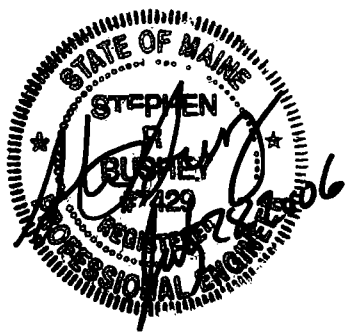
MERCY AT THE FORE
INDEX OF SPECIFICATIONS

DIVISION 2 – SITEWORK



SECTION 02000 – SITE PERMIT REQUIREMENTS

PART 1 - GENERAL

A. Construction of this project must meet the terms and conditions of a State of Maine Site Location of Development Permit, Natural Resources Protection Permit, Maine Construction General permit, and the City of Portland Site Plan Permit.

B. Copies of the Permit Applications and Correspondence During Review of the Permits may be inspected during normal working hours at the office of:

DeLuca-Hoffman Associates Inc.
Consulting Engineers
778 Main Street Suite 8
South Portland, Maine 04106
(207) 775-1121

C. Any Contractor who desires to view the Permit Applications and Associated Correspondence must contact DeLuca-Hoffman Associates Inc. 48 hours prior to inspecting the information.

D. Certain conditions of the permits will be the responsibility of the Contractor. The specific condition for which the Contractor is responsible are expected to include:

1. MeDEP Site Location Permit: The standing conditions of the Site Law apply. The Contractor will be expected to comply with:

   a) **Standard Condition 4.** Specifically, the Contractor shall provide a copy of the permit to any subcontractor.

   b) **Standard Conditions 8 and 9.** Specifically, the Contractor shall provide a copy of the permit to any subcontractors or bidders.

   c) **Special Condition 2.** Specifically, the Contractor shall take all necessary actions to ensure that its activities or those of its agents do not result in noticeable erosion of soils or fugitive dust emissions on the site during the construction and operation of the project covered by this approval.

   All other conditions of the MeDEP Permit are anticipated to be the responsibility of the Owner.

2. Local Permits:

The Contractor will be required to secure a street opening permit from the City of Portland Public Works Department for any activities within the public right of way. The contract drawings can be used by the contractor for securing this permit.

The Contractor is responsible for securing any permits not secured by the Owner pursuant to Condition 2 of the approvals.

The Contractor is also responsible for compliance with conditions outlined in the Voluntary Response Action Program (VRAP) No Action Assurance letter from the MeDEP.

PART 2 - PERMITS

Copies of the MeDEP Standing Condition of Approval and Local Permits are attached.

State of Maine Site Location of Development Permit
City of Portland Site Plan Approval (to be provided upon receipt)

214/47

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE HOUSE STATION 17 AUGUSTA, MAINE 04333

DEPARTMENT ORDER

IN THE MATTER OF

MERCY HEALTH SYSTEM OF MAINE Portland, Cumberland County MERCY HOSPITAL CAMPUS L-20775-19-A-N (approval) L-20775-TG-B-N	) SITE LOCATION OF DEVELOPMENT) NATURAL RESOURCES PROTECTION ACT) WATER QUALITY CERTIFICATION) FINDINGS OF FACT AND ORDER

Pursuant to the provisions of 38 M.R.S.A. Sections 481 et seq. and 480-A et seq., and Section 401 of the Federal Water Pollution Control Act, the Department of Environmental Protection has considered the application of MERCY HEALTH SYSTEM OF MAINE with the supportive data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. PROJECT DESCRIPTION:

A. Summary: The applicant proposes to develop a new hospital campus that will include a three-story, 75,000 square foot medical office building, a two-story, 58,000 square foot ambulatory care center, a 300,000 square foot hospital structure that may vary from two to five stories in height and numerous other ancillary facilities. The project site consists of 85.5 acres of land including approximately 43.5 acres of mudflats. The proposed development is shown on a set of plans the first of which is entitled "Mercy Hospital Relocation," prepared by DeLuca-Hoffman Associates, Inc., and dated January, 2002, with a last revision date on any of the sheets of March 12, 2002. The project site is located off Congress Street, adjacent to the Fore River in the City of Portland, Maine.

The Maine Department of Transportation intends to utilize a portion of the property for construction of the proposed Commercial Street Connector and a pedestrian walkway/bikeway along the river frontage. This project will be the subject of a future application.

B. Current Use of Site: The site of the proposed project is generally undeveloped open areas and woodland. Up until the 1980's, the site contained a railroad yard that was abandoned. All but one set of tracks was removed, but the abandoned rail track beds remain. The project site also contains an old gravel pit that has become a wetland and numerous areas of debris. There are two old structures on the property and temporary stockpiles of various materials.

