the operation of the Landfill. Complaints shall be evaluated and modifications to the operating plan shall be considered and implemented if appropriate.

g. METRO may make maximum permissible use of the subject property for solid waste disposal activities provided METRO conducts disposal activities and completes the Landfill to the final contours and limits to be established in the Landfill Operations Plan to be subsequently developed by the City and which will be subject to the approval of the parties. After approval of the plan by the parties, any modifications to the Landfill Operations Plan are subject to the approval of the City Engineer.

h. METRO will pursue the timely completion and closure of the

Landfill according to a City-approved schedule developed by METRO. METRO will develop said schedule by July 1, 1983.

i. METRO may construct improvements or alter existing improvements subject to the approval of the City Engineer. The City Engineer may require that any new or existing improvements except the Incinerator Road Bridge be removed by METRO at their expense upon the termination of this Agreement. All improvements, both existing and new, not required to be removed shall remain and become the property of City, provided that METRO may remove any scale mechanisms and associated equipment which shall become the property of METRO. Existing landfill improvements are listed in an inventory and included in Exhibit "B."

4. Settlement. METRO shall be responsible for the periodic filling and grading to the final contours established in the Operating Plan for those portions of the Landfill which experience settlement. Such responsibility by METRO shall continue after the final closure of the Landfill until settlement ceases to occur or a maximum of six (6) years, whichever occurs first, except:

a. In those areas of the Landfill which City may lease or transfer title to other parties.

b. In those areas of the Landfill in which City constructs improvements. Such areas being defined as an area within 50 feet of a City-constructed structure.

c. In those areas within 1/2 the width of the roadway of a driveway or road constructed within the Landfill.

5. Bridge

a. A bridge known as the Incinerator Road Bridge crosses the Columbia Slough and is the sole source of access to the operating area of the Landfill. The live load ratings on the Incinerator Road Bridge are HS 20-44, H 20-44, and S-3 as specified in the Standard Specifications for Highway Bridges adopted by the American Association of State Highway Officials, Eleventh Edition, 1973. The maximum allowable loadings under these specifications which can be placed on this structure are specifically detailed in a copy of a memo from R.F. Dow to J.P. Niehuser, dated March 21, 1980 and attached as Exhibit "C."

b. METRO shall be responsible for maintenance, repair, replacement, and establishment of load requirements of the bridge to the extent that such requirements are necessary to insure continued Landfill operations. All costs associated with the above requirements shall be paid by METRO. Upon termination of this Agreement, the bridge shall be returned to City in a condition equal to or better than its state of repair, load capacity and width on June 1, 1980.

c. METRO may, at its discretion, improve the bridge to accommodate any anticipated increase in traffic loading beyond those limits determined by METRO. Proposed improvements to the bridge shall be subject to approval

by the City Engineer and all costs associated with the bridge improvements shall be paid by METRO.

6. Periodic Inspection. METRO shall twice annually and at its expense, provide the City with a report of inspection and evaluation concerning the landfill operations and the condition of all facilities and structures including the Incinerator Road Bridge. The inspection and evaluation report will be provided by a qualified consulting engineer mutually chosen by METRO and City.

7. Methane

a. Methane Control. METRO shall bear full responsibility including the payment of all costs for the planning, construction, operation and maintenance of effective controls to prohibit the vertical and lateral migration of landfill gases from the landfill site boundary. The appropriate control measures shall be designed, constructed, operated and maintained to prevent the spread of nuisance and malodorous gases from the site boundary. METRO shall bear full responsibility for such methane control measures until the termination of this Agreement at which time METRO shall leave the site with control measures acceptable to the regulatory agencies.

b. METRO shall conduct a study on the feasibility of mining methane at the Landfill. All costs associated with the study shall be paid by METRO. If METRO and City jointly determine that the utilization

of methane produced within the Landfill is technically feasible, profitable and compatible with the highest and best use of the completed Landfill, METRO shall implement a plan for utilization of the methane, pay for all associated costs, and pay City fifty percent of its net profit. In calculating the net profit METRO shall apply only direct costs associated with methane development and production. Operation of the methane recovery system shall continue until such time that both METRO and City agree upon its termination or until such time as the recovery system ceases to be profitable.

8. Maintenance of Facilities. In addition to those structures and facilities specifically mentioned herein, METRO shall adequately maintain all other facilities and structures located at the Landfill.

9. Retention of Powers. Except as provided in this Agreement, City retains all governmental powers it has over the subject property.

10. Disposal Facility. METRO shall construct and implement operation of a processing center(s) and/or transfer station(s) in the City of Portland prior to the close of the Landfill to provide a level of disposal service which meets the disposal needs of the City.

11. New Landfill Siting. METRO intends to site a new regional sanitary landfill, including all necessary Federal, State and local regulatory agencies approvals and permits for its construction and operation by July 1, 1983. Unless prohibited by law, if METRO does not site a

new landfill by July 1, 1983 or an alternate proposal acceptable to City, City may extend the time or assume control and operation of the Landfill pursuant to Section 16a.

12. Indemnity; Insurance.

a. During the term of this Agreement METRO shall hold harmless the City, its officers and employees and shall indemnify the City, its officers and employees, for any claims or damage to property or injury to persons which may be occasioned, in whole or in part, by METRO's operation of the Landfill.

b. METRO shall furnish and maintain such public liability and property damage insurance, either through a carrier or self insurance, including automotive coverage, as will protect the City from all claims for damage to property or bodily injury, including death, which may arise from operations under this Agreement or in connection herewith, including all operations of subcontractors. Such insurance shall provide coverage of not less than $100,000 for bodily injury for each person, $300,000 for each occurrence and not less than $300,000 for property damage per occurence. Such insurance shall be without prejudice to coverage otherwise existing therein, and shall name as additional insureds the City, its officers and employees, and shall further provide that the insurance shall not terminate or be cancelled prior to the completion of this Agreement without 30 days written notice to the Auditor of the City of Portland.

c. Prior to any annual anniversary of this Agreement, METRO shall increase the amounts of insurance required to reflect changes in Oregon law in order that the insurance provided shall cover the maximum exposure.

d. Workmen's Compensation. METRO and any subcontractor it may contract with in performance of this Agreement shall provide Workmen's Compensation coverage for all persons employed on the work to be done under the contract. The contractor and all his subcontractors shall be required to assure that his subject workmen will receive the compensation for compensable injuries provided in ORS 656.001 to 656.794 either by:

1. Contributing to the Industrial Accident Fund as a contributing employer; or

2. Qualifying as a direct responsibility employer under ORS 656.405 and 656.409.

In the event that the contractor or any of his subcontractors shall elect to fulfill this responsibility by qualifying as a direct responsibility employer under ORS 656.405 and 656.409, satisfactory proof of such fact shall be required. In the event that the certification as a direct responsibility employer is withdrawn, as provided in ORS 656.417, the contractor or any subcontractor shall thereafter, on the effective date of the withdrawal of certifications, become a contributing employer.

METRO agrees to hold harmless, defend and indemnify City for any liability that may be imposed upon City pursuant to ORS 656.029 by reason of contractor's or subcontractor's failure to provide Workmen's Compensation coverage, as set forth herein.

13. Leachate. As between METRO and the City, regardless of fault or legal liability for any resulting third-party damages, the parties agree hereto:

a. METRO shall be responsible for the control and prevention of leachate that may be discharged from both the present Landfill and new expansion area during the term of this Agreement.

b. METRO will, as part of the Landfill expansion and according to the provisions of Section 2, construct a leachate collection system and pay all associated costs.

c. METRO will, as part of the Landfill operations and according to the provisions of Section 3, operate, maintain and pay for all associated costs including utility charges during the term of the Agreement.

d. Upon the termination of this Agreement, City shall be responsible for the control and discharge of leachate from the present Landfill exclusive of the expanded area.

e. Upon termination of this Agreement, METRO shall continue

its responsibility for the control and prevention of leachate which may be discharged from the new expansion area. METRO shall continue to operate, maintain, repair, replace, if necessary, and pay all costs associated with the leachate collection system in the expansion area until such time as State and Federal regulatory agencies no longer require continued operation.

14. Hazardous Wastes.

a. City shall be responsible for the correction of unacceptable conditions as determined by DEQ, resulting from the past deposits of hazardous waste in the existing Landfill while under City control.

b. METRO shall be responsible in perpetuity for the correction of any unacceptable conditions as determined by DEQ resulting from the deposits of hazardous waste in the Landfill while under METRO control after June 1, 1980.

15. Description of Property; Access. The premises are located at 9363 N. Columbia Boulevard, Portland, Oregon and more specifically described in Exhibit "D." The property subject to this Agreement is Parcel A and Parcel B and that portion of Parcel C adjacent to Parcel B which includes the location of the proposed dike and the area enclosed, about 55 acres.

a. METRO will provide and locate for the benefit of the City a right of access through Parcels A and B to the portion of Parcel C retained by the City.

b. METRO shall permit access to the Landfill by City officers and employees for the purpose of inspection of landfill expansion and operation to determine compliance with the conditions of this Agreement.

c. City shall provide and locate for the benefit of METRO, as necessary, a right of access to enable METRO to comply with the terms of this Agreement.

16. Default.

a. In the event METRO shall default on any of its obligations under this Agreement, the City shall give METRO written notice specifying the nature and the extent of the default. METRO shall have 120 days from receipt of the notice to cure the default. If METRO is unable or unwilling to cure the default, the City may cure the default and bill METRO for the reasonable costs and expenses incurred in curing the default or it may assume control and operation of the Landfill. If the City assumes responsibility for the Landfill, METRO shall, at its discretion, direct sufficient wastes to the Landfill and/or pay sufficient revenues to the City to enable the City to operate the Landfill at a cost which is economically competitive with other regional landfills, provided, however, that METRO will retain its authority to regulate rates at the Landfill.

b. In the event City shall default on any of its obligations under this Agreement, METRO shall give City written notice specifying the nature and extent of the default. City shall have 120 days from receipt of the

notice to cure the default. If City is unable or unwilling to cure the default, METRO may cure the default and deduct the reasonable costs and expenses incurred in curing the default from the payments required to be made by METRO under Section 18.

17. Notice. Any notice required under this Agreement if sent to City shall be delivered to both the City Auditor, Room 203, City Hall, and to the City Engineer, Room 710, 621 SW Alder Street, and if to METRO shall be delivered to the Director of the Solid Waste Division, 527 SW Hall. Either party may change the address where it is to receive notice under this Agreement by giving written notice to the other party.

18. Rental Payment to City. As rent to the City, METRO shall pay $15,330 per month on the 5th day of the following month, beginning on June 1, 1980, with the June rental payment due July 5, 1980. Monthly rental payments for the period June 1, 1980 through May 31, 1983 have been computed by applying an annual rate of return to the adjusted fair market value of the property and dividing by the number of months in one year.

a. The annual rate of return for the period June 1, 1980 through May 31, 1983 shall be 8.4%.

b. The adjusted fair market value of the property for the period June 1, 1980 through May 31, 1983 shall be 50% of the established fair market value of the subject property as determined in the July 21, 1975 appraisal report, Municipal Landfill Site, 9363 N. Columbia Boulevard,

Portland, Oregon, prepared for the Right-of-Way Division, Department of Public Works, City of Portland, and adjusted by the change in the average assessed value of N. Portland industrial property (State ratio code: 3716) between the period 1975 and 1980 an established by Multnomah County, Department of Assessment and Taxation.

c. Monthly rental payments will be renegotiated in April, 1983 and every three years thereafter and based on the change in fair market value of the property and any reasonable adjustments to the rate of return. New rental payments will become effective on June 1, 1983 and every three years thereafter.

1. Rental payments effective June 1, 1983 and every 6 years thereafter shall be based on the reestablishment of the fair market value of the property by an appraisal report prepared by an independent appraisal service mutually selected by City and METRO. City shall pay all costs associated with the preparation of the appraisal report.

2. Rental payments effective June 1, 1986 and every 6 years thereafter shall be based on the adjustment of the previous market value established by appraisal and adjusted by the change in assessed value of North Portland industrial property within the past three years as established by Multnomah County, Department of Assessment and Taxation.

19. Payments to METRO. City shall pay METRO those funds collected through landfill user fee surcharge for the purpose of payment of the cost

of final cover, landfill expansion and leachate collection, including accumulated interest. The total amount of those funds collected by City through May 31, 1980 is estimated at $1,276,000. City shall disburse to METRO $1,000,000 on June 5, 1980, the remaining funds plus accumulated interest earnings, shall be payable to METRO on September 5, 1980.

20. Reimbursement to City. METRO shall reimburse City for those costs incurred by City in the development of plans and specifications for both the landfill expansion and new operations plan according to the provision of Sections 2 and 3 of this Agreement. Reimbursement for plan development shall be payable in equal monthly payments of $6,518 for 36 months due on the 5th day of the following month beginning on June 1, 1980, with the June reimbursement due July 5, 1980.

21. Delinquent Payments. Payments due City under Sections 18 and 20 and payments due METRO under Section 19 shall be considered delinquent if not paid before 30 days after those dates when payment is due. Delinquent payments shall be subject to interest calculated from the date the payment is due to the date the payment is received. Interest rates shall be the bank prime rate interest less 5% effective at the time the payment became delinquent.

22. Term. This Agreement shall be effective from June 1, 1980 until May 31, 1990, subject to the conditions set forth in Section 7, Methane, 4, Settlement, 14, Hazardous Wastes, and 13, Leachate, requiring performance

by METRO regarding the term of this Agreement or any extension thereto, unless:

a. The subject property shall have been utilized to the full extent and completed as specified in the Landfill Operations Plan as referred to in Section 3, or;

b. There is a default according to Section 16, or;

c. The subject property shall not have been utilized to the full extent and completed as specified in the said Landfill Operations Plan (Exhibit B) in which event METRO and City shall extend the term of this Agreement until such time as the Landfill is completed.

23. Transfer of Control.

a. From the execution of this Agreement until June 1, 1980 City reserves the right to control landfill operations pursuant to its Agreement with Land Reclamation, Inc./Larry Cooper, a joint venture, it being the intent of the parties that METRO shall not assume active control of the premises until the termination of City's present Agreement for operation. Except for such obligations that may be required of operator subsequent to termination of City's present Agreement, transfer on June 1, 1980 of complete control of the Landfill free of the City's present Agreement and operator is a condition precedent to assumption by METRO of the obligations and responsibilities herein.

b. From the execution of this Agreement until June 1, 1980, METRO shall secure the approval of various State and Federal regulatory agencies for the transfer of all permits and agreements allowing use, expansion and operation of the Landfill to METRO on June 1, 1980. Final transfer of such permits on June 1, 1980 are subject to the review and approval of the City Engineer.

c. Within 10 days from the execution of this Agreement, METRO shall, with the requested assistance of DEQ, inspect the premises and inform the City of any inadequate conditions at the Landfill which fail to meet existing regulatory requirements, and/or the requirements contained in the current operations contract between Land Reclamation, Inc./ Larry Cooper and City. METRO shall continue to periodically inspect the site and immediately inform the City of any inadequate conditions. Upon notification, City will cause such conditions to be corrected by June 1, 1980 or within 30 days after final notification by METRO. Any correction required of City by METRO is subject to approval by METRO. The City shall be responsible for all liability associated with failure to make said corrections including but not limited to demobilization of its contracted operator and coordination of landfilling operations while making said corrections. If the City fails to correct such conditions within the time allowed, METRO may correct such conditions and deduct the entire cost of correction from any sums due under Section 18 of this Agreement.

d. Prior to termination of this Agreement, City may inspect

the premises and reject transfer of control if it finds that the condition of the Landfill is inadequate and fails to meet then existing standards. City shall not unreasonably reject transfer of control. In the event City rejects transfer METRO shall cause all defects to be corrected and upon correction of defects, City shall assume control. Except as provided for in this Agreement, neither party shall be responsible for correcting any defects in the Landfill after the other party has assumed control.

24. Approvals. Any approval required of the City or METRO under this Agreement shall not be unreasonably withheld.

25. Arbitration. Any dispute between the parties arising out of or under this Agreement may be submitted by them to arbitration in accordance with such conditions as mutually agreed upon or, if no mutual agreement can be arrived at then this agreement be submitted by them to arbitration in accordance with the provisions, then obtaining, of the Arbitration and Award provisions of ORS Chapter 33. The decision of the arbitrator shall be a condition precedent to any right of action that either party may have against the other.

This Agreement is authorized by City Ordinance No._____

CITY OF PORTLAND, OREGON

BY_____
Commissioner of Public Works

Approved as to form:

_____
City Attorney

BY_____
City Auditor

METROPOLITAN SERVICE DISTRICT

Approved as to form:

BY_____

_____
METRO Attorney

_____
Title

149360

EXHIBIT "A"

St. Johns Landfill
Expansion Area

Plans and Specifications

Plans Drawings of 26 sheets

Specifications of 75 pages

149360

TECHNICAL SPECIFICATIONS

FOR CONSTRUCTION OF THE

ST. JOHNS SANITARY LANDFILL

EXPANSION AREA

Department of Public Works
Mike Lindberg, Commissioner

For Information Regarding
This Project Contact:

L. D. Brownson
City of Portland
Portland, Oregon
(503) 248-4674

April, 1980

TECHNICAL SPECIFICATIONS

BDI003

02015 MOBILIZATION, RESTORATION, AND CLEANUP

A. SCOPE

This section covers the work necessary to move in personnel and equipment, set up all temporary offices, buildings, facilities, utilities, and prepare the site for landfill expansion construction, complete.

GENERAL

The Contractor shall make arrangements with the landfill contractor for temporary facilities location and space.

B. MATERIALS

TEMPORARY FACILITIES

The Contractor shall provide all temporary facilities as required for performing the work.

TEMPORARY UTILITIES

The names of utility firms serving the area are included in Section SPECIAL SPECIFICATIONS. The Contractor shall obtain the necessary permits for connection to these services.

STORM WATER MANAGEMENT

Materials, equipment, and work required for storm water management during the construction period shall be provided as specified in Section SPECIAL SPECIFICATIONS.

SECURITY FENCE

Contractor's security fence may be constructed for the protection of the Contractor's materials, tools, and equipment, as approved.

CONCRETE

As specified in Section STORM DRAINAGE SUMPS.

PARKING FACILITIES

Provide parking facilities for personnel working on the project. No employee or equipment parking will be permitted on the Owner's existing paved areas, except as specifically designated for Contractor's use.