2. FINANCIAL CAPACITY:

The total cost of the project is estimated to be $109,600,000. It will be funded through a combination of cash, funds from a capital campaign and bonds. The applicant submitted its latest available balance sheet which identifies substantial investment assets that may be used for

financing or collateral. In addition, the applicant maintains an AAA bond rating and is able to obtain substantial debt financing if necessary.

The Department finds that the applicant has demonstrated adequate financial capacity to comply with Department standards.

3. TECHNICAL ABILITY:

The applicant has successfully operated and maintained a hospital campus for many years. The applicant also retained the services of DeLuca-Hoffman Associates, Inc., a professional engineering firm, to assist in the design and engineering of the project.

The Department finds that the applicant has demonstrated adequate technical ability to comply with Department standards.

4. NOISE:

The Department finds that the proposed project is a "development producing a minor noise impact". Consequently a full noise study is not required.

5. SCENIC CHARACTER:

The proposed project site is surrounded by industrial development. The proposed project is compatible with the existing visual character of the area and will be designed to enhance the scenic and recreational attributes of the Fore River shorefront while maximizing landscape screening of the parking lots and buildings.

Based on the project's location and design, the Department finds that the proposed project will not have an unreasonable adverse effect on the scenic character of the surrounding area.

6. WILDLIFE AND FISHERIES:

The Maine Department of Inland Fisheries & Wildlife (MDIFW) reviewed the proposed project. In its comments, MDIFW stated that it found no records of any essential or significant wildlife habitats associated with this site. Wetlands on the site, particularly the pond in the old gravel pit, are used by several species of waterfowl and wading birds. MDIFW recommended that impacts to these birds be minimized by maximizing the retention of the existing buffer around the pond and maintaining or elevating the water level in the pond. The applicant addressed these concerns by re-designing the proposed project to eliminate direct impacts to the ponded wetland, by re-designing the stormwater system to direct roof runoff into the pond and other runoff directly to the Fore River and by placing a buffer at least 25 feet wide around the pond. No fisheries concerns were identified.

The Department finds that the applicant has made adequate provision for the protection of wildlife and fisheries.

7. HISTORIC SITES AND UNUSUAL NATURAL AREAS:

The Maine Historic Preservation Commission reviewed the proposed project and stated that it will have no effect upon any structure or site of historic, architectural, or archaeological significance as defined by the National Historic Preservation Act of 1966.

The Maine Natural Areas Program database does not contain any records documenting the existence of rare or unique botanical features on the project site. The applicant's wetland consultant surveyed the proposed project site and did not locate any unusual features other than the presence of waterfowl and wading birds in the gravel pit pond.

The Department finds that the proposed development will not have an adverse effect on the preservation of historic sites or unusual natural areas either on or near the development site.

8. BUFFER STRIPS:

No formal buffers were proposed other than those being implemented as part of the wetland compensation plan discussed in Finding 19.

9. SURFACE WATER QUALITY:

The proposed project is not located within the watershed of a lake or great pond. No discharges to surface waters are proposed other than stormwater.

Based on the project's location and the Department's Rules, Chapters 500 and 502, the applicant is not required to provide stormwater quality treatment. The applicant is proposing stormwater quality treatment for the site because it is required by the City of Portland and serves as partial compensation for the wetland impacts discussed in Finding 19.

The Department finds that the proposed project will not have an unreasonable adverse impact on surface water quality.

10. SOILS:

The applicant submitted a medium intensity soil survey map and a geotechnical report based on the soils found at the project site. This report was prepared by a registered professional engineer and reviewed by staff from the Division of Environmental Assessment of the Bureau of Land and Water Quality (DEA). The applicant indicated that dewatering is not likely to be necessary, but if it is, it must not be undertaken without prior approval from the Third Party Inspector discussed in Finding 13. The applicant agreed that all existing on-site wells would be abandoned in accordance with the well abandonment procedure outlined by DEA. The wells will be grouted using a tremie pipe and capped. DEA also requested a copy of any reports describing remedial work already undertaken to properly manage residual fertilizer.

The applicant completed an environmental assessment report and remedial workplan as part of its request to have the project site participate in

the Department's Voluntary Response Action Plan (VRAP). The workplan outlines the remedial measures to be implemented at the property and was reviewed by the Division of Remediation of the Bureau of Remediation and Waste Management (DR). DR concurs with the workplan recommendations, which includes removing asbestos, removing an existing septic system, disposing of existing solid waste appropriately, properly remediating areas with ash and lead contamination and properly capping or disposing of petroleum contaminated soil. Once the recommended remedial measures are completed, but no later than one year from the date of this Order, a report demonstrating the successful implementation of the tasks must be sent to the Bureau of Land and Water Quality (BLWQ), in addition to being sent to DR. The report sent to the BLWQ must also include the location of abandoned wells and any additional information requested by DEA in review memorandums dated April 22 and May 13, 2002, that may not specifically be required as part of the VRAP.

The Department finds that, based on the reports submitted by the applicant and the applicant's compliance with all the measures outlined above, the soils on the project site present no limitations to the proposed project that cannot be overcome through standard engineering practices.

11. STORMWATER MANAGEMENT:

The project site is moderately sloped except for the gravel pit area and the knolls to the northeast of the pit. It generally slopes to the riverfront.

The applicant is not proposing a formal stormwater management system to detain stormwater from 24-hour storms of 2-, 10-, and 25-year frequency. Instead, because the project site is located adjacent to tidal waters of the Fore River, the applicant requested a waiver from the peak flow standard pursuant to Department Rules, Chapter 500(3)(A)(1).

Although Total Suspended Solids removal (TSS) is not required for the proposed project to achieve compliance with the Department's stormwater rules, the applicant is proposing to use a vegetated "water quality treatment" swale, water quality inlets and deep sumps on the catch basins and Vortechnics units to provide TSS removal for the reasons outlined in Finding 9.

The stormwater management system proposed by the applicant was reviewed by, and revised in response to, comments from the Division of Watershed Management of the Bureau of Land and Water Quality (DWM). In its comments, stated that the proposed system complies with Department standards for stormwater management and that a waiver from the peak flow standard may be approved.

Based on the system's design and these comments, the Department finds that the applicant has made adequate provision to ensure that the proposed project will meet the stormwater quantity standards for: (1) peak flow from the site and peak flow of the receiving waters; (2) grading or other construction activity; (3) channel limits and runoff

areas; (4) maintenance; (5) discharge to freshwater or coastal wetlands; and (6) level spreaders.

12. MAINTENANCE OF COMMON FACILITIES:

The applicant will be responsible for the maintenance of all common facilities including the stormwater management system, which maintenance will include, but not be limited to, any necessary erosion and sedimentation control measures, and the long-term maintenance of the stormwater management system. The proposed stormwater management system maintenance plan is contained in Section 9, Attachment A of the application. Prior to the start of construction, the applicant must contract with an appropriate entity to clean the Vortechnics units on a yearly basis for a minimum period of five years.

13. EROSION AND SEDIMENTATION CONTROL:

The applicant submitted an Erosion and Sedimentation Control Plan as Section 24 of the application. This plan and plan sheets containing erosion control details were reviewed by, and revised in response to the comments of DWM. Erosion control details will be included on the final construction plans and the erosion control narrative will be included in the project specifications to be provided to the construction contractor. Given the size and nature of the project site, the applicant must retain the services of a Third Party Inspector in accordance with the Special Condition for Third Party Inspection Program, which is attached to this Order.

The Department finds that the applicant has made adequate provision to control erosion and sedimentation.

14. GROUNDWATER:

The project site is not located over a mapped sand and gravel aquifer. The proposed project does not propose any withdrawal from, or discharge to, the groundwater. As discussed in Finding 10, existing on-site contamination will be remediated as part of a VRAP and the applicant does not anticipate that the groundwater will be intercepted during construction.

The Department finds that the proposed project will not have an unreasonable adverse effect on ground water quality.

15. WATER SUPPLY:

When completed, the proposed project is anticipated to use 80,600 gallons of water per day. The Portland Water District will supply water. The applicant submitted a letter from the District, dated November 5, 2001, indicating that it will be capable of servicing this project.

The Department finds that the applicant has made adequate provision for securing and maintaining a sufficient and healthful water supply.

16. WASTEWATER DISPOSAL:

When completed, the proposed project is anticipated to discharge 80,600 gallons of wastewater per day to the City's East End Wastewater Treatment Facility. The applicant submitted a letter from the City of Portland's Department of Public Works stating that there is adequate capacity to transport these flows and that the East End facility has adequate capacity to treat the flows. This project was reviewed by the Division of Engineering, Compliance and Technical Assistance of the Bureau of Land and Water Quality (DECTA), which commented that the East End Wastewater Treatment Facility has the capacity to treat these flows. DECTA also stated that the final plans, including sewer profiles, must be reviewed by the City of Portland's engineering department for compliance with their design standards and sewer use ordinance requirements.

Based on DECTA's comments, the Department finds that the applicant has made adequate provision for wastewater disposal at a facility that has the capacity to ensure satisfactory treatment.

17. SOLID WASTE:

General solid wastes from the proposed project will be disposed of at Regional Waste Systems, which is currently in substantial compliance with the Solid Waste Management Regulations of the State of Maine.

Stumps and grubbings generated will be chipped and ground on-site in accordance with the Solid Waste Management Regulations of the State of Maine.