C. WORKMANSHIP

LAYOUT

Set up construction facilities in a neat and orderly manner within designated area at location of choice as approved. Accomplish all required work in accordance with applicable portions of these Specifications or as approved. Confine operations to work area shown.

OBSTRUCTIONS

Some obstructions may not be shown. Bidders are advised to carefully inspect the existing facilities before preparing their proposals. The removal and replacement of minor obstructions such as electrical conduits, air, water, waste piping, and similar items shall be anticipated and accomplished, even though not shown or specifically mentioned.

Major obstructions encountered that are not shown on the Drawings or could not have been foreseen by visual inspection of the site prior to bidding, should immediately be brought to the attention of the Owner. The Owner will make a determination for proceeding with the work. If the Owner finds that the obstruction adversely affects the Contractor's costs or schedule for completion, a proper adjustment to the Contract will be made.

PAVEMENT REMOVAL BENEATH SOUTH DIKE ABUTMENT

Remove the existing pavement beneath the south dike abutment where designated. Dispose of pavement debris in the waste area designated for clearing and grubbing debris.

CULVERT REMOVAL

Remove the designated culvert, beneath the dike near station 20+00 prior to construction of the dike. Remove any disturbed earth and backfill the resulting hole to grade with earth fill in lifts not exceeding 8-inch loose depth. Compact each lift to 95 percent of maximum density at optimum moisture content as determined by ASTM D 698.

FILLING CULVERTS WITH CONCRETE

Completely fill the 20 foot length of the culvert beneath the dike near station 10+50 with concrete as shown.

Completely fill the culvert beneath the dike near station 39+00 with concrete and plug both ends as shown. Place the concrete as approved.

EXTENSION AND PROTECTION OF OBSERVATION WELLS

Protect all existing observation wells shown from damage. Those located beneath fill shall be extended to 2 feet above final grade. Materials and workmanship for extending the wells shall be equal to those of the existing wells. Damaged wells shall be repaired or replaced by the Contractor as approved by the Engineer.

D. PAYMENT

Payment for mobilization will be a lump sum bid item as stated in the Proposal.

Payment for restoration and cleanup will be a lump sum bid item as stated in the Proposal.

* * * * * *

BDI004

02102 CLEARING, GRUBBING, AND STRIPPING

A. SCOPE

This section covers the work necessary to remove all interfering or objectionable material from the designated areas of work as shown and as approved exclusive of the work specified in Section TRENCH EXCAVATION AND BACKFILL for construction of the leachate pressure main.

This work shall also include the preservation from injury or defacement of all vegetation and existing objects designated to remain, as shown or as specified herein.

Review with the Engineer the location, limits, and methods to be used prior to commencing the work under this section.

B. MATERIALS AND PROCEDURES

GENERAL

Provide all materials, suitable and in adequate quantity, required to accomplish the work as specified herein.

CLEARING

DEFINITION

Clearing shall consist of cutting, removing, and disposing of trees, snags, stumps, shrubs, brush, limbs, grass and other vegetative growth, and shall be performed in such a manner as to remove all evidence of their presence from the surface. Clearing shall also include the removal and disposal of trash piles, rubbish, and fencing; and the preservation of trees, shrubs, and vegetative growth which are not designated for removal.

CUTTING GRASS AND OTHER VEGETATION

Grass and other vegetation shall be cut to within 2-inches of the ground surface, and clippings shall be removed.

CUTTING TIMBER

In the cutting of timber growth, cuts shall be made such that all trees are felled into the area to be cleared. Exercise care when clearing near the clearing limits so as not to damage existing trees, vegetation, structures, or utilities which are outside of the clearing limits.

PRESERVATION OF TREES, SHRUBS, AND OTHER VEGETATION

Protect trees, shrubbery, and other vegetation not designated for removal from damage resulting from the work. Cut and remove tree branches only where, in the opinion of the Engineer, such cutting is necessary to effect construction operation. Remove branches other than those required to effect the work to provide a balanced appearance of any tree, as approved prior to removal. Scars resulting from the removal of branches shall be treated with an approved tree paint, as specified under Section 02240, SEEDING, EROSION CONTROL, AND STABILIZATION.

GRUBBING

DEFINITION

Grubbing shall consist of the removal and disposal of wood or root matter below the ground surface remaining after clearing and shall include stumps, trunks, roots, or root systems greater than 2-inches in diameter or thickness to a depth of 6-inches below the ground surface.

CLEARING AND GRUBBING LIMITS

The area beneath the dike, access roads, and landings, and the graded area between the dike and existing landfill shall be cleared and grubbed. Except only as approved by the Engineer as necessary for construction of the waterfowl nesting areas, no clearing or grubbing beyond the outside toe of the dike will be permitted.

DISPOSAL OF CLEARING AND GRUBBING DEBRIS

No burning of combustible materials will be permitted. Dispose of all cleared and grubbed material in the waste disposal area designated for clearing and grubbing debris.

STRIPPING

Complete clearing and grubbing and obtain Engineer approval before stripping. If clearing and grubbing is completed in phases, stripping shall be restricted to approved areas only.

DEFINITION

Stripping shall include the removal and disposal of all organic sod, topsoil, grass and grass roots, and other objectionable material remaining after clearing and grubbing from the areas to be stripped. The exact depth of stripping will be determined by the Engineer.

AREAS TO BE STRIPPED

All borrow areas shall be stripped as specified. Other areas to be stripped are those beneath the dike, access roads, and landings. Stripping of waterfowl nesting areas will not be required. Do not mix strippings with subsoil.

DISPOSAL OF STRIPPINGS

Strippings shall be disposed in the stockpile area designated for strippings.

D. PAYMENT

Payment for the work in this section will be included as the lump sum bid item for clearing, grubbing, and stripping as stated in the Proposal.

BDI005

02200 EARTHWORK

A. SCOPE

This section covers the work necessary for the earthwork, complete.

B. MATERIALS

SUBSURFACE INFORMATION

Test pits or test holes were made and the information obtained therefrom is indicated on Drawing No's. 22, 23, 24, 25, and 26. This information is presented to give some indication of the conditions that may be encountered during construction and is offered as supplementary information only. It shall be the Bidder's sole responsibility to estimate the type and quantity of materials and the amount of ground water that will be encountered. The Engineer and Owner will make available to all prospective bidders, upon request, prior to the receipt of proposals, all information that they may have as to subsurface conditions and surface topography at the worksite. Neither the Owner nor the Engineer assumes any responsibility for the interpretation of the subsurface data indicated on the Drawings, or for subsurface conditions at other locations.

Information derived from inspection of logs of test pits or test holes, of topographic maps, or from plans showing location of utilities and structures will not relieve the Contractor from any risk, or from properly examining the site and making such additional investigations as he may elect, or from properly fulfilling all the terms of the Contract Documents.

The submission of a Proposal shall be conclusive evidence that the Bidder has investigated the site and is satisfied as to the conditions to be encountered, as to the character, quality, and quantities of work to be performed and materials to be furnished, and as to the requirements of the Contract Documents.

UNCLASSIFIED EXCAVATION

Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered. The Contractor shall make his own estimate of the kind and extent of the various materials to be excavated in order to accomplish the work.

EARTH FILL

ZONE 1

Excavated material free from roots, garbage, debris, rocks larger than 3 inches, and other deleterious materials, approved by the Engineer.

STABILIZATION ROCK

Imported 3-inch minus quarry rock, crushed rock or crushed gravel, well graded from coarse to fine particles, and containing less than 10 percent passing the No. 200 sieve, as determined by AASHTO T 27. Submit samples for approval prior to delivery of any stabilization rock.

GRANULAR BACKFILL MATERIAL

Imported granular material as specified for crushed rock base course in Section CRUSHED ROCK BASE COURSE, LEVELING COURSE, AND SURFACING.

GRANULAR DRAIN MATERIAL

Imported granular material meeting all requirements specified for Special Filter Materials in Section 703.51 of the Oregon State Highway Division Standard Specifications for Highway Construction.

GRANULAR SLOPE PROTECTION MATERIAL

Imported river-run gravel or crushed rock, 3- or 4-inch minus, well graded from coarse to fine, hard and durable with a percentage of wear less than 35 percent when tested for resistance to abrasion in conformance with ASTM C 535, free of roots and organic material. Submit source where gravel may be obtained so the Engineer can inspect the pit or quarry. Submit samples of the material for testing and approval prior to delivery to the jobsite.

GRANULAR FILL MATERIAL

Imported granular fill material for landing access road fill shall be as specified for GRANULAR SLOPE PROTECTION MATERIAL.

WATER FOR COMPACTION

Furnish as required.

MATERIAL APPROVAL

All tests necessary for the Contractor to locate an approved source of imported granular materials or other aggregate shall be made by the Contractor. Certification that the material conforms to the Specification requirements along with copies of the test results from an approved commercial testing laboratory shall be submitted to the Engineer for approval at least 14 days before the material is required for use. All aggregate samples shall be furnished by the Contractor at no additional cost to the Owner. Samples shall be representative and be clearly marked to show the source of the material and the intended use on the project. Sampling of the aggregate source shall be done by the Contractor under the supervision of the Engineer in accordance with ASTM D 75. Tentative approval of the aggregate source shall be based on an inspection of the source by the Engineer and the certified test results submitted by the Contractor to the Engineer. No imported materials shall be delivered to the site until the proposed source and materials tests have been tentatively approved in writing by the Engineer. Final approval will be based on tests made on samples of

material taken from the completed and compacted course. The completed course is defined as a course or layer that is ready for the next layer or the next phase of construction. All testing for final approval shall be performed by the Engineer.

Gradation tests shall be made at the place of production by the Contractor prior to shipment. Samples of the finished product for gradation testing shall be taken from each 1,500 tons of prepared materials or more often as directed by the Engineer, if variation in gradation is occurring, or if the material appears to depart from the Specifications. Test results shall be forwarded to the Engineer within 48 hours after sampling.

If tests conducted by the Contractor or the Engineer indicate that the material does not meet Specification requirements, material placement will be terminated until corrective measures are taken. Material which does not conform to the Specification requirements and is placed in the work shall be removed and replaced at the Contractor's expense. Sampling and testing performed by the Contractor shall be done at no expense to the Owner.

COMPACTION EQUIPMENT

Compaction equipment shall be of suitable type and adequate to obtain the densities specified and approved. Compaction equipment shall be operated in strict accordance with the manufacturer's instructions and recommendations. Equipment shall be maintained in such condition that it will deliver the manufacturer's rated compactive effort.

INSTRUMENTATION

PIEZOMETER TIPS

Piezometer tips shall be PETUR Model P-106 canvas pack piezometers, or equal, as manufactured by PETUR Instrument Co., Inc., 11300 - 25th Ave. N.E., Seattle, WA 98125.

PIEZOMETER TUBING

Piezometer tubing shall be 1/2-inch polyethylene as recommended by the piezometer manufacturer. The tubing shall have a burst strength of 360 psi minimum. Provide end caps with tubing which fit tight without splitting.

READOUT BOX

The readout box shall be PETUR Model C-102, or equal. It shall be compatible with the tubing and peizometer tip. The box should be available to the Engineer until completion of the project.

SETTLEMENT PLATES

Provide settlements fabricated as shown.

TEMPORARY STORM SHELTER

The minimum building shall be a minimum of 8 feet in height and the floor area of 4 feet by 4 feet with a lockable door and three stout hinges. The structure shall be weatherproof and constructed by standard wood frame construction methods as approved by the Engineer.

C. WORKMANSHIP

CLEARING, GRUBBING AND STRIPPING

Complete clearing, grubbing and stripping work as specified in Section CLEARING, GRUBBING AND STRIPPING prior to beginning work in this section. If clearing, grubbing, and stripping is completed in phases, earthwork shall be restricted to approved areas only.

REMOVAL OF WATER

Provide and operate equipment adequate to keep all work areas free of water. Standing water shall be removed from all borrow areas prior to beginning any excavation. Dispose of water in a manner that will not damage adjacent property, as approved. When dewatering open excavations, dewater from outside the structural limits and from a point below the bottom of the excavation when possible.

EXCAVATION

Perform all excavation of every description, regardless of the type, nature, or condition of material encountered, as specified, shown, or required to accomplish the construction.

BACKFILL

Backfill around concrete structures only after the concrete has attained 2/3 of the specified compressive strength. Remove all form materials and trash from the excavation before placing any backfill. Obtain the Engineer's approval of concrete work and attained strength prior to backfilling.

Do not operate earth-moving equipment within 5 feet of structures or embankment instrumentation for the purpose of depositing or compacting fill or backfill material, except as approved. Compact backfill adjacent to structures or embankment instrumentation with hand-held tampers or other approved equipment that will not damage the structure.

GRANULAR DRAIN MATERIAL

Place granular drain material around the leachate drain line and on the interior slope of the dike to the lines and grades shown and in a manner which avoids segregation. No compaction is required. Avoid disturbing the subgrade. Replace any material which becomes contaminated by soil or other foreign matter and dispose offsite. Do not operate heavy equipment over the leachate drain line which may crush under heavy loads. Damaged pipe shall be replaced at the Contractor's own expense.

GRANULAR BACKFILL

Place gravel backfill in previously excavated areas under structures, and as backfill around structures where shown. Do not exceed loose lifts of 6-inch thickness. Compact each lift to 95 percent of maximum density at optimum moisture content as determined by ASTM D 698. Moisten material as required to aid compaction. Place material in a manner which avoids segregation.

EMBANKMENT CONSTRUCTION

Instrumentation shall be installed prior to initiating embankment construction. Compact the subgrade to 95 percent of maximum density at optimum moisture content as determined by ASTM D 698 prior to placing fill. Construct embankments to lines and cross sections shown or as directed. Deposit earth fill in horizontal lifts not exceeding 8-inch loose depth across the full embankment width. Compact each lift to 95 percent of maximum density at optimum moisture content as determined by ASTM D 698. During the compacting operations, maintain optimum practicable moisture content required for compaction purposes in each lift of the earth fill. Maintain moisture content uniform throughout the lift. Insofar as practicable, add water to the material at the site of excavation. Supplement, if required, by sprinkling the earth fill. At the time of compaction, the water content of the material shall be at optimum water content plus or minus 2 percentage points.

Do not compact earth fill which contains excessive moisture to obtain the required compaction. Aerate material by blading, discing, harrowing, or as approved, to hasten the drying process.

Construct embankment to an elevation at least 2 feet above the top of pipeline prior to trench excavation for pipeline. Dress completed embankment to elevations and slopes shown.

Foundation soils are weak, and may not be capable initially of supporting the weight of the full embankment height. If in the Engineers opinion, foundation performance, based on instrumentation data, indicates instability, the Contractor shall stop placing fill on affected portions of the dike until, the Engineer authorizes the Contractor to resume.

EARTH BACKFILL AROUND STRUCTURES

Backfill with excavated material in all areas not designated to be granular backfill. Deposit material in lifts of maximum 6-inch depth and compact each lift to 95 percent of maximum density at optimum moisture content as determined by AASHTO T 99. Maintain material at optimum moisture content for compaction. Place backfill material free of roots, organic matter, trash, and rocks larger than 4-inch diameter. Stop backfill at specified grade to allow for placing of crush rock surfacing when required.

COMPACTION TESTS

The Engineer will determine in-place density and moisture content by any one or combination of the following methods: AASHTO T 191, 204, 205, 214 or 238. The Contractor will cooperate with this testing work

by leveling small test areas as designated by the Engineer.

TRENCH EXCAVATION AND BACKFILL

As specified in Section TRENCH EXCAVATION AND BACKFILL

SITE GRADING

Perform all necessary cutting and filling to attain the lines and grades as shown. Fill outside embankment limits requires no compaction. Finished site grading shall provide a smooth surface free of ruts or other surface depressions which would interfer with surface drainage.

PLACING GRANULAR SLOPE PROTECTION MATERIAL

Place granular slope protection material, on the dressed exterior slope to the uniform depth not less than the thickness shown. The surface shall be free from irregularities. No compaction is required. Place carefully to avoid distrubing the subgrade.

DISPOSAL OF EXCAVATED LANDFILL MATERIAL

Dispose of excavated landfill material or earth fill contaminated with landfill material at the existing landfill. Coordinate disposal with the landfill operator.

INSTRUMENTATION

WATERFOWL NESTING AREAS

Construct four waterfowl nesting areas to the dimensions shown. Clear only as necessary to accomplish the work. No stripping is required. No planting of vegetation is required.

The embankment foundation will be monitored for potential settlement, foundation pore pressure buildup, and lateral deformation. Instrumentation will include settlement plates and piezometers installed by the Contractor. All instrumentation will be monitored by the Engineer. The Contractor shall cooperate with the Engineer during installation and monitoring. The Contractor will be responsible for replacing or repairing any instrumentation damaged by him at no additional cost to the Owner. The Engineer shall be present during installation of all instrumentation.

PIEZOMETERS

Piezometers shall be installed in borings drilled to the required depths at the designated locations. Drilling fluid other than clear water or "revert" shall not be introduced into the hole, unless approved by the Engineer. Install piezometers with tubing attached at the depths shown and backfill the borings to grade with bentonite pellets.

Collect piezometer tubing in trenches as shown. Backfill trenches with sand compacted to 95 percent of maximum density at optimum moisture content as determined by ASTM D 698 with a vibratory plate compactor.

SETTLEMENT PLATES

Install settlement plates plumb at designated locations.

D. PAYMENT

Payment for compacted earth fill, uncompacted earth fill, and stabilization construction will be made at the respective unit prices per cubic yard stated in the Contractor's Proposal.

Payment for providing and placing granular slope protection material will be made at the unit price per cubic yard stated in the Contractor's Proposal.

Payment for providing and placing granular drain material will be made at the unit price per cubic yard stated in the Contractor's Proposal.

Payment for providing and installing settlement plates, piezometers, and temporary instrumentation will be based on the lump sum price as stated in the Contractor's Proposal.

Payment for final grading and construction of waterfowl nesting areas will be based on the lump sum price as stated in the Contractor's Proposal.

When any work described in this section is required but no item of payment is provided therefor in the Proposal, the work required shall be considered as incidental to the construction and all costs thereof shall be included by the Contractor in other pay items of the Contract.

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BDI008

02221 TRENCH EXCAVATION AND BACKFILL

A. SCOPE

This section covers the work necessary for the trench excavation and backfill, complete, except for pipe base and pipe zone backfill which are included under the specification for the pipe.

TYPE OF BACKFILL

For bidding purposes, the class of backfill to be used above the pipe zone is indicated on the Drawings. The right is reserved to modify the use, location, and quantities of the various types of backfill during construction as the Engineer considers to be to the best interest of the Owner. Payment will be made based on the class of backfill installed. During construction, the Engineer will designate the type of backfill to be used in each location throughout the project.

Trench backfill above the pipe zone will be divided into the following classifications for the purpose of payment:

CLASS C BACKFILL

Class C backfill will, generally, be limited to use in unsurfaced or unimproved areas.

CLASS D BACKFILL

Class D backfill will, generally, be limited to traveled roadways and crossings where final surfacing replacement will be made shortly after backfilling and subsequent trench settlement must be held to a minimum.

When directed by the Engineer, Class D backfill shall also be used under all culverts, water, gas, irrigation, and sewerlines, buried telephone, power and television cable, and any other miscellaneous buried pipelines or cables that cross the excavated trench. The Contractor will be paid for 10 feet of Class D backfill under each crossing so constructed.

CLASS E BACKFILL

Class E backfill will, generally, be limited to street and road shoulders, driveways, and lightly traveled streets and roadways on which gravel surfacing is to be replaced.

TRENCH EXCAVATION

Excavation is unclassified. Complete all excavation regardless of the type of materials encountered. The Contractor shall make his own estimate of the kind and extent of the various materials which will be encountered in the excavation.

B. MATERIALS

FOUNDATION STABILIZATION

Foundation stabilization shall be 2-1/2-inch minus crushed rock, with reasonably uniform gradation from coarse to fine, and free from excessive dirt or other organic material.

TRENCH BACKFILL

GRANULAR BACKFILL

Granular backfill shall be clean, bank- or pit-run gravel or crushed rock, reasonably well-graded from coarse to fine. The maximum size shall be 1-1/2 inches.

IMPORTED TOPSOIL

Shall conform to Zone I embankment material as specified in Section 02200, EARTHWORK.

COMPACTION EQUIPMENT

Compaction equipment shall be of suitable type and adequate to obtain the amount of compaction specified. Compaction equipment shall be operated in strict accordance with the manufacturer's instructions and recommendations and shall be maintained in such condition that it will deliver the manufacturer's rated compactive effort.

C. WORKMANSHIP

GENERAL

Where clearing or partial clearing of the trench centerline is necessary, complete prior to the start of trenching. Cut trees and brush as near to the surface of the ground as practicable, remove all stumps, and pile for disposal. Do not permit excavated materials to cover brush or trees prior to disposal.

Do not remove existing trees or tree limbs over 2 inches in diameter, whether on public or private property, unless they are within 4 feet of the pipe centerline, without permission from the Engineer. Only trees and shrubs designated by the Engineer shall be removed outside 4 feet of the pipe centerline. Protect all other trees and shrubs.

DISPOSAL OF CLEARED MATERIAL

No burning of combustible materials will be permitted. Dispose of all cleared material in the waste disposal area designated for clearing and grubbing debris.

OBSTRUCTIONS

This item refers to obstructions which may be removed and do not require replacement. Remove obstructions within the trench area or adjacent thereto such as tree roots, stumps, abandoned piling, buildings and concrete structures, logs, and debris of all types without additional compensation.

Dispose of obstructions removed from the excavation in accordance with paragraph, DISPOSAL OF CLEARED MATERIAL.

REMOVAL AND REPLACEMENT OF TOPSOIL

Where trenches cross lawns, garden areas, pasturelands, cultivated fields, or other areas on which reasonable topsoil conditions exist, remove the topsoil for a depth of 12 inches for the full width of the trench to be excavated. Stockpile this topsoil to one side of the right-of-way and do not mix with the remaining excavated material. Replace the topsoil in the top 12 inches of the backfilled trench. Minimum finished depth of topsoil over all trenches shall be 10 inches.

In lieu of stockpiling and replacing the topsoil, imported topsoil from borrow areas may be substituted in the top 10 inches.

Maintain the finished grade of the topsoil level with the area adjacent to the trench until final acceptance by the Engineer. Repair damage to adjacent topsoil caused by work operations. Remove all rock, gravel, clay, and any other foreign materials from the surface, regrade, and add topsoil as required.

PAVEMENT, CURB, AND SIDEWALK REMOVAL

Cut all bituminous and concrete pavements, regardless of the thickness, and all curbs and sidewalks, prior to excavation of the trenches with an approved pavement saw or approved pavement cutter. Width of the pavement cut shall be at least equal to the required width of the trench at ground surface. Pavement and concrete materials removed shall be hauled from the site and not used for trench backfill.

TRENCH WIDTH

Minimum width of unsheeted trenches in which pipe is to be laid shall be 18 inches greater than the inside diameter of the pipe, or as approved. Sheeting requirements shall be independent of trench widths.

The maximum width at the top of the trench will not be limited, except where excess width of excavation would cause damage to adjacent structures or property.

GRADE

Excavate the trench to the lines and grades shown or as established by the Engineer with proper allowance for pipe thickness and for pipe base or special bedding when required. If the trench is excavated below the required grade, correct any part of the trench excavated below the grade at no additional cost to the Owner, with gravel of the type specified for pipe base in Section PRESSURE PIPE. Place the gravel over the full width of trench in compacted layers not exceeding 6 inches deep to the established grade with allowance for the pipe base or special bedding.

SHORING, SHEETING, AND BRACING OF TRENCHES

Sheet and brace the trench when necessary to prevent caving during excavation in unstable material, or to protect adjacent structures, property, workmen, and the public. Increase trench widths accordingly by the thickness of the sheeting. Maintain sheeting in place until the pipe has been placed and backfilled at the pipe zone. Shoring and sheeting shall be removed, as the backfilling is done, in a manner that will not damage the pipe or permit voids in the backfill. All sheeting, shoring, and bracing of trenches shall conform to the safety requirements of the Federal, State, or local public agency having jurisdiction. The most stringent of these requirements shall apply.

LOCATION OF EXCAVATED MATERIALS

During trench excavation, place the excavated material only within the approved working area. Do not obstruct any private- or public-traveled roadways or streets. Conform to all Federal, State, and local codes governing the safe loading of all trenches with excavated material.

REMOVAL OF WATER

At all times provide and maintain ample means and devices to promptly remove and dispose of all water entering the trench excavation during the time the trench is being prepared for the pipe laying, during the laying of the pipe, and until the backfill at the pipe zone has been completed. These provisions shall apply during the noon hour as well as overnight.

Dispose of the water in a manner to prevent damage to adjacent work areas. Drainage of trench water through the pipeline under construction is prohibited.

FOUNDATION STABILIZATION

When, in the opinion of the Engineer, the existing material in the bottom of the trench is unsuitable for supporting the pipe, excavate below the flow line of the pipe, as directed by the Engineer. Backfill the trench to subgrade of pipe base with foundation stabilization material specified hereinbefore. Place the foundation stabilization material over the full width of the trench and compact in layers not exceeding 6 inches deep to the required grade.

PIPE BASE AND PIPE ZONE BACKFILL

Pipe base and pipe zone backfill are included in specification for pipe.

TRENCH BACKFILL ABOVE PIPE ZONE

When backfill is placed mechanically, push the backfill material onto the slope of the backfill previously placed and allow to slide down into the trench. Do not push backfill into the trench in such a way as to permit free fall of the material until at least 2 feet of cover is provided over the top of the pipe. Under no circumstances allow sharp, heavy pieces of material to drop directly onto the pipe or the tamped material around the pipe. Do not use backfill material of consolidated masses larger than 1/2 cubic foot.

CLASS C BACKFILL

Backfill the trench above the pipe zone with excavated trench materials.

In untraveled areas on private or public street or road rights-of-way, leave the trench with the backfill material neatly mounded not more than 6 inches above the existing ground for the entire width of the trench. In lawn or garden areas, backfill the trench and maintain it level with the existing adjacent grade. In all other locations, estimate and provide the amount of backfill material required so that after normal settlement, the finished surface will meet the existing grade. Neatly windrow the material over the trench, and remove all excess. Any excess or deficiency of backfill material which becomes apparent after settlement and within the warranty period shall be corrected by regrading, disposal of excess material, and adding additional material where required. Remove rocks larger than 2 inches from the upper 8 inches of the backfill.

CLASS D BACKFILL

Backfill the trench above the pipe zone with approved granular backfill material in lifts not exceeding 8-inch loose depth and compact each lift to a minimum of 95 percent of maximum density as determined by AASHTO T 99 with mechanical vibrating or impact tampers.

Maintain the surface of the backfilled trench level with the existing grade with 1-1/2-inch minus crushed rock backfill material until pavement replacement is completed or the entire project is accepted by the Owner.

Any subsequent settlement of the finished surfacing during the warranty period shall be considered to be a result of improper or insufficient compaction and shall be promptly repaired by the Contractor at no cost to the Owner.

CLASS E BACKFILL

Backfill the trench above the pipe zone with excavated material to a depth of 9 inches below the original ground surface. Place a minimum of 9 inches of 1-1/2-inch approved crushed rock backfill material over the entire trench surface and compact to a minimum of 95 percent of maximum density as determined by AASHTO T 99. The completed backfilled surface shall be at the same level as the original surface.

MAINTENANCE OF TRENCH BACKFILL

Maintain the backfilled trench surface between any valved sections of pipeline until the following operations have been completed and approved by the Engineer:

Valves and valve boxes installed.

Hydrostatic or air testing.

Cleanup and restoration of all physical features.

Utilities restored to their original condition or better.

And, in general, all work required between the line valves accomplished with the exception of repaving.

This maintenance shall include, but not be limited to, the addition of crushed rock backfill material to keep the surface of backfilled trenches reasonably smooth, free from ruts and potholes, and suitable for normal traffic flow.

No additional payment will be made for the maintenance of the trench backfill prior to completion of the work outlined above.

No pavement replacement shall be undertaken until all items outlined above have been completed and approved by the Engineer.

Maintenance of Class D backfilled trenches is considered as incidental to this item of work and payment for such maintenance will be considered as included in payment for Class D backfill.

DISPOSAL OF EXCESS EXCAVATED MATERIAL

Dispose of all excess excavated materials in the stockpile designated for strippings.

DRAINAGE CULVERTS

Replace in kind drainage culverts which are removed and are at or near right angles to the pipe centerline. If the pipe is damaged during removal, dispose of it and furnish and install new pipe. Dispose of culvert pipe that is in too poor condition to replace because of age, physical conditions, or other reasons beyond the Contractor's control, and install new pipe furnished by the Owner.

All culverts with centerlines over 4 feet from the pipe centerline shall be protected from damage or restored to equivalent condition, if damaged, at no cost to the Owner.

Replace culverts to the lines and grades established by the Engineer. Do not replace culverts until the proposed pipeline is installed and the backfill of the trench has been completed to the subgrade of the culvert.

SETTLEMENT

Any settlement noted in backfill, fill, or in structures built over the backfill or fill within the 1-year warranty period will be considered to be caused by improper compaction methods and shall be corrected at no cost to the Owner. Structures damaged by settlement shall be restored to their original condition by the Contractor at no cost to the Owner.

D. PAYMENT

Payment for the work specified in this section will be made at the unit prices stated in the Proposal and shall be included under the following items. Computation of quantities will be as indicated for each item and will be based upon measurements made by the Engineer.

TRENCH EXCAVATION AND BACKFILL

The work under this item for pressure pipe will be paid for on a linear foot basis for the type of backfill installed. The payment per linear foot will be the aount stated in the Proposal.

The length of trench will be measured horizontally from center-to-center of valves and other fittings, in place, or to the end of the pipe, whichever is applicable. Payment for this item shall cover all work specified herein, or not specifically paid for in other sections, except foundation stabilization, which will be paid for as other separate items. Pipe base and pipe zone backfill will be paid for under Section PRESSURE PIPE.

The price bid per linear foot shall include any extra excavation required to provide space for pipe base specified under Section PRESSURE PIPE.

Preparation of pipe centerline, disposal of cleared material and excess excavated material shall be considered incidental to trench excavation at backfill and the Contractor shall bear all cost.

FOUNDATION STABILIZATION

Payment for this item will be based on the unit price per cubic yard stated in the Proposal. Measurement will be based upon individual trip tickets of actual truck measure furnished the Engineer for cubic yards used under this item. Trip tickets shall be presented to the Engineer for his signature on the day the material is delivered. No payment will be allowed on trip tickets not so validated by the Engineer. Payment for this item shall constitute full compensation for all materials, labor, equipment, and incidentals necessary to furnish materials at trench side and for placing and compacting it in the trench and for the extra depth of trench excavation required below the pipe base grade to provide for a stable base for the pipe. This item is to provide for unstable base encountered in the progress of the work and shall be used only under the direction of the Engineer.

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BDI028

02223 RAILROAD, HIGHWAY, AND BRIDGE UNDERCROSSING

A. SCOPE

This section covers the work necessary for the construction of the undercrossings, complete, within the limits shown.

All necessary permits for the undercrossing will be obtained by the Owner.

The operation across the Railroad Company's right-of-way must conform to the requirements of the railroad company as outlined in a pipeline crossing agreement made between the railroad company and the Owner. The Contractor shall conform with all requirements of the pipeline crossing agreement. Before work is commenced, the Contractor shall obtain and deliver to the railroad company a public liability and property damage insurance policy in the amount required in the pipeline crossing agreement. The insurance company writing the policy shall be authorized to do business in the State of Oregon and shall be satisfactory to the railroad company. The insurance policy or policies shall be delivered to and remain in the possession of the railroad company.

The operation across the highway right-of-way must conform to the requirements of the Permitter. Execute all necessary agreements and/or permits before entering upon or commencing any work on the highway right-of-way. Comply, also, with the applicable requirements of the SPECIAL SPECIFICATIONS.

Utilize equipment capable of completing at least 1/2 the highway crossing during daylight hours in 1 day. At least one-way traffic shall be maintained at all times, unless approval on detours is obtained from the Permitter.

Prior to starting construction, all required labor, materials, and equipment shall be on the site. Notify all permitters at least 72 hours in advance of working within their right-of-way. The term "Permitter" as used herein shall be understood to mean the party, agency, or governmental authority issuing the permit or permits for the construction within the said right-of-way.

Tentative limits for each undercrossing(s) have been indicated. The length of undercrossing may be increased or decreased when final approval is obtained.

LOCATION

The following undercrossings will require tunneling, jacking, or boring:

Crossing No.	Location	Sewerline	Station	Permitter
3	Union Pacific Railroad	Leachate Pressure Main	83+10 to 83+85	Union Pacific Railroad

Tunneled crossings will require casing.

The following undercrossings shall be made by the open cut method:

Crossing No.	Location	Sewerline	Station	Permitter
2	St. Johns Landfill Rd	Leachate Pressure Main	78+60 to 78+90	N/A N/A
4	Columbia Blvd	Leachate Pressure Main	90+50 to 91+00	N/A N/A

The following undercrossing shall be made by suspending pipe under an existing bridge.

Crossing No.	Location	Sewerline	Station	Permitter
1	St. Johns Landfill Bridge	Leachate Pressure Main	74+00 to 77+50	N/A

The bridge undercrossing will require the installation of two pipes; (1) will require the use of ductile iron pipe in place of PVC pipe; and (2) will require the use of galvanized rigid steel conduit. The conduit will be used for an electrical insulation.

B. MATERIALS

SEWER PIPE

Conform to Section PRESSURE PIPE. Strength classification and type as indicated on Drawings.

EXCAVATION

Excavation shall conform to Section TRENCH EXCAVATION AND BACKFILL.

CONDUIT

Conduit shall be a galvanized rigid steel conduit and conform to applicable portions of Section ELECTRICAL.

IMPORTED PIPE BASE AND PIPE ZONE MATERIAL

Conform to Section PRESSURE PIPE.

TRENCH BACKFILL

Foundation stabilization and granular backfill shall conform to Section TRENCH EXCAVATION AND BACKFILL.

CASING

Provide casing of size to permit proper construction to the required lines and grades. Casing shall be type shown below, fabricated in sections for welded field joints, except standard, galvanized, asbestos bonded, asphalt coated, and corrugated metal pipe will be permitted in cased open cut trenches. Coupling bands shall be given a protective coating similar to pipes. Provide galvanized bolts for connection.

The minimum gauge or wall thickness shall correspond to the size of casing selected from the following. However, the Contractor shall be responsible for selecting the gauge consistent with his operation:

Diameter Inches	AASHTO M 36 Corrugated Metal Pipe U.S. Standard Gauge	Smooth Steel Pipe Minimum Thickness
15-24	12	1/4 ASTM A 53
30-36	10	5/16 AWWA C201
48-78	8	Not allowable

Jacked casings shall be equipped with nipples at the spring line and crown at 10-foot centers for pressure grouting.

GROUT

Grout for filling the annular space between the carrier pipe and casing pipe shall be proportioned 1 part portland cement, 5 parts sand, 7 parts pea gravel (by volume), or equal by the Engineer.

STAINLESS STEEL BANDS

One-half-inch wide by 0.020-inch thick, 304 stainless steel bands, or equal.

SEALS AND SUPPORTS

Seals and supports shall be of No. 2 western red cedar graded in accordance with the WWPA Current Grading Rules for Western Lumber.

PAVEMENT REPLACEMENT

Materials shall conform to requirements of Section SURFACE RESTORATION.

PIPE BRACKETS

Clamps, brackets, piperollers and rods as shown on Drawings.

PIPE INSULATION

Protective insulation as shown on Drawings.

C. WORKMANSHIP

GENERAL

Prior to the start of the work, submit satisfactory evidence to the Engineer that all insurance coverage requirements called for by the Permitter have been complied with. All proposed construction methods and materials for the undercrossing shall be approved by the Engineer and Permitter prior to the crossing operation, and no construction shall be started until written approval to proceed from the Permitter has been submitted to the Engineer.

The Contractor shall submit his proposed methods for constructing the bridge crossings for the Engineer's review prior to start of construction. The submitted information shall include the method for reaching and setting the bridge section and pipe brackets.

PAVEMENT REMOVAL

Cut all pavement to be removed with approved pneumatic or powered tools. Remove all excavated pavement from site. Open no more than 1/2 paved width at one time. Provide two-way traffic at end of each day's work.

TRENCH EXCAVATION AND BACKFILL

Conform to the applicable portions of Section TRENCH EXCAVATION AND BACKFILL. Compact Class D backfill for full depth of trench with approved mechanical tampers to 95 percent maximum density as determined by AASHTO T 99.