Asbestos and mixed construction debris will be disposed of at either Waste Management's Norridgewock Facility or at Pine Tree Landfill. Wood construction debris will be disposed of at the KTI Wood Recycling Facility. Separated Metal/Ferrous Material will be recycled at Grimmel Industries or the City of Portland's Riverside Transfer Station. Masonry debris will be recycled at the Shaw Brothers "H" Pit. Special waste that must be removed from the site will be transported to Commercial Recycling Systems. Old railroad ties, old piers and docks will be removed and salvaged or taken to Commercial Recycling Systems. All of these facilities are currently in substantial compliance with the Solid Waste Management Regulations of the State of Maine.

After the facilities open, Stericycle of Massachusetts will collect biomedical waste for disposal at its Massachusetts facility, which is an acceptable method of disposal.

Hazardous materials, including nuclear medicines, used at the facility will be handled, stored and disposed of in compliance with 30 M.R.S.A. Section 1301 *et seq.*

Based on the above information, the Department finds that the applicant has made adequate provision for solid waste disposal.

18. FLOODING:

The proposed project is not located within the 100-year floodway of any river or stream.

The Department finds that the proposed project is unlikely to cause or increase flooding or cause an unreasonable flood hazard to any structure.

19. WETLAND IMPACTS:

The applicant submitted a Natural Resources Protection Act (NRPA) application and is proposing to fill 39,835 square feet of mostly shrub/scrub wetland to construct the hospital campus described above.

The Wetland Protection Rules, Chapter 310 require that the applicant to meet the following standards:

a. Avoidance. No activity, which would cause a loss in wetland area, functions and values, will be permitted if there is a practicable alternative to the project that will be less damaging to the environment. The applicant's alternative analysis was based on finding a site that met six criteria including a need to be near Maine Medical Center, easily accessible to the interstate highways and on or near public transportation. A real estate consultant was retained to identify possible development sites and numerous sites were considered. Based on the site selection review, the applicant concluded that the proposed project site most closely met its site criteria while having minimal impact on natural resources. A small ditch area, located within 250 feet of the Fore River, is classified as a wetland of special significance. It will be filled as part of the VRAP program because its soil is contaminated with lead ash. This fill is required for health and safety reasons and no practicable alternative exists. The Department agrees that there is no practicable alternative to the entire project that would be less damaging to the environment.

b. Minimal Alteration. The applicant is required to minimize the amount of wetland alteration while meeting the project's purpose. The applicant had several pre-application meetings with the Department, the MDIFW and the Army Corps of Engineers to ensure that the final project design would minimize wetland impacts. The proposed project layout minimizes wetland impacts to the greatest extent practicable while still allowing the project's purpose to be met.

c. Compensation. The applicant is required to replace lost wetland functions and values associated with the proposed wetland. The applicant's wetland compensation plan is contained in Exhibit 14 of the NRPA application, last revised June 19, 2002. The compensation plan includes 0.5 acres of wetland enhancement, 0.2 acres of wetland creation and 3.02 acres of wetland preservation to improve wildlife habitat in the pond, provide for flood flow alteration and generally improve the water quality of the remaining on-site wetlands and stormwater discharge to the Fore River. The wetland enhancement and creation areas must be

completed, as outlined in Exhibit 14, during Phase I of the proposed project. The deed restrictions that will be utilized to protect the enhanced wetland, created wetland and preserved wetland must be recorded and a copy submitted to the Department within 30 days of completing the enhanced and created wetlands.

The Department finds that the applicant has avoided and minimized wetland impacts to the greatest extent practicable, and that the proposed project represents the least environmentally damaging alternative that meets the project's purpose.

20. AIR QUALITY:

The applicant is proposing to utilize natural gas as the primary source of fuel for the hospital campus. The Bureau of Air Quality stated, in a letter dated February 21, 2002, that the Department does not foresee any problems permitting a facility that uses natural gas as a primary fuel. Department Rules require an air emission license to be obtained before construction is commenced.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S.A. Sections 480-A et seq. and Section 401 of the Federal Water Pollution Control Act:

A. The proposed activity will not unreasonably interfere with existing scenic, aesthetic, recreational, or navigational uses.

B. The proposed activity will not cause unreasonable erosion of soil or sediment.

C. The proposed activity will not unreasonably inhibit the natural transfer of soil from the terrestrial to the marine or freshwater environment.

D. The proposed activity will not unreasonably harm any significant wildlife habitat, freshwater wetland plant habitat, threatened or endangered plant habitat, aquatic habitat, travel corridor, freshwater, estuarine, or marine fisheries or other aquatic life.

E. The proposed activity will not unreasonably interfere with the natural flow of any surface or subsurface waters.

F. The proposed activity will not violate any state water quality law including those governing the classifications of the State's waters.

G. The proposed activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties.

H. The proposed activity is not on or adjacent to a sand dune.

I. The proposed activity is not on an outstanding river segment as noted in 38 M.R.S.A. Section 480-P.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S.A. Sections 481 et seq.:

A. The applicant has provided adequate evidence of financial capacity and technical ability to develop the project in a manner consistent with state environmental standards.