CASING OR TUNNEL LINER

Size of casing or tunnel liner shall be large enough to provide sufficient working space to properly install the sewer pipe to lines and grades shown. Jacked or bored casings shall be continuously welded at joints for a rigid, watertight encasement. Install tunnel liner plate in strict conformance with manufacturer's recommendations.

UNCASED PIPE

Provide gravel base under all pipe within limits of crossing. Base and pipe installation to conform to Section PRESSURE PIPE, including hydrostatic testing and line and grade.

When tongue-and-groove jacked uncased pipe is used, pneumatically grout joints from the inside after the pipe has been jacked. Grout with a machine similar to the gunite machine or Nicholson grouting machine, or equal. Apply grout continuously until the joint is full. Cut off excess mortar flush with the inside of the pipe with a trowel or other approved tool. Remove all excess mortar and waste material from the grouting from the pipe. The finished joint shall be watertight and capable of withstanding all internal and external pressures without leakage.

CASED OR TUNNELED PIPE

Where timber cradles are shown, provide strapped timber cradle under barrel of pipe, join pipe, and slide into casing. Pipe barrel shall bear continuously on cradles.

Pipe installation to conform to applicable portions of Section PRESSURE PIPE, including hydrostatic or air testing and line and grade.

PLACING FILL IN CASING

Where indicated on the Drawings, fill the annular space between the casing, tunnel liner, or tunnel wall and the pipe completely with lean grout or sand to prevent pipe flotation during high water. Accomplish grout filling by pouring or pumping the grout from the two ends and such intermediate points as may be necessary. Grouting, once commenced at any one point, shall be completed without stopping. Suitable low pressure grouting equipment, having capacity to deliver grout under pressure of up to 5 pounds per square inch, will be approved by the Engineer. Accomplish sand filling by similar methods using a gunite machine for blowing, or other approved equipment.

Dispose of excess excavated material as approved by the Engineer.

PLACING CONCRETE SEALS AT ENDS OF CASING

After the pipeline has been tested and approved, construct a wood form at the ends of the casing and pour minimum 6-inch-thick concrete plugs as shown. Work the concrete around the pipe so that the plug will provide a tight seal.

CONCRETE CLOSURE COLLARS

Clean surfaces of pipe and wet surfaces prior to pouring collars. Cover joint with light-gauge sheet metal or building felt. Make collar in one pour and extend minimum of 6 inches on each side of joint and around the outside diameter of the pipe. Cure in approved manner.

TEMPORARY PAVEMENT

Should weather conditions or other factors prevent immediate repaving, apply a temporary approved cold patch for the full trench width and maintain until such time as the final asphalt surface course can be completed. Temporary pavement shall only be used on open cut highway crossings with the approval of the Permitter.

PAVEMENT REPLACEMENT

All work in connection with the pavement replacement shall be done in strict accordance with the Permitter's standard specification, and the completed work must be acceptable to the agency having jurisdiction over the highway.

ASPHALT CONCRETE PAVEMENT

Prime prepared existing asphalt surfaces to be bonded. Following placing of the prime coat, lay two 2-inch hot-plant-mix bituminous surface courses in compliance with the applicable sections of the Permitter's standard specifications.

GRAVEL SHOULDERS

Gravel for shoulders shall be 3/4-inch minus crushed rock conforming to IMPORTED PIPE BASE AND IMPORTED PIPE ZONE MATERIAL, Section PRESSURE PIPE. Resurface all disturbed gravel shoulders with 2 inches of crushed rock.

CONTRACTOR'S RESPONSIBILITY

The Contractor shall be fully responsible for settlement or deterioration of the finished highway crossing pavement until a period of 1 year after final acceptance by the Owner.

The Owner will withhold final payment for this project until the Contractor furnishes a satisfactory release from the railroad company stating that all claims for labor and materials have been satisfied and that the Contractor's work across the right-of-way has been completed to the satisfaction of the railroad company.

D. PAYMENT

Payment for the crossings will be based upon the lump sum price stated in the Contractor's Proposal for each crossing. Payment on the lump sum basis shall constitute full compensation for all labor, materials, and equipment required to complete the installation, within the limits shown including connection to the Leachate system. No additional payment for trench excavation and backfill, for furnishing and placing

pipe, or for any other items will be made within the limits of the crossings as shown on the Drawings. Payment to the Contractor for any services provided by the Permitter shall also be included in this item.

Should the limits of any crossing be increased or decreased for any reason during construction, the lump sum payment for the crossing will be adjusted by a negotiated amount and a Change Order issued in accordance with the provisions of the SPECIAL SPECIFICATIONS.

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BDI009

02232 PREPARATION OF SUBGRADE

A. SCOPE

This section covers the work necessary for the preparation of the subgrade, complete.

GENERAL

The subgrade will be considered as those areas and surfaces upon which crush rock base course or crushed rock surfacing are to be placed.

All underground work contemplated in the area of the subgrade shall be completed and properly backfilled before subgrade work is started.

These Specifications are to be used in conjunction with requirements in those sections of the Specifications having to do with specific types of base materials and pavements.

B. MATERIALS

EXCAVATION AND EMBANKMENT

Conform to Section EARTHWORK.

EQUIPMENT

Furnish all necessary equipment required to accomplish the excavating, shaping, grading and rolling, and compaction specified herein.

C. WORKMANSHIP

SUBGRADE

Excavate and shape subgrade to line, grade, and cross section. Roll subgrade with an approved roller until the top 6 inches is compacted to 100 percent of maximum density at optimum moisture content as determined by AASHTO T 99. Remove all soft or otherwise unsuitable material disclosed by the rolling and replace with suitable material from the excavation, as directed. Fill holes and depressions, which develop under the roller, to the required grade and cross sections with material from the excavation. The finished subgrade shall be within a tolerance of plus or minus 0.08 of a foot of the grade and cross section shown, and shall be smooth and free from irregularities and at the specified density. The subgrade shall be considered to extend over the full width of the crushed rock surfacing or base course, as applicable. Compaction shall extend 1 foot beyond the edge of paving, curb, or form.

PROTECTION OF SUBGRADE

After preparing the subgrade as above specified, all unnecessary traffic shall be kept off. Should it be found necessary to haul over the prepared subgrade, the Contractor shall drag and roll the traveled way as frequently as may be necessary to remove ruts, cuts, and breaks in the surface. All cuts, ruts, and breaks in the surface of the subgrade that are not removed by the above operations shall be raked and hand tamped. All equipment used for transporting materials over the prepared subgrade shall be equipped with pneumatic tires.

Continued use of sections of prepared subgrade for hauling, so as to cut up or deform it from the true cross section, will not be permitted. The Contractor shall protect the prepared subgrade from both his own and public traffic.

The subgrade shall be maintained in the finished condition until the first succeeding course is placed.

D. PAYMENT

When any work described in this section is required but no item of payment is provided therefor in the Proposal, the work required shall be considered as incidental to the construction and all costs thereof shall be included by the Contractor in other pay items of the Contract.

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BDI010

02240 SEEDING, EROSION CONTROL AND STABILIZATION

A. SCOPE

This section covers work necessary for seeding, erosion control and stabilization of soil following construction, in the areas designated on the Drawings. The work shall include the furnishing and delivery of all required materials, miscellaneous construction work, and seeding. No allowance will be made for any seeding outside the construction easement. The Contractor shall be responsible for any damage to vegetation outside the permanent and construction easement and shall repair damage as directed by the Engineer at no additional cost to the Owner.

For bidding purposes, the areas requiring seeding are indicated on the Drawings. The right is reserved to modify the use, location, and quantities of the areas during construction as the Engineer considers to be in the best interest of the Owner. During construction, the Engineer will designate the extent of seeding, erosion control and stabilization to be used in each location throughout the project.

B. MATERIALS

TOPSOIL

STOCKPILED TOPSOIL

Topsoil from stockpiles shall be free from unwanted plant life and all material deleterious to plant life, and free from all objects over 2 inches in any one direction.

IMPORTED TOPSOIL

Imported topsoil shall be a natural, friable soil, representative of productive soils in the vicinity. It shall be obtained from well-drained areas, free from admixture of subsoil and foreign matter and objects larger than 2 inches in diameter, toxic substances, and any other deleterious material which may be harmful to plant growth and be a hinderance to grading, planting, and maintenance operations.

SEED

Seed shall be clean, delivered in original unopened packages and bearing an analysis of the contents. Guaranteed 95 percent pure with minimum germination rate of 85 percent.

SUMMER SEED MIX

Summer seed mix shall be mixed in the following proportions:

SPECIES	PROPORTION BY WEIGHT
Pennlawn creeping red fescue	20 percent
Pennfine perennial ryegrass	10 percent
Common (annual) ryegrass	10 percent
Astoria colonial bentgrass	5 percent
Alta tall fescue	15 percent
Cascade birdsfoot trefoil	10 percent
Subterranean clover	5 percent
Intermediate wheatgrass	15 percent
New Zealand white clover	10 percent

WINTER PROTECTIVE SEED MIX

Winter protective seed mix shall be 100 percent Winter Barley.

FERTILIZER

Fertilizer shall be commercial, chemical type, uniform in composition, granular, dry, free-flowing, delivered in original bags, conforming to state and federal laws, and suitable for application with equipment used.

Fertilizer shall have the following minimum percentages of available plant food:

For summer seed mix, 20 percent nitrogen, 10 percent phosphoric acid, and 5 percent potash.

For winter seeding, 20 percent nitrogen, 10 percent phosphoric acid, and zero percent potash.

FIBER MULCH

Fiber mulch shall be a specially processed cellulose fiber containing no growth or germination-inhibiting factors. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous slurry. When sprayed on the ground the material shall allow absorption and percolation of moisture. Each package of the cellulose fiber shall be marked by the manufacturer to show the air dry weight content. Grass Mulch, Silva-Fibre, or approved.

STRAW MULCH

Straw shall be threshed straw of oats, wheat, or rye, free from seed or obnoxious weeds, or clean salt hay. Average stalk length shall be 6 inches.

INOCULANT

Pure culture of nitrogen-fixing bacteria prepared specifically for the species. A mixing medium, as recommended by the manufacturer, shall be used to bond the inoculant to the seed. Inoculation shall be done no earlier than 48 hours before seeding.

TREE PAINT

Tree paint for repairing damage to existing vegetation shall be waterproof, asphalt-base paint with antiseptic properties, manufactured for use on tree wounds.

TACKIFIER

Tackifier shall be an emulsified asphalt meeting the requirements for Type SS. 1 of the Specification for Emulsified Asphalt, AASHTO M140. CSS-1 as manufactured by Chevron Asphalt Company, or approved.

SOIL EROSION NETTING

Soil erosion netting shall be heavy-duty jute or hemp netting, or 20 mil polypropolene netting with approximately 1/2-inch or 3/4-inch mesh. Staples shall be minimum 9-inch length - 10-gauge steel wire. Stakes shall be notched wooden stakes, 1/2-inch by 1-inch by 18-inch, or 18-inch hooked rebar, as approved by the Engineer.

C. WORKMANSHIP

SUBMITTALS

Contractor shall submit to Engineer certificates of inspection of seed by state or federal authorities and copies of delivery invoices or other proof of quantities of seed, mulch, and fertilizer.

The Contractor shall give at least 3 days notice to the Engineer of the time and place of starting the following operations:

1. Delivery of materials.

2. Soil and seed bed preparation.

3. Planting of grass.

4. Placement of netting, straw mulch, and tackifier.

The Contractor shall keep the Engineer advised of his scnedule of operations.

SEEDING SCHEDULE

Seeding shall be performed in accordance with the following schedule, subject to adjustment by the Engineer. In no case shall any 500 linear foot section of completed dike be allowed to remain more than 2 days without beginning seeding and stabilization operations.

SUMMER SEEDING

No earlier than April 1st and no later than October 15th.

When seeding occurs between May 1 and August 14, the Contractor shall take extra care to water often enougn to ensure satisfactory germination and to maintain growth until tne seedings are fully established.

WINTER PROTECTIVE SEEDING

October 16th or after.

SEEDING

SOIL PREPARATION

Prior to seeding operations, and after surface has been shaped, graded and compacted to finish grade, scarify surface to a minimum depth of one inch.

Where seeding is indicated to be performed on the granular slope protection material as specified on the Drawings, spread a minimum 2-inch layer of topsoil from stripping stockpile over the entire area - compacted measurements.

SEED BED PREPARATION

All seed beds shall be a minimum depth of one inch. Foreign materials and rock over 2-inches in diameter brought to the surface by seed bed preparation shall be removed prior to seeding, except in the granular slope protection material areas. Seed beds shall be approved by the Engineer prior to seeding.

SUMMER SEEDING

After soil has been scarified, apply summer seed mix by hydro-seeding method to the entire disturbed area on the outside of the dike. Prepare and apply slurry at the rate and proportion specified below:

Summer Seed Mix	50 lbs/acre
Fertilizer	400 lbs/acre
Fiber Mulch	1500 lbs/acre
Water	As necessary

WINTER PROTECTIVE SEEDING

Prepare seedbeds as directed by the Engineer.

Seed entire disturbed area on the outside of the dike with winter seed mix by hydro-seeding method. Prepare and apply slurry in the following proportions and rates:

Winter protective seed mix	50 lbs/acre
Fertilizer	400 lbs/acre
Fiber Mulch	1500 lbs/acre
Water	As necessary

EROSION CONTROL AND SLOPE STABILIZATION

Immediately upon completion of seeding operations on any segment, begin operations for erosion control or slope stabilization, as determined by slope.

EROSION CONTROL

Place soil erosion netting flat over all seeded areas where slopes are 3 to 1 or less. Place in single thickness strips paralleling the direction of drainage.

Netting shall be held in place by wooden stakes or rebar at all 4 corners of each strip and at 4-foot centers along each edge of the strip. In addition, staples will be required along lapped edges of netting in accordance with manufacturer's recommendations. Staples shall not be substituted for stakes.

SLOPE STABILIZATION

Where slopes are greater than 3 to 1, apply straw mulch to a reasonably uniform thickness of 1-1/2 inches to 2-1/2 inches in depth. Mulch shall be loose enough to permit penetration of sunlight and air circulation, but dense enough to shade ground, reduce evaporation rate and prevent or materially reduce erosion of underlying soil. Retain straw in place by applying tackifier at a rate of 100 gallons per acre.

REPLANTING OF WINTER PROTECTIVE SEEDING AREAS

All completed dike areas seeded with winter protective seed mix shall be re-scarified and reseeding with summer seed mix during the next planting season. Replanting shall meet all the requirements as specified.

MAINTENANCE

Contractor shall regularly maintain all seeding areas by performing the following operations: watering as often as required to ensure satisfactory germination and growth until grass is established, replacing of mulch, replacing and restaking of netting, replacing and tackifying of straw mulch, and refilling, resnaping, reseeding, mulching and netting of areas subjected to erosion damage. When watering, care shall be taken not to cause erosion in seeding areas. Correct all damage to existing vegetation, or as directed by the Engineer.

INSPECTION FOR ACCEPTANCE

Eight weeks after the start of maintenance on the last section of completed grass, and on written notice from the Contractor, the Engineer will, within 15 days of such written notice, make an inspection of the grass to determine if a satisfactory stand of grass has been produced. If a satisfactory stand of grass has not been established, another inspection will be made after written notice from the Contractor that the grass is ready for inspection following the next growing season.

If a satisfactory stand of grass has not been produced, the Contractor shall renovate and reseed the unsatisfactory portions thereof immediately. If a satisfactory stand of grass develops by 1 July of the following year, the grass will be accepted. If the grass is not accepted, a complete replanting will be required during the planting season meeting all of the requirements specified under SEEDING AND STABILIZATION.

A satisfactory stand is defined as a section of summer seed mix grass that has:

No bare spots larger than 3 square feet.

Not more than 10 percent of total area with bare spots larger than 1 square foot.

Not more than 15 percent of total area with bare spots larger than 6 inches square.

D. PAYMENT

GRASS

Payment for establishment of grass will be made on the basis of the unit price per 100 square feet as stated in the Contractor's Proposal. Payment will be made on the basis of field measurements by the Engineer to the nearest 50 square feet of grass area.

WINTER PROTECTIVE SEEDING

Payment for winter protective seeding will be made on the basis of the unit price per 100 square feet as stated in the Contractor's Proposal. Payment will be made on the basis of field measurements by the Engineer to the nearest 50 square feet of grass area.

EROSION CONTROL

Payment for erosion control shall include only the additional cost of furnishing and applying the soil erosion netting. Payment will be based on the unit price per 100 square feet as stated in the Contractor's Proposal. Payment will be made on the basis of field measurements by the Engineer.

SLOPE STABILIZATION

Payment for slope stabilization shall include only the additional cost of furnishing and applying the straw mulch and nontoxic bituminous material. Payment will be based on the unit price per 100 square feet as stated in the Contractor's Proposal. Payment will be made on the basis of field measurements by the Engineer.

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BDI011

02431 STORM DRAINAGE SUMPS AND PUMPS

A. SCOPE

This section covers the work necessary for the storm drainage sumps and pumps, complete.

B. MATERIALS

CONCRETE

Concrete shall be ready-mixed, conforming to ASTM C 94, Alternate 2. Compressive field strength shall be not less than 2,500 psi at 28 days. Maximum size of aggregate shall be 1-1/2-inch. Slump shall be between 2 and 4 inches. Field strength shall be assumed as equal to 85 percent of the strength of laboratory-cured cylinders.

FORMS

Exposed surfaces shall be plywood, others shall be steel, matched boards, plywood, or other approved material. Form all vertical surfaces. Provide fillets on reentrant angles. Trench walls, large rock, or earth will not be approved form material.

MORTAR

Standard premixed mortar conforming to ASTM C 387, Type S, or proportion 1 part portland cement to 2 parts clean, well-graded sand which will pass a 1/8-inch screen. Admixtures may be used not exceeding the following percentages of weight of cement: Hydrated lime, 10 percent; diatomaceous earth or other inert materials, 5 percent. Consistency of mortar shall be such that it will readily adhere to the concrete.

STORM WATER PUMPS

Storm water pumps shall be 460V, 3-phase, 3 wire, 4-inch submersible pump with a rated horsepower of 8.2. The pump shall have 25 feet of Type SO power cable. The pump shall be a Model B-2102 as manufactured by Flygt of Norwalk, CT or approved equal.

PUMP CONTROLS

The pump controls shall have two liquid level sensors with 20 feet of Type SO cable, NEMA 3, 16-gauge control unit, NEMA 4 cast aluminum junction box, 50 of Type SO drop cable and suitable for operation on a 480 volt service. The pump controls shall be a Model 8.408 portable pump level control as manufactured by Flygt of Norwalk, CT or approved equal.

PUMP DISCHARGE PIPING

Pump discharge piping shall be a 6-inch flexible four-ply rubber hose, or approved square.

C. WORKMANSHIP

EXCAVATION AND BACKFILL

As specified in applicable portions of Section EARTHWORK.

CONSTRUCTION OF CATCH BASINS

Construct sumps at the locations shown and in accordance with the Drawings. Construct forms to the dimensions and elevations required. Forms shall be tight and well braced. Chamfer corners of forms.

Prior to placing the concrete, remove all water and debris from the forms. Moisten forms just prior to placing the concrete. Handle concrete from the transporting vehicle to the forms in a continuous manner as rapidly as practical without segregation or loss of ingredients. Immediately after placing, compact concrete with an approved mechanical vibrator. Limit the duration of vibration to the time necessary to produce satisfactory consolidation without causing segregation.

Screed the top surface of exposed slabs and walls. When the initial water has been absorbed, float the surfaces with a wood float and lightly trowel with a steel trowel to a smooth finish free from marks or irregularities. Finish exposed edges with a steel edging tool. Remove forms and patch any defects in the concrete with mortar mixed in the same proportions as the original concrete mix.

Cure concrete by preventing the loss of moisture for a period of 7 days. Accomplish with an approved membrane-forming curing compound. Apply the curing compound immediately after removal of forms or finishing of the slabs. Protect concrete from damage during the 7-day curing period.

CLEANING

Upon completion, clean each structure of all silt, debris, and foreign matter and install storm water pump and test the pumps and controls.

D. PAYMENT

STORM DRAINAGE SUMPS

Payment for storm drainage sumps will be made at the unit price per storm drainage sump stated in the Contractor's Proposal for the number of storm drainage sumps satisfactorily constructed. This price shall constitute full compensation for all work required for the construction of the storm drainage sumps, complete.

STORM WATER PUMPS

Payment for storm water pumps will be made at the unit price per storm water pump as stated in the Contractor's Proposal. This price shall constitute full compensation for the pumps and pump controls installed, complete.

PUMP DISCHARGE PIPING

Payment for pump discharge piping will be made at the unit price per linear foot stated in the Contractor's Proposal for pump discharge piping installed, complete.

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BDI013

02503 LEACHATE DRAIN SYSTEM

A. SCOPE

This section covers the work necessary for the leachate drain system, complete.

B. MATERIALS

PIPE FOR LEACHATE DRAINS

Pipe and fittings shall be heavy-duty corrugated polyethylene tubing of the diameter indicated conforming to ASTM F405-76. Where shown on the Drawings the pipe will be slotted. Slotted pipe shall have a minimum of three rows of slots, with each row 120 degrees apart. Slots will be between 0.10 and 0.05-inch wide and between 1.0 and 1.25 inches long, arranged circumferentially around the pipe. The pipe will have between 22 and 30 slots per foot. Slots shall be smooth, clean, and clear of plastic debris. Suggested manufacturer is Advanced Drainage Systems (ADS) or equal.

GRANULAR DRAIN MATERIAL AROUND LEACHATE DRAIN PIPE

As specified in Section EARTHWORK.

C. WORKMANSHIP

INSTALLATION OF PIPE

PREPARATION OF PIPE PRIOR TO INSTALLATION

Inspect all pipe and fittings before lowering into the prepared trench to insure that no cracked, broken, or defective pipe or fittings are being used in the work. Clean the ends of the pipe thoroughly with a brush or other approved means. Remove foreign matter and dirt from the inside of the pipe. Insure that the pipe is free from any projections which would interfere with the assembly of the joint.

HANDLING

Provide and use proper implements, tools, and facilities for the safe and proper protection of the work. Install all pipe in such a manner as to avoid any physical damage to the pipe. Reject all damaged pipe and remove from the jobsite.

LINE AND GRADE

The leachate drain pipe shall be laid on a prepared bed at granular drain material. Maximum deviation from true line or grade, as established by the Engineer, shall not exceed 2 inches for line and 1/4 inch for grade.

PLACING OF GRANULAR DRAIN MATERIAL AROUND LEACHATE DRAIN PIPE

As specified in Section EARTHWORK. Place granular drain material around the pipe without displacing the pipe beyond the allowable deviations from true line and grade.

CLEANOUTS

Cleanouts shall be constructed according to the details shown on the Drawings.

D. PAYMENT

LEACHATE DRAIN

Payment for leachate drain will be based on the unit price per linear foot stated in the Contractor's Proposal for leachate drain and the number of linear feet installed as shown or as directed by the Engineer. This payment will constitute full compensation for all work specified herein.

CLEAN OUTS

Payment for clean outs will be based on the unit price per clean out stated in the Contractor's Proposal and the number of cleanouts installed according to the Drawings and Specifications.

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BDI015

02602 CRUSHED ROCK BASE COURSE, LEVELING COURSE, AND SURFACING

A. SCOPE

This section covers the work necessary for constructing the crushed rock base course, leveling course, and surfacing, complete.

B. MATERIALS

Materials for crushed rock base course, leveling course, and surfacing shall conform to aggregate for aggregate base of Section 703 of the Standard Specifications for Highway Construction, State of Oregon, except as modified herein.

Twenty days prior to the time the materials will be required in the work, all tests necessary for the Contractor to locate an approved source of materials shall be made by the Contractor, and certified copies of the test results from an approved laboratory shall be furnished to the Engineer. Final approval of the aggregate material will be based on tests of material taken from the compacted base course.

The Contractor will be responsible for furnishing satisfactory materials that meet the Specifications and shall make such tests during the course of the work as are necessary to assure that the quality of the material used meets the Specifications.

CRUSHED ROCK BASE COURSE

Base course shall meet the grading requirements of 1-1/2-inch to zero base aggregates as specified in Section 703.07(e) of the Standard Specification for Highway Construction, State of Oregon.

CRUSHED ROCK LEVELING COURSE

Leveling course shall meet the grading requirements of 3/4-inch to zero base aggregates as specified in Section 703.07(e) of the Standard Specifications for Highway Construction, State of Oregon.

CRUSHED ROCK SURFACING

Crushed rock surfacing shall meet the grading requirements of 3/4-inch to zero base aggregates as specified in Section 703.07(e) of the Standard Specifications for Highway Construction, State of Oregon.

C. WORKMANSHIP

CONSTRUCTION OF BASE COURSE AND LEVELING COURSE

Obtain approval of the subgrade by the Engineer prior to placing any base course material on the subgrade. Workmanship in manufacturing, placing, and maintaining base or leveling course shall be in conformance with the requirements of the Standard Specifications for Highway Construction of the Oregon State Highway Department, except as modified herein.

Construct base course in one lift such that when compacted to the specified density, the finished surface will conform to the grades and dimensions shown, with proper allowance for the leveling course and the asphalt concrete paving.

Place the leveling course on the prepared base course to such a depth that when compacted, the finished surface will conform to the grades and dimensions shown, with proper allowance for the asphalt concrete paving.

SHOULDERS

Shoulders shall be constructed in the manner shown, material used shall conform to the same Specifications, and method for payment as like materials used and processed in the roadway itself.

SPREADING MATERIALS

Spreading of the first course of base shall begin at points nearest from the point of loading and each successive course shall begin at points farthest from the point of loading. Each course shall be constructed continuously from the beginning point of the course, unless otherwise directed by the Engineer.

The surfacing, keystone, and base may be spread by any method that will result in an even distribution of the material upon the roadway without perceptible separation in gradation. The method of spreading and the field operation shall be satisfactory to the Engineer at all times.

Should there occur during any stage of the surfacing or stockpiling a separation of the coarser from the finer materials causing serious lack of uniformity in the grading, the Contractor shall immediately make changes in the method of handling such as will prevent separation and meet approval of the Engineer.

Equipment such as scrapers and other equipment essentially used for earth excavation will not be permitted.

ROLLING

Compaction of each layer of base shall begin as soon after spreading operations as practicable and shall continue until a density of 80 percent of the relative maximum density determined by ASTM D 2049-70 has been achieved.

All rolling shall commence at the outer edges of the surfacing and continue toward the center. Under no circumstances shall the center of the road be rolled first.

Compaction equipment shall be adequate in design and number to provide compaction and obtain the specified density for each layer while still moist. Water shall be applied as needed to obtain the specific densities at no cost to the Owner.

Field in-place density tests on the finished compacted base will be taken in accordance with AASHTO T 191, T 205, or T 238 as approved by the Engineer.

Each layer of base course shall be placed and compacted to the specified density before a succeeding layer is placed.

The Contractor shall construct the base course in an orderly manner so that reasonable size areas will be ready for testing and a reasonable length of time will be allowed for the Engineer to perform tests and obtain the test results during normal working hours.

Prior to requesting the Engineer to test any completed base course, the Contractor shall show reasonable proof that the completed section meets the requirements specified.

LOADING AGGREGATE FROM STOCKPILE

The use of dragline equipment to transport the aggregate from stockpiles to elevators or other loading devices will not be permitted.

HAULING

Hauling shall be distributed over the roadway in such a manner as to be most effective in the compacting of the surfacing. Hauling over any of the surfacing in process of construction will not be permitted when, in the opinion of the Engineer, the effect will be detrimental. All loads shall be of uniform capacity when it is practicable.

CORRECTION OF SURFACE DEFECTS

Should irregularities develop in any surface during or after rolling, they shall be remedied by loosening the surface and correcting the defects, after which the entire area, including the surrounding surface, shall be rerolled until thoroughly compacted. The finished surface shall be true to the proper grade and crown before proceeding with the surfacing.

FLOATING OR LOOSE STONE

Before placing the leveling course, the preceding course shall be properly bound up and all floating or loose stone shall be removed from the surface.

HOURS OF WORK

When necessary to complete the project within the time specified, work may be undertaken during the hours of darkness provided the Contractor furnishes and operates during such period, an adequate and effective artificial lighting apparatus to insure that all work undertaken can be carried on satisfactorily in the manner contemplated by the Specifications.

UNFAVORABLE WEATHER

When, in the opinion of the Engineer, the weather is such that satisfactory results cannot be secured, the Contractor shall suspend operations until the weather is favorable. No surfacing materials shall be placed in the snow or on a soft, muddy, or frozen subgrade. The Owner shall not be liable for damages or claims of any kind or description by reason of suspending operations under directions of the Engineer.

PATROLLING

All surfacing in progress of construction shall be bladed and otherwise worked as may be necessary to maintain the proper grade and cross section at all times, and to keep the surface smooth and thoroughly compacted. The cost of any or all of the above work shall be included in the prices bid for the surfacing materials involved.

CONSTRUCTION OF COURSES

Whenever practicable, any one course shall be completed in advance of laying the succeeding one. Any one course shall be completed as much in advance of the succeeding course as is practicable for good results and adequate inspection. The spread of any one course before another course is added shall be as much distance as is practicable under the circumstances, subject to the direction of the Engineer. Each layer shall be spread and compacted. The completed layer shall have a smooth, tight, and uniform surface reasonably true to the line, grade, and cross section shown on the Drawings.

SURFACE TOLERANCES

The finished surface of the base course and leveling course at any individual point shall be within plus or minus .04 foot of the grade shown on the Drawings.

CRUSHED ROCK SURFACING

Construct crushed rock surfacing as specified herein for base and leveling course, except the finished thicknesses shall be as shown.

FINAL CLEANUP

After the work is completed, the entire area shall be neatly finished and trimmed to the lines, grades, and cross sections shown. All material shall be removed, and all stockpile areas shall be cleaned of all aggregate and left in an acceptable condition.

D. PAYMENT

Payment for the base course and leveling course, gravel surfacing, and all work specified and connected therewith will be made at the respective unit prices per square yard stated in the Contractor's Proposal. The quantity to be paid for at each price shall be the number of square yards actually furnished and incorporated in the work, in accordance with the Specifications and as directed by the Engineer. This payment shall constitute full compensation for all work as specified herein.

The quantities of materials to be paid for shall be determined by measurement of the materials in place in the roadway.

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BDI016

02612 ASPHALT CONCRETE PAVEMENT

A. SCOPE

This section covers the work necessary for the asphalt concrete pavement, complete.

B. MATERIALS

ASPHALT CONCRETE

Asphalt concrete shall be Class B, conforming to the Standard Specifications for Highway Construction of the State of Oregon.

AGGREGATE

Aggregate shall meet the requirements of Section 703 of the referenced specification, except as modified and supplemented hereinafter.

All tests necessary for the Contractor to locate an approved source of aggregate shall be made by the Contractor, and certified copies of the test results from an approved testing laboratory shall be furnished to the Engineer. Approval of the source of the aggregate does not relieve the Contractor in any way of the responsibility for delivery at the jobsite of aggregates that meet the requirements specified herein.

ASPHALT CEMENT

The asphalt cement to be mixed with the mineral aggregates at the central plant shall be AR8000 conforming to the requirements of Section 702 of the referenced specifications. Tests necessary to determine conformance with the requirements specified shall be the responsibility of the Contractor. Test results performed by a recognized testing laboratory shall be submitted by the Contractor to the Engineer for approval prior to the use of the material in the work.

TACK COAT

Tack coat shall conform to Section 702 of the referenced specification.

C. WORKMANSHIP

PREPARATION OF ROADWAY

PREPARATION OF ASPHALT SURFACES

Before construction of an asphalt concrete pavement on an existing surface, all fatty asphalt patches, grease drippings, and other objectionable matter shall be entirely removed from the existing pavement. All excess asphalt joint filler shall be completely removed and all premolded joint filler shall be removed to at least

1/2 inch below the surface of the existing pavement. All types of existing pavement or bituminous surfaces shall be thoroughly cleaned by sweeping to remove dust and other foreign matter.

A tack coat of asphalt applied at the rate of .05 to .12 gallon per square yard shall be applied uniformly to all surfaces on which any course of asphalt concrete is to be placed, unless its omission is specifically directed by the Engineer.

The tack coat shall be a heated cutback asphalt, or emulsified asphalt, as directed by the Engineer. The emulsified asphalt may be mixed with water at the rate of 1 to 2 parts water to 1 part of emulsified asphalt, as directed by the Engineer.

When asphalt concrete pavement is to be constructed over an existing paved or oiled surface, in addition to the preparation as outlined hereinbefore, all holes and small depressions shall be filled with an appropriate class of asphalt concrete mix by hand shoveling. The surface of the patched area shall be leveled and compacted thoroughly, as directed by the Engineer.

ASPHALT CONCRETE PAVEMENT

Workmanship in producing, hauling, placing, compacting, and finishing asphalt concrete shall conform to the applicable portions of the Standard Specifications for Highway Construction of the Oregon State Highway Commission, except as modified and supplemented herein.

CONNECTIONS WITH EXISTING FACILITIES

Where the bituminous pavement is to be connected with an existing roadway surface, bridge, railway crossing, or other facility, the Contractor will be required, under direction of the Engineer, to modify the existing roadway profile in such a manner as to produce a smooth riding connection to the existing facility.

Where it is necessary to remove existing asphalt surfaces or oil mat surfaces to provide proper meet lines and riding surfaces, the Contractor shall burn or chip the existing surface so that there will be sufficient depth to provide a minimum of 1 inch of asphalt concrete, and the waste material shall be disposed of to the satisfaction of the Engineer. Prior to placing the asphalt concrete, these areas shall be tacked. Meet lines shall be straight and the edges be vertical. The edges of meet line cuts shall be painted with liquid asphalt or emulsified asphalt prior to placing asphalt concrete. After placing the asphalt concrete, the meet line shall be sealed by painting with a liquid asphalt or emulsified asphalt and immediately covered with clean, dry sand.

Prior to laying the second strip of asphalt concrete pavement, the edge of the first strip laid and other contact surfaces such as curbs, manhole frames, and similar materials shall be painted with emulsified asphalt or liquid asphalt to provide closely bonded watertight joints. This work shall be done in a manner that will prevent staining adjacent surfaces not intended to be coated.

CONSTRUCTION OF COURSES

The asphalt concrete pavement shall be constructed in one or more courses as shown on the Drawings or required in the referenced specification.

Where more than one course is specified, the first course shall include widening of the existing pavement (if specified) and leveling up of all irregularities in the surface of the existing pavement or foundation to the extent that will enable the final course to be of a uniform thickness throughout the project.

The leveling shall be to such elevation that when a uniform wearing surface is placed, the finished pavement will conform to the grade and cross section shown on the Drawings.

Longitudinal joints in the leveling and wearing courses shall be offset a minimum of 6 inches, so that one joint will not be directly over the other. In construction of two-lane pavement, the longitudinal joints shall be offset in such a manner that the longitudinal joint in the wearing course will coincide with the centerline of the pavement.

COMPACTION

Rolling shall continue until all roller marks are eliminated and a density of 92 percent of the measured maximum density determined in accordance with ASTM D 204 has been obtained.

SURFACE TOLERANCE

Tests for conformity with the specified crown and grade shall be made by the Contractor immediately after initial compression. Any variation shall be immediately corrected by the removal or addition of materials and by continuous rolling.

The completed surface of the top or wearing course shall be of uniform texture, smooth, uniform as to crown and grade, and free from defects of all kinds. The completed surface shall not vary more than 1/8-inch from the lower edge of a 10-foot straightedge placed on the surface parallel to the centerline. The transverse slope of the completed surface shall vary not more than 1/4-inch in 10 feet from the rate of transverse slope shown on the Drawings. The finished grade shall not vary more than .02 from that indicated on the Drawings.

After completion of the final rolling, the smoothness and grade of the surface shall again be tested by the Contractor.

When deviations in excess of the above tolerances are found, the pavement surface shall be corrected by the addition of asphalt concrete mixture of an appropriate class to low places or the removal of material from high places by methods satisfactory to the Engineer, or by removal and replacement of the wearing course of asphalt concrete. Correction of defects shall be carried out until there are no deviations anywhere greater than the allowable tolerances.

All areas in which the surface of the completed pavement deviates more than twice the allowable tolerances described above shall be removed and replaced to the satisfaction of the Engineer.

All costs involved in making the corrections of defects described above shall be borne by the Contractor and no compensation will be made for this work.

ASPHALT CONCRETE PAVEMENT REPLACEMENT

SUBGRADE

Bring the trench to a smooth, even grade at the correct distance below the top of the existing pavement surface so as to provide adequate space for the base and leveling course and pavement. Trim existing pavement to a straight line to remove any pavement which has been damaged or which is broken and unsound to provide a smooth, sound edge for joining the new pavement.