B. The applicant has made adequate provision for fitting the development harmoniously into the existing natural environment and the development will not adversely affect existing uses, scenic character, air quality, water quality or other natural resources in the municipality or in neighboring municipalities.

C. The proposed development will be built on soil types which are suitable to the nature of the undertaking and will not cause unreasonable erosion of soil or sediment nor inhibit the natural transfer of soil provided a Third Party Inspector is retained to help ensure that all appropriate erosion control measures are undertaken.

D. The proposed development meets the standards for storm water management in Section 420-D and the standard for erosion and sedimentation control in Section 420-C provided the Vortechnics units are cleaned on a yearly basis and the stormwater management system is maintained as outlined in Section 9, Attachment A of the application.

E. The proposed development will not pose an unreasonable risk that a discharge to a significant groundwater aquifer will occur.

F. The applicant has made adequate provision of utilities, including water supplies, sewerage facilities, solid waste disposal and roadways required for the development and the development will not have an unreasonable adverse effect on the existing or proposed utilities and roadways in the municipality or area served by those services provided that all the actions outlined in Finding 10 are completed.

G. The activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties nor create an unreasonable flood hazard to any structure.

THEREFORE, the Department APPROVES the application of MERCY HEALTH SYSTEM OF MAINE to construct a hospital campus, SUBJECT TO THE FOLLOWING CONDITIONS and all applicable standards and regulations:

1. The Standard Conditions of Approval, a copy attached.

2. In addition to any specific erosion control measures described in this or previous orders, the applicant shall take all necessary actions to ensure that its activities or those of its agents do not result in noticeable erosion of soils or fugitive dust emissions on the site during the construction and operation of the project covered by this approval.

3. Prior the start of construction, the applicant shall conduct a pre-construction meeting. This meeting shall be attended by the applicant's representative, Department staff, the design engineer, the contractor, and the third-party inspector.

4. The applicant shall complete the actions outlined in Finding 10 and submit the required reports in the time frames indicated.

5. The applicant shall retain the services of a Third Party Inspector in accordance with the Special Condition for Third Party Inspection Program that is attached to this Order.

6. Prior to the start of construction, the applicant shall contract with an appropriate entity to clean the Vortechnics units on a yearly basis for a minimum period of five years.

7. The wetland enhancement and creation areas shall be completed, as outlined in Exhibit 14 of the NRPA application, during Phase I of the proposed project. The deed restrictions that shall be utilized to protect the enhanced wetland, created wetland and preserved wetland shall be recorded and a copy submitted to the Department within 30 days of completing the enhanced and created wetlands.

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DONE AND DATED AT AUGUSTA, MAINE, THIS 26 DAY OF June, 2002.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

By: _____
MARTHA G. KIRKPATRICK, COMMISSIONER

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES.

Date of initial receipt of application 1-22-02
Date of application acceptance 1-29-02

Date filed with Board of Environmental Protection
LK/L20775AN

FILED
JUN 27 2002
BOARD OF ENVIRONMENTAL PROT.
STATE OF MAINE

SITE LOCATION OF DEVELOPMENT (SITE)
STANDARD CONDITIONS

STRICT CONFORMANCE WITH THE STANDARD AND SPECIAL CONDITIONS OF THIS APPROVAL IS NECESSARY FOR THE PROJECT TO MEET THE STATUTORY CRITERIA FOR APPROVAL.

1. This approval is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation from the plans, proposals and supporting documents is subject to the review and approval of the Board prior to implementation. Further subdivision of proposed lots by the applicant or future owners is specifically prohibited, without prior approval by the Board of Environmental Protection, and the applicant shall include deed restrictions to this effect.

2. The applicant shall secure and comply with all applicable Federal, State and local licenses, permits, authorizations, conditions, agreements, and orders, prior to or during construction and operation as appropriate.

3. The applicant shall submit all reports and information requested by the Board or Department demonstrating that the applicant has complied or will comply with all conditions of this approval. All preconstruction terms and conditions must be met before construction begins.

4. Advertising relating to matters included in this application shall refer to this approval only if it notes that the approval has been granted WITH CONDITIONS, and indicates where copies of those conditions may be obtained.

5. Unless otherwise provided in this approval, the applicant shall not sell, lease, assign or otherwise transfer the development or any portion thereof without prior written approval of the Board where the purpose or consequence of the transfer is to transfer any of the obligations of the developer as incorporated in this approval. Such approval shall be granted only if the applicant or transferee demonstrates to the Board that the transferee has the technical capacity and financial ability to comply with conditions of this approval and the proposals and plans contained in the application and supporting documents submitted by the applicant.