Compact the subgrade with mechanical vibratory or impact tampers. Determine the amount and method of compaction necessary to prevent subsequent settlement. Any subsequent settlement of the finished surfacing during the warranty period shall be promptly repaired by the Contractor at no cost to the Owner.

BASE COURSE

Place sufficient base course on the subgrade to obtain a thickness of 8 inches after compaction. Place for the full width of the trench and process as required to provide a smooth surface without segregation.

Compact the base course with mechanical vibratory or impact tampers. Determine the amount and method of compaction necessary to prevent subsequent settlement. Any subsequent settlement of the finished surfacing during the warranty period shall be promptly repaired by the Contractor at no cost to the Owner.

LEVELING COURSE

Place sufficient leveling course material to obtain a thickness of 4 inches after compaction, and for proper matching with the adjacent existing pavement. Place the leveling course for the full width of the trench where pavement was disturbed, including bituminous surfaced shoulders.

ASPHALT CONCRETE

Place the asphalt concrete on the prepared subgrade over the trench to a depth of not less than 4 inches or the depth of the adjacent pavement, whichever is greater, but not for more than 6 inches. If the thickness is greater than 6 inches, place the surfacing in two lifts. Spread and level the asphalt concrete with hand tools or by use of a mechanical spreader, depending upon the area to be paved. Bring the asphalt concrete to the proper grade and compact by rolling or the use of hand tampers where rolling is impossible or impractical.

Roll with power rollers capable of providing compression of 200 to 300 pounds per linear inch. Begin the rolling from the outside edge of the replacement progressing toward the existing surfacing, lapping the existing surface at least 1/2 the width of the roller. If existing surfacing bounds both edges of the replacement, begin rolling at the edges of the replacement, lapping the existing surface at least 1/2 the width of the roller, and progress toward the center of the replacement area. Overlap each preceding track by at least 1/2 the width of the roller and make sufficient passes over the entire area to remove all roller marks and to produce the desired result, as determined by the Engineer.

The finished surface of the new compacted paving shall be flush with the existing surface and shall conform to the grade and crown of the adjacent pavement.

Immediately after the new paving is compacted, all joints between new and original asphalt pavement shall be painted with hot asphalt or asphalt emulsion and be covered with dry paving sand before the asphalt solidifies.

SEAL AND COVER COAT

Apply a seal coat to all asphalt surfaces replaced. Extend the seal coat a minimum of 6 inches beyond the new pavement and onto the existing surfacing. Workmanship and application rate shall conform to the Standard Specifications for Highway Construction of the Oregon State Highway Department.

SHOULDERS

Shoulders, if required, shall be constructed to the lines, grades, and cross sections shown on the Drawings and in accordance with the Specifications for materials and construction.

UNFAVORABLE WEATHER

Asphalt concrete shall not be placed when the atmospheric temperature is lower than 40 degrees F nor during rainfall nor when the surface upon which it is to be placed is frozen, except upon written order of the Engineer.

D. PAYMENT

ASPHALT CONCRETE PAVEMENT

Payment for the asphalt concrete pavement will be made at the unit price per ton of asphalt concrete stated in the Contractor's Proposal, and shall constitute full compensation for furnishing and applying the tack coat, furnishing, laying, and compacting the asphalt concrete, and all incidental work. Measurement for payment will be based on the number of tons (2000 pounds) of asphalt concrete incorporated in the pavement, as weighed on approved and tested scales. Present trip tickets to the Engineer for his signature as the material is delivered. Each trip ticket shall show the date and time of delivery, truck number or driver's name, net weight of the material, and shall be considered

as valid delivery receipts only when signed by the Engineer.

ASPHALT REPLACEMENT

Payment for the asphalt replacement will be made at the unit price per linear foot of asphalt replacement stated in the Contractor's Proposal, and shall constitute full compensation for furnishing and applying this seal and cover coat, furnishing, laying, and compacting the asphalt concrete and all incidental work.

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BDI019

11002 PUMP STATION

A. SCOPE

This section covers the work necessary for furnishing and installing complete factory-built pump station(s). Connecting pressure lines are included under this section.

The Contractor shall include in the Proposal alternate bids from at least three pump station manufacturers and shall request each manufacturer to submit full descriptive literature to the Engineer prior to the bid opening, including pump curves indicating pump efficiency, horsepower, and head capacity relationships, pump and motor shaft diameter, all structural data including plate thickness and reinforcing, and all mechanical and electrical details.

B. MATERIALS

CONCRETE AND REINFORCING STEEL

Concrete to conform to ASTM C 94, Alternate 2, with a 28-day minimum compressive field strength of 2,500 psi. Field compressive strength shall be assumed as equal to 85 percent of the strength of laboratory-cured cylinders. Reinforcing steel shall conform to ASTM A 615, Grade 40.

PRESSURE PIPE BASE AND PIPE ZONE MATERIAL

Clean 3/4-inch-minus rock, gravel, or approved sand.

VALVE BOX

Valve box shall be a precast concrete utility vault manufactured by Utility Vault Company, Inc. of Wilsonville, Oregon or as approved.

CAST IRON PIPE AND FITTINGS

Conform to Federal Specification WW-P-421, Class 150. Flanged fittings conform to ANSI B16.1, 125-pound, and mechanical joints to ANSI A21.11. Provide all fittings and adapters as required.

EXTERIOR PLUMBING

Galvanized pipe conforming to ASTM A 120. Malleable iron, screwed fittings conforming to Federal Specification WW-P-521, Type II, galvanized. Copper to be Class K, conforming to ASTM B 88, with soldered joint fittings.

GUARD POSTS

Eight-inch, Schedule 40 pipe, conforming to ASTM A 120. Hot-dip galvanized after fabrication as shown on Drawings.

ELECTRICAL SERVICE

Shall conform to Section ELECTRICAL.

PUMP STATION

GENERAL

The station shall be a complete factory-built, wet-pit, two-pump unit, as manufactured by Flygt Corporation, or equal, with modifications as outlined herein. Station shall be built with three sections consisting of pump chamber and required entrance as shown for joining in field by bolting. Minimum pump chamber inside diameter shall be 6 feet.

PUMP CHAMBER

Construct in circular cross section with fiberglass materials. Minimum thickness as follows:

Shell and miscellaneous	1/4 inch
Top plate	3/8 inch
Bottom plate	1/4 inch

Reinforce top with channels to withstand all loads including hydrostatic uplift and foot traffic.

The pump chamber shall consist of three sections of equal diameter and height that can be bolted together in the field. The joints shall be watertight.

Submit complete detailed shop drawings for the pump chamber and entrance tube with detailed structural calculations. The calculations shall show design stresses for all members, plates, anchors, and connections for all loading conditions and critical combinations. Special design formulas shall be referenced to a source.

Provide lifting eyes or lugs suitably placed to lift chamber sections.

Where the cast iron discharge lines pass through the station walls, they shall be reinforced. The space between the cast iron pipes and the steel sleeves shall be packed tight with Kent-Seal No. 2 joint sealant or approved equal, to prevent leakage.

PUMPS

Pumps shall be submersible nonclog sewage pumps. Each unit shall be fitted with 30 feet of lifting chain of adequate strength to permit raising and lowering the pump.

Pump suction centerline elevation is 7.0 with discharge at elevation 48.

Each pump shall have a guaranteed capacity of 300 gpm at a total head of 60 feet and a speed not exceeding 1750 rpm. Each pump shall also have a capacity of approximately 500 gpm against a total head of 45 feet at a speed not exceeding 1750 rpm. Minimum motor horsepower shall be 9.4 hp.

Each pump shall be factory tested by the manufacturer for capacity, power requirement, and efficiency for each speed and specified operating head and as many other points as necessary to provide certified pump performance curves. The selected pump station manufacturer shall furnish such curves for approval prior to delivery of the station.

Provide double carbon and wide ceramic construction mechanical seal constructed so as to be readily removable from the pump shaft as a unit. The seal shall be a double mechanical seal composed of two face seals, each consisting of one fixed and one rotating tungsten-carbide ring held in contact by spring pressure. The seal shall require neither maintenance nor adjustment, and shall be easily replaced.

MOTORS

Vertical solid shaft, squirrel-cage induction type, designed, manufactured, and tested in conformance with NEMA MG 1. Motors shall be continuously rated 460-volt, 3-phase, 60-Hz, with 1.15 service factor. The connected load shall not exceed the motor nameplate horsepower rating under any anticipated operating conditions.

Motors for close-coupled pumps shall have a combination one-piece stainless steel pump and motor shaft from the top of the motor through the impeller. Each motor shall have oversized, grease-lubricated ball bearings with the thrust bearing at the bottom locked in position to eliminate shaft end play. The minimum motor pump shaft diameter for motor frame sizes 182 through 286 shall be 1-7/8 inches; for motor frame sizes 324 to 326, it shall be 2-1/8 inches; and for frame 364 and larger, it shall be 3 inches. The motor pump shaft shall be centered in relation to the motor base within .005 inch. The shaft runout shall be limited to .003 inch.

The complete unit, consisting of the motor and the pump, connected and in normal operation, shall not develop amplitudes of vibration in excess of the limits recommended by the Hydraulics Institute Standards. The pumps shall be free of cavitation over their full range of operation. The driving motor alone shall operate without vibration in excess of the limits prescribed by NEMA MG 1.

The complete unit, consisting of the motor and the pump, connected and in normal operation shall be epoxy coated to protect it from Leachate with a pH of 5.5.

PUMP CONTROLS AND CONTROL PANELS

Pump manufacturer shall supply pump control panels suitable for operating and controlling two 3-phase, 480-volt, 60-Hz, 10 hp pumps.

Pump control panels shall include the following features:

1. Lead-lag pump selector switch and automatic alternator.

2. Provision for interfacing with 5-float switch level control system.

   A. Low level alarm and automatic pump shutdown.

   B. Low level shut-off for both pumps.

   C. Lead pump start.

   D. Lag pump start.

   E. High level alarm.

   Low level alarm and high alarm shall turn on individual alarm lights mounted on the front door of the control panel and a common alarm light at a remote location. Alarms shall be provided with a manual resets.

3. Each pump shall be provided with an elapsed time meter, a green "on" light, and hand-off-automatic selector switch.

Pump control panel shall be suitable for surface mounting in a NEMA 1 enclosure. Pump control panel shall be Flyte model F-401 as modified above, or as approved.

LIGHTS

Lighting shall provide illumination for all areas in the station and control panels. The lighting shall be protected against damage and shall be controlled by the spring-operated entrance switch and a manual switch.

PIPING AND VALVES

Pump suction lines shall be 4-inch, Class 150 cast iron pipe, coated and lined with an epoxy approved by the Engineer with mechanical joint bell outside the pump chamber and with bronze-fitted, double-disc 4-inch gate valves inside the valve chamber. The discharge line from each pump shall be Class 150 cast iron coated and lined with an epoxy approved by the Engineer, and shall have flanged or mechanical joint outlet as shown. Individual discharge lines shall be minimum 4-inch and common lines shall be minimum 6-inch. Bronze-fitted, spring-loaded checks and double-disc gate valves the same size as the discharge piping shall be installed in each pump discharge line.

ELECTRICAL

The electric power and control equipment for the pump station shall be mounted in NEMA Type 1 gasketed dead-front enclosure, fabricated of not less than 12-gauge sheet steel, and provided with hinged doors complete with handles and three-point latching devices. All wiring inside the panel shall be neatly bundled, tied, and supported at regular intervals with sleeve type wire markers at each wire end. The panel shall be finished inside with two coats of white enamel and outside with two

coats of light gray enamel over a rust-inhibiting primer. The panel shall be Autocon Plan-Pak, or equal.

The panel construction and all interior and exterior wiring and equipment wiring shall be in strict accordance with the National Electrical Code, state and local codes, and in conformance with applicable specifications of NEMA, ANSI, UL, and IPCEA. Circuit breakers, externally operable, dead-front type, shall be provided for each motor branch circuit, control circuits, and auxiliary power and lighting circuits.

Panel shall be suitable for operation from 480-volt, 3-phase, three-wire delta power supply. Provide transformer to serve 120-volt loads.

Panel shall be suitable for 120/240-volt, single-phase, three-wire service.

Magnetic motor controllers shall have thermal overload protection in all phases and shall be full voltage auto-transformer.

An automatic alternator with manual ON/OFF selector switch shall be provided to change the sequence of operation of the pumps on the completion of each pumping cycle. Provisions shall be made for the standby pump to operate in parallel with the base pump should the level in the wet well continue to rise above the starting level for the base pump and for shutdown of the standby pump prior to the base pump, with a falling level in the wet well as shown on the Drawings.

Conductors up to and including No. 8 AWG shall have thermoplastic insulation Type TW. Conductors No. 6 AWG or larger shall have Type THW insulation. All wiring outside station shall be minimum No. 12 AWG.

FACTORY TEST

The completed pump station shall be given an operation test or all equipment at the factory to check for excessive vibration, for leaks in all piping, and for correct operation of the automatic control system and all auxiliary equipment.

SPARE PARTS

Provide a complete tool kit containing all necessary nonstandard tools to dismantle pump and replace pump seals, including a lightweight chain or cable hoist suitable for lifting pump and motor assembly.

Provide following spare parts:

Two complete replacement mechanical seal assemblies

Two spare filter cones

Two spare volute gaskets

Two complete sets pump packing

STARTUP

A factory representative shall inspect the startup test, and shall make the necessary adjustments to the equipment for satisfactory operation. The representative shall also be responsible for instructing the Owner's personnel in the operation and maintenance of the station.

Provide manufacturer's catalog information and diagrams for the preparation of operating and maintenance manuals as specified in Section GENERAL REQUIREMENTS.

GUARANTEE AND OPERATION

Each complete station shall be guaranteed for a period of 1 year from final acceptance against defective materials and workmanship.

C. WORKMANSHIP

EXCAVATION AND BACKFILL

As specified in applicable portions of Section EARTHWORK.

Take extreme care in backfilling around the pump station to prevent damage to the outside protective coating and exterior piping. The Contractor will not be allowed to push the backfill material into the excavation in such a manner as to permit free fall of the material.

CONCRETE AND STEEL

Float finish pump station base slab protection ring around top of pump station. Give broom finish to exposed slabs. Pour mass concrete under station after installation of station and any piping in the area. Place reinforcing in conformance with best accepted practice.

CAST IRON PRESSURE PIPE AND FITTINGS

Install in conformance with applicable portions of Section PRESSURE PIPE, and best accepted practice.

ELECTRICAL

Install in strict accordance with the National Electrical Code and applicable state and local codes. Provide minimum 2-foot cover for conduit installed underground.

PUMP STATION

Installation of the prefabricated pump station shall be in strict conformance with the manufacturer's instructions. These instructions shall accompany the pump station. All joints shall be watertight. All exterior abraded areas and field joints shall be touched up with two coats of the same epoxy material as the original coating a minimum of 2 days prior to backfilling. The Contractor shall provide protection for all related pump station equipment in field during construction of

dike.

Prior to starting up the station, all construction debris shall be removed from the system. A representative of the pump station manufacturer shall start, test, and adjust the equipment for complete and satisfactory operation, and shall instruct a representative of the Owner in the operation and maintenance of the station. Two bound copies of operating and maintenance instructions for the pump station shall be furnished at the station mounted on the interior wall in a plastic covered case. The complete operating instructions shall accompany the pump station when delivered to the site.

All supplementary water required to start, test, and adjust the station shall be supplied by the Contractor as directed by the pump station manufacturer's representative. It will be the responsibility of the Contractor to make all necessary arrangements for tne source of water.

The pump station shall be touched up on the inside with the touchup paint furnished and the entire interior cleaned of all dust, dirt, and other foreign material.

D. PAYMENT

PUMP STATION

Payment for the pump station, within the limits shown, complete, will be based on the lump sum price for each station as stated in the Contractor's Proposal for the particular station selected by the Owner.

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BDI022

15005 PRESSURE PIPE

A. SCOPE

This section covers all work necessary for the installation of pressure pipe and fittings of the sizes and classes indicated.

B. MATERIALS

GENERAL

Sizes of pressure pipe to be used in all locations are indicated on the Drawings.

DUCTILE IRON PIPE

Push-on joint ductile iron pipe shall be centrifugally cast of 60-42-10 iron and shall conform to ANSI A21.51 or AWWA C151. Thickness class shall be 51. The pipe shall be poly coated. The rubber-ring gaskets shall be suitable for the specified pipe sizes and pressure and shall conform to applicable parts of the latest Federal Specifications WW-P-421, and shall be furnished by the pipe manufacturer. A nontoxic vegetable soap lubricant shall be supplied with the pipe in sufficient quantities for installing the pipe. Fittings shall conform to ANSI A21.00 and A21.11 or AWWA C110 and C111.

PVC PIPE AND FITTINGS

The rigid pipe shall have a cell classification of 12454 A or B as identified by ASTM D 1784, "Rigid Polyvinyl Chloride Compounds and Chlorinated Polyvinyl Chloride Compounds." The PVC pipe shall have a pressure rating of 200 psi as manufactured by Johns-Manville, or as approved.

Unless otherwise shown or specified, fittings shall be Ring-Tite cast iron of an equivalent class and rating of the pipe. Fitting joints shall be as required for the pipe being connected. Such transition fittings as are necessary for proper connection shall be the standard of, and provided by the manufacturer of the fitting.

HYDROSTATIC TESTING

Make all arrangements for furnishing water from the nearest hydrant or other suitable source for testing purposes. Perform the tests and provide all hoses, tank trucks, plugs, and other necessary equipment to complete the tests.

CONCRETE FOR THRUST BLOCKING

Concrete for thrust blocking shall have a minimum compressive strength of 2,500 psi at 28 days.

IMPORTED PIPE BASE AND IMPORTED PIPE ZONE MATERIAL

Granular material for pressure pipe base and pipe zone backfill for pipe 18 inches in diameter and smaller shall be crushed rock with a maximum size of 3/4 inch, uniformly graded from coarse to fine. Clean beach, pit-run, or reject crusher-run sand may be substituted for gravel in trenches with no ground water in the pipe zone. Submit samples to the Engineer for approval.

C. WORKMANSHIP

PIPE UNLOADING AT THE SITE

Inspect each shipment of pipe and fittings and make provisions for a timely replacement of any damaged material. Unload by hand or use canvas slings to avoid scratching the pipe. Do not slide or drag PVC pipe over an abrasive surface. Pipe with deep scratches shall be replaced with new pipe and removed for the site.

Stack pipe no higher than 5 feet and provide support for the pipe barrel to prevent bending of the pipe. Pipe stockpiled for more than 30 days shall be covered to protect it from the sun's rays. Provide for air circulation through the stockpile.

Store rubber rings in a cool, dark place out of the direct rays of the sun.

DISTRIBUTING PIPE ALONG THE TRENCH

Distribute pipe by hand. Do not drop or drag pipe. Distribute sufficient pipe for 1 day's work, and place with bell end in the direction of pipe laying. Prevent dirt and contaminates from entering the pipe.

PREPARATION OF TRENCH

IMPORTED PIPE BASE MATERIAL

Provide imported pipe base material under all pressure pipe for full width of trench. Minimum depth of base shall be 4-inches.

ASSEMBLING THE PIPE

Pipe may be preassembled alongside of the trench then lowered into the trench position in long sections. Closely follow the manufacturer's recommended procedure for cleaning, setting the ring, lubricating the spigot end of pipe, and assembling.

PLACING PIPE IN TRENCH

Pipe than is assembled prior to placing in the trench shall be carefully fed by hand [or with the use of approved equipment] on the pipe bed. Provide pockets in the pipe bed material to accommodate bell ends and eliminate a concentration of load at these points.

CONNECTION TO EXISTING PRESSURE PIPE

Connect pressure sewer to existing pipe at location as shown on Drawings. Provide all work necessary to maintain sewage flow in existing sewer during connection to the pipe.

PRESSURE PIPE

Minimum pipe cover shall be 3 feet unless otherwise indicated. Pipe cover shall be varied as required to avoid air pockets.

THRUST BLOCKING

Take care not to overexcavate in the areas where thrust blocks are to be poured. Remove all water from the excavation. Construct suitable forms to obtain shapes that will provide full bearing surfaces against undisturbed earth, as indicated. Pour thrust blocking against undisturbed earth. Cure thrust blocks 5 days before conducting hydrostatic or air tests.

BACKFILL AT THE PIPE ZONE

The pipe zone shall be considered to include the full width of the excavated trench from the bottom of the pipe to a point 6-inches above the top outside surface of the barrel of the pipe.

Particular attention must be given to the area of the pipe zone from the flow line to the centerline of the pipe to insure that firm support is obtained to prevent any lateral movement of the pipe during the final backfilling of the pipe zone.

Imported pipe zone material shall be used for the full depth of the pipe zone. This material shall be placed, in a manner approved by the Engineer, simultaneously on both sides of pipe in lifts not to exceed 4-inches.

Each lift shall be "walked in" and supplemented by slicing with a shovel to insure that all voids around the pipe have been completely filled.

MATERIALS, TESTS, AND INSPECTIONS

PRESSURE PIPE

All pipe shall be inspected at the point of manufacture in accordance with the manufacturer's standard methods. Unless otherwise directed by the Engineer, provide a certificate of tests in lieu of witnessing the inspection and test procedures.

Pipe and accessories that are chipped, cracked, or contain other imperfections, or do not satisfactorily meet the manufacturer's standard test requirements, shall be rejected.

HYDROSTATIC TESTING OF PRESSURE LINES

GENERAL

Conduct pressure and leakage tests on all pressure lines. Furnish all necessary equipment and material and make all taps in the pipe as required. The Engineer will monitor the tests.

Furnish the following equipment and materials for the tests:

Amount	Description
2	Approved graduated containers.
2	Pressure gauges.
1	Hydraulic force pump approved by the Engineer. Suitable hose and suction pipe as required.

Conduct the tests after the trench has been completely backfilled. The Contractor may, if field conditions, as determined by the Engineer, permit, partially backfill the trench and leave the joints open for inspection and conduct an initial test. The acceptance test shall not, however, be conducted until all backfilling has been completed. Where any section of pipe is provided with concrete thrust blocking, the pressure test shall not be conducted for 5 days after the concrete blocking is installed. If high-early cement is used for the concrete thrust blocking, the curing time may be reduced to 2 days.

PROCEDURE

After backfilling, fill pipe with water. Test pressure shall be 160 calculated for the low end of the pipe, or as directed by the Engineer. Expel all air from pipe prior to test. Make up any water lost by absorption and then apply test pressure with suitable pump. Valve off line when test pressure is reached and conduct pressure test for 2 hours. At end of test period raise to test pressure with pump. Measure quantity of water required to restore test pressure.

Leakage is quantity of water necessary to restore test pressure at end of test period. Leakage shall not exceed the gallons per hour as determined by the formula:

$$L = \frac{NDP^{1/2}}{5,500}$$

In the above formula:

L = Allowable leakage, in gallons per hour.
N = Number of joints in the length of pipe tested.
D = Nominal diameter of pipe, in inches.
P = Average test pressure during the leakage test, in pounds per square inch.

Repair or replace any test section of pipe with leakage greater than that allowed under the above formula until the leakage is within the specified allowance, at no cost to the Owner.

FINAL SEWER CLEANING

Prior to final acceptance and final inspection of the leachate system by the Engineer, flush and clean all parts of the system. Remove all accumulated construction debris, rocks, gravel, sand, silt, and other foreign material from the leachate system at or near the closest downstream manhole. If necessary, use mechanical rodding or bucketing equipment.

Upon the Engineer's final manhole-to-manhole inspection of the leachate system, if any foreign matter is still present in the system, reflush and clean the sections and portions of the lines as required.

D. PAYMENT

PIPE

Payment for pipe will be based upon the unit price per linear foot as stated in the Contractor's Proposal for the various classes, types, and sizes of pipe installed as shown or as directed by the Engineer. Payment for pipe will be based on the actual number of feet installed, as measured by the Engineer. The pipe will be measured horizontally from center-to-center of valves and fittings or to the end of the pipe, whichever is applicable.

The unit price per linear foot of pressure pipe stated in the Contractor's Proposal shall be considered as including pipe, in place, imported pipe base, and pipe zone, all cast iron fittings required, the construction of thrust blocks at all angle points, connection to existing pressure line pressure testing, and all other work specified.

No payment for pipe, in place, will be made until the pipe has successfully passed the air or hydrostatic test.

The Engineer will withhold full payment on any section of pipe deemed unsatisfactory due to excessive leakage, unsatisfactory line and grade, or any other cause until such defects have been corrected in accordance with the intent of these Contract Documents.

If, within warranty period, any section of the sewer system, although originally accepted, is actually not acceptable due to subsequent excessive leakage, or any other defects, the Contractor shall repair or replace the affected portion at no cost to the Owner. It is understood that if the Contractor fails to do such work as required, the Surety shall be liable for said costs of repair or replacement.

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BDI023

15170 AIR RELEASE VALVE ASSEMBLIES

A. SCOPE

This section covers the work necessary for furnishing and installing the air release valve assemblies, complete.

B. MATERIALS

SERVICE FITTING

Tif-Tec No. 535 tapped coupling with internal stops. Tapped coupling shall be adequate for use with the size, type, and class of the pressure pipe.

AIR RELEASE VALVES

The air and vacuum release valves shall be constructed to permit the escape of large volumes of air when the line is being filled with water to permit smaller amounts of accumulated air to be released under normal operating conditions, and so that air may reenter the line to break any vacuum caused by the water leaving the line rapidly. The valves shall be designed to operate under working pressures of 150 psi and shall have been tested at a pressure not less than 300 psi.

The air release valves shall be 1-inch air release valves similar to APCO Heavy-Duty Combination Air Release Valve, Model No. 401WA, as manufactured by the American Valve and Primer Corporation, Chicago, IL. The inlets shall have iron pipe threads.

MANHOLE

The manhole for the Type B air release valve assembly shall be as specified in the Drawings.

MANHOLE RING AND COVER

The manhole ring and cover shall be cast iron. The 24-inch manhole ring and cover shall be Olympic Pattern No. 5822, with lid Type A, as manufactured by the Olympic Foundry Company, Seattle, WA, or similar as approved. Cover and ring shall have machined bearing surfaces.

ANGLE VALVE

The angle valve shall be bronze body, plug disc. Valves shall have threaded connections and shall be Crane No. 15-1/2 P, or equal. Size shall be the same as the air release valves.

PIPE AND MALLEABLE IRON FITTINGS

The pipe used for the air release valve assemblies shall be Schedule 80 steel pipe conforming to ASTM A 120, as shown. Fittings and companion flanges shall conform to Federal Specification WW-P-521, Type II, galvanized.

BRASS FITTINGS

Brass nipples shall conform to Federal Specification WW-P-460.

GRAVEL

Gravel shall be 3/4-inch minus gravel with reasonably even gradation from coarse to fine and free from excessive dirt or other foreign material.

CLASS D BACKFILL

Granular backfill around the air valve assemblies shall be Class D compacted gravel. Sufficient material shall be furnished under this item to fully support the air release valve manhole and shall extend above the surrounding ground surface. Class D backfill shall be placed prior to backfilling the adjacent pipe trench.

MISCELLANEOUS MATERIALS

Provide all miscellaneous materials not specified herein, but necessary to accomplish the construction as shown. All such materials shall be of the best commercial quality and suitable for the intended use.

C. WORKMANSHIP

PIPING

Cut pipe with sharp tools and ream ends of all cut sections. An approved joint compound shall be applied to the threads of all pipe, fittings, and valves prior to joining. After threaded joints are made up, the exposed threads and pipe shall be given a protective coating of Tarset, a coal-tar epoxy, manufactured by Porter Coatings Company, or Bitumastic 300, as manufactured by Koppers Company, Inc. Protective coating shall be applied in conformance with the manufacturer's printed directions and recommendations.

MANHOLE

Compact thoroughly the pipe zone and bedding for the manhole. The concrete pipe for manhole shall then be set in place. The concrete manhole pipe shall be bedded upon Class D backfill in such a manner that it does not rest within 8-inches of the crown of the transmission pipeline. Cut concrete pipe as required so that the finished grade of the manhole conforms to the slope and elevation of the adjacent ground. The concrete pipe shall be placed off center and the air valve oriented for easy access to the valve operator.

The manhole ring and cover shall be set in a bed of mortar consisting of 1 part cement to 3 parts sand. The ring shall have continuous and uniform bearing on the concrete pipe. Manhole cover shall not contact street ell in any cover position.

CELLULAR POLYSTYRENE

Install as shown.

TESTING

Air valve assemblies shall be tested in conjunction with pipeline.

D. PAYMENT

Payment for the air and vacuum release valve assemblies will be made at the unit prices stated in the Contractor's Proposal for each respective air release valve assembly installed.

Payment shall constitute full compensation for all work specified under this section, complete and within the limits shown, including Class D backfill when specified.

* * * * * *

BDI024

16001 ELECTRICAL

A. SCOPE

GENERAL

This section covers the work necessary for the complete power, lighting, and control systems. Furnish materials, labor, and equipment in accordance with these Specifications, the accompanying Drawings, and the directions of the Engineer.

MATERIALS INSTALLED AND CONNECTED, BUT FURNISHED UNDER OTHER SECTIONS

Flow switches.

Pump controllers.

B. GENERAL

SITE INSPECTION

Prior to submitting a bid, visit the project, ascertain conditions affecting the proposed work, and make allowance as to the cost thereof.

RESPONSIBILITY

Be responsible for:

Complete systems in accordance with the intent of these Contract Documents.

Referring to all of the Drawings and Specifications, and shop drawings for other trades for details of facility equipment and construction which affect the work covered under this section.

Coordinating electrical work with Owner and work of other trades to avoid conflicts, errors, delays, and unnecessary interference with operation of the plant during construction.

Contractor is responsible for coordination with utility concerning both temporary and permanent service. Any charges by utility for placing or removing temporary service to be the responsibility of the Contractor.

Checking the approximate locations of light fixtures, electrical outlets, equipment, and other electrical system components shown on Drawings for conflicts with openings, structural members, and components of other systems and equipment having fixed locations. In the event of conflicts, consult the Engineer. The Engineer's decision shall govern. Make necessary changes at no cost to Owner.

Installing materials and equipment in a workmanlike manner.

Installing materials and equipment in strict accordance with manufacturer's recommendations, unless otherwise specified or directed by the Engineer.

Furnishing and installing all incidental items not specifically shown or specified which are required by good practice to provide the complete systems specified herein.

INTENT OF DRAWINGS

Drawings are partly diagrammatic and are intended to show circuiting and switching details which shall be exactly as shown.

Exact conduit locations are not shown unless so indicated or specifically dimensioned.

One-line and riser diagrams are schematic and do not show physical arrangement of equipment.

DEPARTURES FROM DRAWINGS

Submit, in writing, to the Engineer for review, details of any necessary proposed departures from these Contract Documents, and the reasons therefor, as soon as practicable and within 30 days after the award of the Contract. Make no such departures without the prior written approval of the Engineer.

EQUIPMENT AND MATERIAL SUBMITTALS

PREBID

Manufacturer's trade names and catalog numbers stated herein are intended to indicate the type and quality of equipment or materials desired. Unless substitution is specifically forbidden, proposed alternates may be submitted for approval. Manufacturers not listed require written approval 10 calendar days prior to bid opening. Provide sufficient material or data to allow determination of compliance with these Contract Documents. List any proposed deviations from these Contract Documents.

POST-CONTRACT AWARD

Within 30 calendar days of Contract award, provide manufacturer's complete descriptive information for the items of material, equipment, and systems listed hereinafter. Submit all data at one time in ring binder.

Provide shop drawings, literature, and requested samples showing item proposed for use, size, dimensions, capacity, special features required, schematic (elementary) control diagrams, equipment schedules, rough-in, etc., as required by the Engineer for complete check and for installation. Use NEMA device designations and symbols for all electric circuit diagrams submitted. Make content of schematic (elementary) connection or interconnection diagrams in accordance with the latest edition of NEMA ICS.

Contractor shall check submittals for number of copies, adequate identification, correctness and compliance with Drawings and Specifications, and initial all copies. Revise, change, and/or resubmit all submittal information until acceptable to the Engineer. Obtain Engineer's acceptance before commencement of fabrication or installation of any materials or equipment.

Review of submittal information by the Engineer shall not relieve the Contractor from responsibility for deviations from Drawings and Specifications, unless he has in writing at time of submission requested and received written approval from the Engineer for specific deviations. Review of submittal information shall not relieve the Contractor from responsibility for errors and omissions in shop drawings or literature.

Provide six copies minimum of submittal information for distribution after review as follows: Engineer - two, Information and Instruction Manuals - two, Contractor - four.

Furnish submittal information on following items:

Pump controller: Outline and control schematic, descriptive literature.

Float switches.

Light fixtures.

Motor starters.

C. MATERIALS

GENERAL

Unless otherwise indicated, provide all first-quality, new materials, free from any defects, in first-class condition, and suitable for the space provided. Provide materials approved by UL or CSA wherever standards have been established by that agency.

Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.

STANDARD PRODUCTS

Unless otherwise indicated, provide materials and equipment which are the standard products of manufacturers regularly engaged in the production of such materials and equipment. Provide the manufacturer's latest standard design that conforms to these Specifications.

EQUIPMENT FINISH

Electrical equipment may be installed with manufacturer's standard finish and color, except where specific color, finish, or choice is indicated. If the manufacturer has no standard color, equipment shall be painted ANSI 61, light gray.

TYPE

The materials used shall be as follows:

CONDUIT, RIGID STEEL, ZINC-COATED

Rigid steel conduit, including couplings, elbows, and nipples shall be galvanized by hot-dipping, electroplating, sherardizing, or metallizing process, and shall meet the requirements of ANSI C80.1, UL, and the NEC. Use only threaded couplings, elbows, and nipples.

CONDUIT, RIGID PVC

Rigid polyvinyl chloride (PVC) conduit shall be Schedule 40 UL listed for concrete encased, direct burial underground, and exposed use. Rigid PVC conduit, including couplings, elbows, and nipples, shall conform to the requirements of the latest edition of NEMA TC 2, NEC, Federal Specification W-C-1094, and shall meet applicable ASTM test requirements for the intended use. Conduit shall be rated for use with 90 degrees C conductors.

CONDUIT FITTINGS, METALLIC

Metallic conduit fittings shall be of the type indicated or required for the anticipated purpose, and shall meet applicable requirements of ANSI C80.4, UL, NEC, and NEMA FB 1.

CONDUIT FITTINGS, PVC

PVC conduit fittings shall be of the type indicated or required for the anticipated purpose and shall meet the requirements of NEMA TC 3, Federal Specification W-C-1094, UL, and NEC.

CONDUCTORS

CONDUCTORS 600 VOLTS AND LESS

Conductors in raceways, ducts, and cables shall be copper with the type of insulation specified. Conductors, including insulation, cabling, jacket, filler, shielding, covering, and testing, shall meet all applicable requirements of IPCEA S-19-81 and S-61-402, the NEC, and UL. Conductor sizes shall be not less than those shown.

Conductors No. 8 AWG or larger shall be stranded. Conductors No. 6 AWG or larger shall have insulation of a heat- and moisture-resistant Grade THW, unless otherwise shown on the Contract Drawings.

SERVICE ENTRANCE

Provide a meter base and other materials, as required by the electric utility which will provide service to the facility, for installation of metering equipment and attachment of service conductors.

MOTOR CONTROL, GENERAL

Provide each motor with a suitable controller and devices that will perform the functions as specified for the respective motors. Controllers shall meet NEMA ICS, ANSI C19.1, the NEC, and UL. Motor horsepower ratings and enclosures shown are what is expected.

Magnetic motor controllers shall be full voltage, non reversing type. Each controller to have motor circuit protector circuit breaker for short circuit protection. Contractor shall adjust motor circuit protectors in accordance with manufacturer's instructions.

Provide each motor with thermal overload protection in all ungrounded phases. This protection shall consist of thermal overload relays sensitive to motor current and mounted within the motor controller. All overload protection devices shall be of the inverse-time-limit type.

Controller-mounted overload relays shall be manual-reset type with externally operated reset button. Select and install overload relay heaters after the actual nameplate full-load current rating of the motor has been determined.