6. If the construction or operation of the activity is not begun within two years, this approval shall lapse and the applicant shall reapply to the Board for a new approval. The applicant may not begin construction or operation of the development until a new approval is granted. Reapplications for approval shall state the reasons why the development was not begun within two years from the granting of the initial approval and the reasons why the applicant will be able to begin the activity within two years from the granting of a new approval, if granted. Reapplications for approval may include information submitted in the initial application by reference.

7. If the approved development is not completed within five years from the date of the granting of approval, the Board may reexamine its approval and impose additional terms or conditions or prescribe other necessary corrective action to respond to significant changes in circumstances which may have occurred during the five-year period.

8. A copy of this approval must be included in or attached to all contract bid specifications for the development.

9. Work done by a contractor pursuant to this approval shall not begin before the contractor has been shown by the developer a copy of this approval.

(2/81)/Revised November 1, 1979

DEPLW 148

DEP FACT SHEET

Appealing a Commissioner's Licensing Decision

issued: April 2000 **contact:** (207) 287-2811

SUMMARY

One of two methods is available to an aggrieved person for appealing a licensing decision made by the Department of Environmental Protection's ("DEP") Commissioner -- in an administrative process before the Board of Environmental Protection ("Board") or a judicial process before Maine's Superior Court. This FACT SHEET, in conjunction with consulting statutory and regulatory provisions referred to herein, will assist aggrieved persons with understanding their rights and obligations in filing an administrative or judicial appeals. A failure to file an appeal within the identified time periods will result in the Commissioner's decision becoming final.

I. ADMINISTRATIVE APPEALS TO THE BOARD

LEGAL REFERENCES

Maine Revised Statutes Title 38, section 341-D(4) and DEP Rule Chapter 2, section 21(B)

HOW LONG YOU HAVE TO SUBMIT AN APPEAL TO THE BOARD

The Board must receive a written notice of appeal within 30 calendar days of the date on which the Commissioner's decision was filed with the Board.

HOW TO SUBMIT AN APPEAL TO THE BOARD

Signed original appeal documents must be sent to: Chair, Board of Environmental Protection, c/o Department of Environmental Protection, 17 State House Station, Augusta, ME 04333-0017; faxes and photocopies are not acceptable. The person appealing a licensing decision must also send the DEP's Commissioner and the applicant a copy of the documents. All the information listed in the next section must be submitted at the time the appeal is filed. Only the extraordinary circumstances described at the end of that section will justify evidence not in the DEP's record at the time of decision being added to the record for consideration by the Board as part of an appeal.

WHAT YOUR APPEAL PAPERWORK MUST CONTAIN

An appeal must contain the following information:

1. *The findings, conclusions or conditions objected to or believed to be in error.* Specific references and facts regarding the appellant's issues with the decision must be provided in the notice of appeal.
2. *The basis of the objections or challenge.* If possible, specific regulations, statutes or other facts should be referenced. This may include citing omissions of relevant requirements, and errors believed to have been made in interpretations, conclusions, and relevant requirements.
3. *The remedy sought.* This can range from reversal of the Commissioner's decision on the license or permit to changes in specific permit conditions.
4. *All the matters to be contested.* As part of the appeal, the Board will limit its consideration to those arguments specifically raised in the written notice of appeal.

5. *Request for hearing.* The Board will hear presentations on appeals at its regularly scheduled meetings, unless a public hearing is requested and granted. A request for public hearing on an appeal must be filed as part of the notice of appeal.

6. *New or additional evidence to be offered.* The Board may allow new or additional evidence as part of an appeal only when the person seeking to add information to the record can show due diligence in bringing the evidence to the DEP's attention at the earliest possible time in the licensing process or show that the evidence itself is newly discovered and could not have been presented earlier in the process. Specific requirements for additional evidence are found in DEP Rule Chapter 2, section 21(B)(3).

OTHER CONSIDERATIONS IN APPEALING A DECISION TO THE BOARD

1. *Be familiar with all relevant material in the DEP record.* A licensing file is public information made easily accessible by DEP. Upon request, the DEP will make the material available during normal working hours, provide space to review the file, and provide opportunity for photocopying materials. There is a charge for copies or copying services.

2. *Be familiar with the regulations and laws under which the application was processed, and the procedural rules governing your appeal.* DEP staff will provide this information on request and answer questions regarding applicable requirements.

3. *The filing of an appeal does not operate as a stay to any decision.* If an applicant proceeds with a project pending the outcome of an appeal, it runs the risk of the decision being reversed or modified as a result of the appeal.

WHAT TO EXPECT ONCE YOU FILE A TIMELY APPEAL WITH THE BOARD

The Board will formally acknowledge initiation of the appeals procedure, including the name of the DEP project manager assigned to the specific appeal, within 15 days of receiving a timely filing. The notice of appeal, all materials accepted by the Board Chair as additional evidence, and any materials submitted in response to the appeal will be sent to Board members along with a briefing and recommendation from DEP staff. Parties filing appeals and interested persons are notified in advance of the date set for Board consideration of an appeal or request for public hearing. With or without holding a public hearing, the Board may affirm, amend, or reverse a Commissioner decision. The Board will notify parties to an appeal and interested persons of its decision.

II. APPEALS TO MAINE SUPERIOR COURT

Maine law allows aggrieved persons to appeal final Commissioner licensing decisions to Maine's Superior Court, see 38 M.R.S.A. § 346(1); 06-096 CMR 2.21(D); 5 M.R.S.A. § 11001; & MRCivP 80C. Parties to the licensing decision must file a petition for review within 30 days after receipt of notice of the Commissioner's written decision. A petition for review by any other person aggrieved must be filed within 40-days from the date the written decision is rendered. The laws cited in this paragraph and other legal procedures govern the contents and processing of a Superior Court appeal.

ADDITIONAL INFORMATION

If you have questions or need additional information on the appeal process, contact the DEP's Director of Procedures and Enforcement at (207) 287-2811.

Note: The DEP provides this FACT SHEET for general guidance only; it is not intended for use as a legal reference. Maine law governs an appellant's rights.

(A)

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE HOUSE STATION 17 AUGUSTA, MAINE 04333

DEPARTMENT ORDER

IN THE MATTER OF

MERCY HOSPITAL	) SITE LOCATION OF DEVELOPMENT
Portland, Cumberland County	)
MERCY HOSPITAL CAMPUS	) TRANSFER
L-20775-19-F-T (approval)	) FINDINGS OF FACT AND ORDER

Pursuant to the provisions of 38 M.R.S.A. Sections 481 et seq. and 06-096 CMR 2.17, Rules Concerning the Processing of Applications, (August 1, 1994), the Department of Environmental Protection has considered the application of MERCY HOSPITAL with the supportive data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. In Department Orders #L-20775-19-A-N and #L-20775-TG-B-N, dated June 26, 2002, the Department approved the development of a new Mercy Hospital Campus on 85.5 acres of land off Congress Street, adjacent to the Fore River in Portland.

2. The applicant is applying to transfer Department Orders #L-20775-19-A-N and #L-20775-TG-B-N, currently held by Mercy Health System of Maine. On October 8, 2002, the applicant purchased the 85.5-acre parcel.

3. The applicant submitted the following information in support of this transfer request:

   A. Transfer application dated April 23, 2003 and signed by Eileen F. Skinner on behalf of Mercy Health System of Maine and signed by Eileen F. Skinner on behalf of Mercy Hospital.

   B. Financial Capacity: The hospital campus construction costs remain unchanged from the projection of $109,600,000 in the original application submitted to the Department. The project will be funded through a combination of cash, funds from a capital campaign, and debt financing. The applicant submitted a balance sheet that shows its assets to be approximately $100,000,000.

   C. Technical Ability: The applicant has operated Mercy Hospital at 144 State Street in Portland for many years. The applicant has retained the services of DeLuca-Hoffman Associates, Inc. for the planning, design and permitting of the proposed project, and DeLuca-Hoffman Associates, Inc. continues to provide these services to the applicant.

BASED on the above findings of fact, the Department CONCLUDES that MERCY HOSPITAL has provided adequate evidence of financial capacity and technical ability to comply with all conditions of Department Orders #L-20775-19-A-N and #L-20775-TG-B-N, and to satisfy all applicable statutory and regulatory criteria

THEREFORE, the Department APPROVES the above noted application of MERCY HOSPITAL, to transfer of Department Orders #L-20775-19-A-N and #L-20775-TG-A-N, SUBJECT TO THE FOLLOWING CONDITIONS and all applicable standards:

1. The Standard Conditions of Approval, a copy attached.

2. All other Findings of Fact, Conclusions and Conditions remain as approved in Department Order #L-20775-19-A-N, and subsequent orders, and are incorporated herein.

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DONE AND DATED AT AUGUSTA, MAINE, THIS 27th DAY OF June, 2003.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

By: Dawn E Gallagher
DAWN R. GALLAGHER, COMMISSIONER

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES...