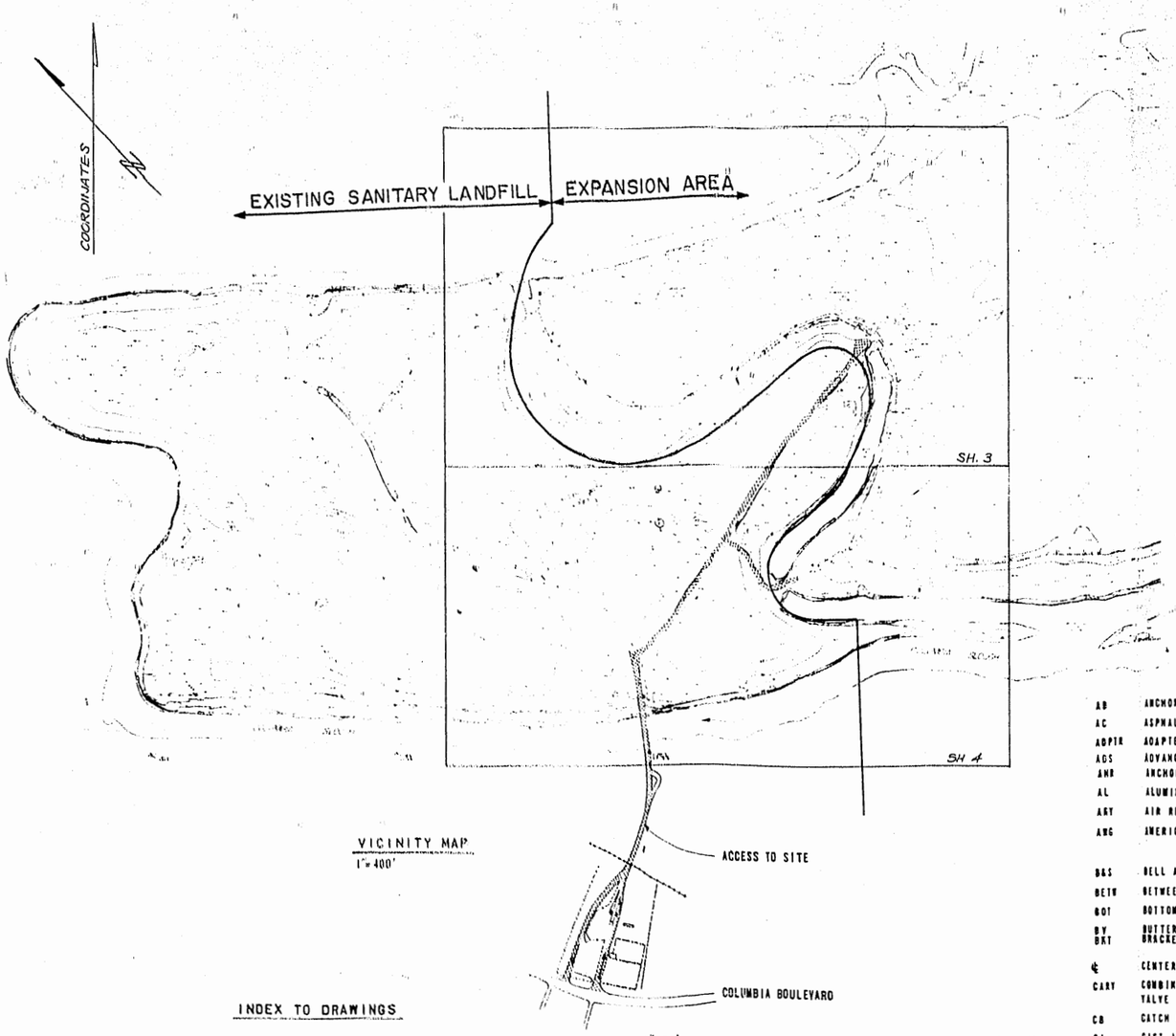
D. WORKMANSHIP

All electricl wiring in this Contract shll be installed in strict accordance with the National Electrical Code and applicable state and local codes. Joints in all exterior conduit shall be watertight.

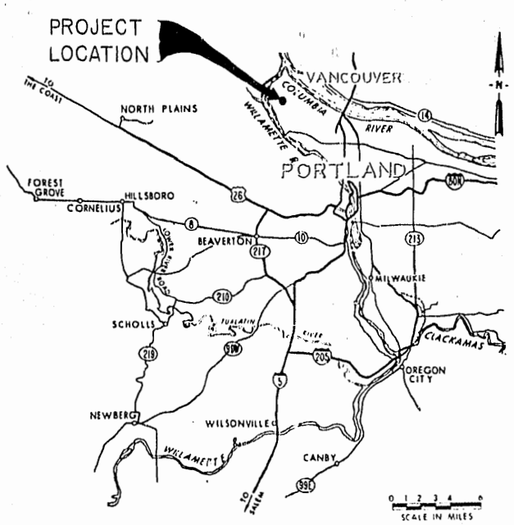
E. PAYMENT

Payment for the work in this section will be included as part of the lump sum bid.

* * * * * *



VICINITY MAP
1"=400'



LOCATION MAP

INDEX TO DRAWINGS

ABBREVIATIONS

AB	ANCHOR BOLT	ELB	ELBOW	NO	NUMBER
AC	ASPHALTIC CONCRETE	EP	EDGE OF PAVEMENT	NTS	NOT TO SCALE
ADPTR	ADAPTER	EQ	EQUATION		
AGS	ADVANCED DRAINAGE SYSTEMS INC.	EW	EACH WAY	OC	ON CENTER
ANR	ANCHOR	EXP JT	EXPANSION JOINT	OD	OUTSIDE DIAMETER
AL	ALUMINUM	EXST EXCL	EXISTING ENCLOSURE	PE	PLAIN END
ARV	AIR RELEASE VALVE			PERM	PERMANENT
AWG	AMERICAN WIRE GAUGE	FCA	FLANGE COUPLING ADAPTER	PL	PLATE
		FHY ASSY	FIRE HYDRANT ASSEMBLY	PRV	PRESSURE REDUCING VALVE
B&S	BELL AND SPIGOT	FLG	FLANGE	PVC	POLYVINYL CHLORIDE
BETW	BETWEEN	FLL FS	FLOW LINE FLOAT SWITCH	PVMT	PAVEMENT
BOT	BOTTOM	GALV	GALVANIZED	RCPT RAD	RECEPTACLE RADIUS
BV BRKT	BUTTERFLY VALVE BRACKET	GALVI	GALVANIZED IRON	RD	ROAD
℄	CENTERLINE	GALVS	GALVANIZED STEEL	RDCR	REDUCER
CARV	COMBINATION AIR RELEASE VALVE	GND	GROUND	RDWAY	ROADWAY
		GTV	GATE VALVE	REINF	REINFORCE
CB	CATCH BASIN			REQD	REQUIRED
CI	CAST IRON	HORIZ HTR	HORIZONTAL HEATER	SW SCHED	SWITCH SCHEDULE
CSP	CORRUGATED METAL PIPE	ID	INSIDE DIAMETER	SH	SHEET
CO	CLEAN OUT	INVT	INVERT	SHOUD	SHOULDER
CONC	CONCRETE	IPT	IRON PIPE THREAD	SLP SERV	SLOPE SERVICE
CONN	CONNECTION			SPECS	SPECIFICATIONS
CONT	CONTINUED	LATL	LATERAL	SST	STAINLESS STEEL
CPLG	COUPLING	LF	LINEAR FEET	STA	STATION
CSP	CONCRETE SEWER PIPE			STD	STANDARD
CTR	CENTER	MATL	MATERIAL	STL TRANS	STEEL TRANSITION
CY CAB	CUBIC YARD CABINET	MAX	MAXIMUM	TBM	TEMPORARY BENCH MARK
DET	DETAIL	MFR	MANUFACTURER	TEMP	TEMPORARY
DI	DUCTILE IRON	MH	MANHOLE	T&B	TOP AND BOTTOM
DIA	DIAMETER	MIN	MINIMUM	T&G	TONGUE AND GROOVE
DMH	DROP MANHOLE	MISC	MISCELLANEOUS	TYP	TYPICAL
		MJ	MECHANICAL JOINT	VERT	VERTICAL
EA	EACH			W	WITH
EF	EACH FACE			WTR	WATER
EL	ELEVATION			WTRTT WP	WATERTIGHT WATERPROOF
				XFMR	TRANSFORMER

LEGEND

NEW
- CHECK VALVE
- PUMP STATION
- GATE VALVE
- MANHOLE DESIGNATION
- GRAVITY SEWER WITH MANHOLE
- 6"FYC — LEACHATE PRESSURE MAIN
- 30" PRESSURE SEWER (DASHED PLAN ONLY)
- (2) — SURFACE RESTORATION ZONE
- (D) — BACKFILL CLASSIFICATION
- 8"@ 0.0040 — SIZE AND SLOPE OF PIPE (8 PIPE AT 0.0040 FT/FT)
- AIR RELEASE VALVE
- P — UNDERGROUND POWER CABLE

EXISTING
- PS. — PUMP STATION
- 8"S — SANITARY SEWER WITH MANHOLE
- 6"PS — PRESSURE SEWER
- 18"SS — STORM SEWER WITH CATCH BASIN AND MANHOLE
- 8"W — WATER PIPELINE WITH FIRE HYDRANT AND VALVE
- 2"G — GAS PIPELINE
- P — UNDERGROUND POWER CABLE
- T — UNDERGROUND TELEPHONE CABLE
- TV — UNDERGROUND TELEVISION CABLE
- CULVERT (SIZE AND TYPE INDICATED)
- FENCE LINE
- UTILITY POLE
- UTILITY POLE WITH GUY WIRE

GENERAL
- PROPERTY LINE AND/OR RIGHTS-OF-WAY-LINE
- HV-11 — SURVEY MONUMENT WITH HORIZ AND VERT. CONTROL (CITY OF PORTLAND DATUM)
- H-1 — SURVEY MONUMENT WITH HORIZ CONTROL
- DITCH SHOWING DIRECTION OF FLOW
- CREEK OR RIVER SHOWING DIRECTION OF FLOW
- TP-1 — TEST PIT LOCATION
- B-1 — BORING LOCATION
- P-1 — DUTCH CONE PROBE LOCATION
- W-1 — OBSERVATION WELL LOCATION
- W.L.11.8 — WATER LEVEL WHEN SURVEYED
- X — EXISTING ELEVATION
- FINAL ELEVATION
- SETTLEMENT PLATE (CONTRACTOR INSTALLED)
- PIEZOMETER (CONTRACTOR INSTALLED)

MISCELLANEOUS PIPE FITTINGS

DOUBLE LINE	SINGLE LINE	
		FLANGE JOINT
		MECHANICAL JOINT
		BELL & SPIGOT JOINT
		FLANGE COUPLING ADAPTER
		FLEXIBLE COUPLING
		FLEXIBLE COUPLING WITH THRUST TIES

SECTION (LETTER) OR DETAIL (NUMERAL) DESIGNATION
SHEET WHERE SECTION OR DETAIL IS SHOWN
SHEET WHERE SECTION OR DETAIL IS TAKEN

SECTION DESIGNATION

REGISTERED PROFESSIONAL ENGINEER 8480 MICHAEL D. KENNEDY

CH2M HILL

DES. MDK
DR. ALR
CHK. MDK
APPD. MDK

CITY OF PORTLAND OREGON

NO.	DATE	DESCRIPTION	APPD.
		REVISION	

1/4 SECTION
FILE NUMBER
JOB NUMBER

OFFICE OF CITY ENGINEER
APPROVED CHIEF: BUREAU SAN. ENG. REG. PROF. ENG. NO. 3656
APPROVED ACTING CITY ENGINEER REG. PROF. ENG. NO. 8416

CITY OF PORTLAND, OREGON
DEPARTMENT OF PUBLIC WORKS
MIKE LINDBERG COMMISSIONER
JOHN LANG ACTING CITY ENGINEER

ST JOHN'S SANITARY LANDFILL EXPANSION AREA DESIGN
INDEX TO DRAWINGS, LOCATION MAP, VICINITY MAP, LEGEND, ABBREVIATIONS

SHEET 1 OF 26
DATE APR. 1980
DWG. NO. P12717.A1

THIS PRINT IS REDUCED TO ONE HALF OF THE ORIGINAL SCALE

COORDINATES

1" = 200'

BEGINNING OF DIKE

DIKE ACCES ROAD

℄ DIKE

LANDING

SH 11

SH 12

SH 13

SH 14

ACCESS ROAD SHOULDER IMPROVEMENTS SEE DET. SH 20

END OF DIKE

℄ DIKE

LANDING

SH 15

TO COLUMBIA BLVD

NOTES:

1. MAP WAS PREPARED BY WESTERN MAPPING AND DATED JUNE 1979
2. ELEVATIONS ARE REFERENCED TO CITY OF PORTLAND DATUM
3. WATER LEVELS VARY SEASONALLY

REGISTERED PROFESSIONAL ENGINEER 8480 OREGON AUGUST 22, 1975 MICHAEL D. KENNEDY

CH2M HILL

DES. RDL
DR. ALR
CHK. RASL
APPD. MDK

CITY OF PORTLAND OREGON

NO.	DATE	DESCRIPTION	APPD.
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APPROVED _____ ACTING CITY ENGINEER REG. PROF. ENG. NO. 8416

CITY OF PORTLAND, OREGON

DEPARTMENT OF PUBLIC WORKS

MIKE LINDBERG COMMISSIONER

JOHN LANG ACTING CITY ENGINEER

ST JOHN'S SANITARY LANDFILL EXPANSION AREA DESIGN

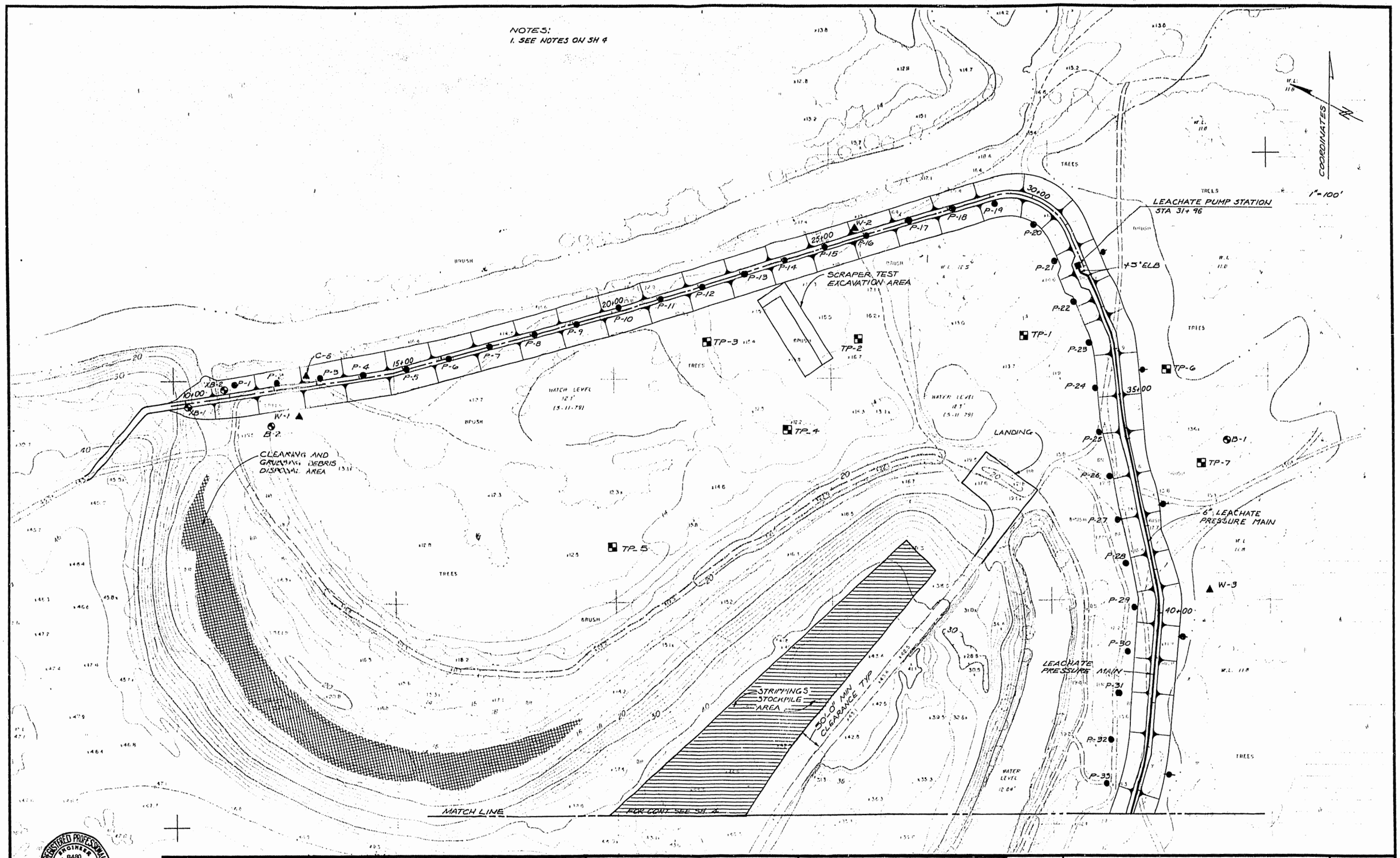
SITE PLAN AT 1"=200'

SHEET 2
OF 26
DATE APR. 1980
DWG. NO. P12717.A1

THIS PRINT IS REDUCED TO ONE HALF OF THE ORIGINAL SCALE

149360

NOTES:
1. SEE NOTES ON SH 4



REGISTERED PROFESSIONAL ENGINEER
8488
OREGON
August 22, 1975
MICHAEL D. KENNEDY

CH2M HILL

DES.	RDL
DR.	ALR
CHK.	RASL
APPD.	MDK

THE CITY OF PORTLAND OREGON

NO.	DATE	DESCRIPTION	APPD.
		REVISION	

1/4 SECTION
FILE NUMBER
JOB NUMBER

OFFICE OF CITY ENGINEER
APPROVED _____ CHIEF, BUREAU SAN. ENG. REG. PROF. ENG. NO. 3656
APPROVED _____ ACTING CITY ENGINEER REG. PROF. ENG. NO. 8416

CITY OF PORTLAND, OREGON
DEPARTMENT OF PUBLIC WORKS
MIKE LINDBERG COMMISSIONER
JOHN LANG ACTING CITY ENGINEER

ST JOHN'S SANITARY LANDFILL EXPANSION AREA DESIGN
SITE PLAN AT 1"=100'
PRESSURE MAIN PLAN 32+00 TO 44+50
BORING & TEST PIT LOCATIONS

SHEET 3
OF 28
DATE APR 1980
DWG. NO. P12717.A1

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