Date of initial receipt of application 4/24/2003
Date of application acceptance 5/8/2003

Date filed with Board of Environmental Protection

DBB/L20775FT

FILED
JUN 30 2003
BOARD OF ENVIRONMENTAL PROT.
STATE OF MAINE

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE HOUSE STATION 17 AUGUSTA, MAINE 04333

DEPARTMENT ORDER

IN THE MATTER OF

MERCY HOSPITAL	) SITE LOCATION OF DEVELOPMENT
Portland, Cumberland County	)
MERCY HOSPITAL CAMPUS	) MODIFICATION
L-20775-19-G-M (approval)	) FINDINGS OF FACT AND ORDER

Pursuant to the provisions of 38 M.R.S.A. Sections 481 et seq. and 480-A et seq., and Section 401 of the Federal Water Pollution Control Act, the Department of Environmental Protection has considered the application of MERCY HOSPITAL with the supportive data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. PROJECT DESCRIPTION:

A. History: In Department Orders #L-20775-19-A-N and #L-20775-TG-B-N, dated June 26, 2002, the Department approved the development of a new Mercy Hospital Campus on 85.5 acres off Congress Street, adjacent to the Fore River in Portland. In Department Orders #L-20775-19-C-T, #L-20775-19-D-M, and #L-20775-TG-E-M, the Department approved the partial transfer and modification of the original orders by the Maine Department of Transportation for the construction of a connector road across the property. In Department Order #L-20775-19-F-T, the Department approved the transfer of the original orders to Mercy Hospital.

B. Summary: The applicant is requesting to modify Finding #10 and Special Condition #4 of Department Order #L-20775-19-A-N to allow sufficient time to complete all the remedial tasks outlined in the Voluntary Response Action Plan (VRAP) workplan and submit the required report to the Division of Remediation of the Bureau of Remediation and Waste Management (DR) and the Bureau of Land and Water Quality (BLWQ). The required submission date for the report is June 26, 2003. The applicant requests a two-year extension because the project construction is scheduled to begin in 2004. The DR reviewed and agreed to the proposed change.

C. Current Use of Site: The site of the proposed development is an undeveloped open area and woodland that includes an abandoned railroad yard and rail beds. The site also includes an old gravel pit that has become a freshwater wetland.

2. FINDING:

The proposed project is a minor change and will not significantly affect any issues identified during previous Department reviews of the project site.

Based on its review of the application, the Department finds the requested modification to be in accordance with all relevant Departmental standards. All other findings of fact, conclusions and conditions remain as approved in Department Orders #L-20775-19-A-N, and subsequent orders.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S.A. Sections 481 et seq.:

A. The applicant has provided adequate evidence of financial capacity and technical ability to develop the project in a manner consistent with state environmental standards.

B. The applicant has made adequate provision for fitting the development harmoniously into the existing natural environment and the development will not adversely affect existing uses, scenic character, air quality, water quality or other natural resources in the municipality or in neighboring municipalities.

C. The proposed development will be built on soil types which are suitable to the nature of the undertaking and will not cause unreasonable erosion of soil or sediment nor inhibit the natural transfer of soil.

D. The proposed development meets the standards for storm water management in Section 420-D and the standard for erosion and sedimentation control in Section 420-C.

E. The proposed development will not pose an unreasonable risk that a discharge to a significant groundwater aquifer will occur.

F. The applicant has made adequate provision of utilities, including water supplies, sewerage facilities, solid waste disposal and roadways required for the development and the development will not have an unreasonable adverse effect on the existing or proposed utilities and roadways in the municipality or area served by those services.

G. The activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties nor create an unreasonable flood hazard to any structure.

THEREFORE, the Department APPROVES the application of Mercy Hospital to modify Finding #10 and Special Condition #4 of Department Order #L-20775-19-A-N, SUBJECT TO THE FOLLOWING CONDITIONS and all applicable standards and regulations:

1. The Standard Conditions of Approval, a copy attached.

2. In addition to any specific erosion control measures described in this or previous orders, the applicant shall take all necessary actions to ensure that its activities or those of its agents do not result in noticeable erosion of soils or fugitive dust emissions on the site during the construction and operation of the project covered by this approval.

3. The applicant shall submit a final VRAP remediation report to the DR and the BLWQ by June 26, 2005.

4. All other Findings of Fact, Conclusions and Conditions remain as approved in Department Order #L-20775-19-A-N, and subsequent orders, and are incorporated herein.

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DONE AND DATED AT AUGUSTA, MAINE, THIS 27th DAY OF June, 2003.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

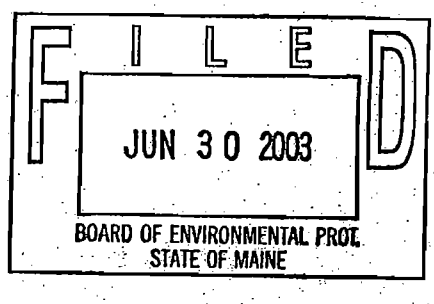
By: Brooke E Barnes Jr
DAWN R. GALLAGHER, COMMISSIONER

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES...

Date of initial receipt of application 4/24/2003
Date of application acceptance 5/8/2003

Date filed with Board of Environmental Protection

DBB/L20775GM



SITE LOCATION OF DEVELOPMENT (SITE)
STANDARD CONDITIONS

STRICT CONFORMANCE WITH THE STANDARD AND SPECIAL CONDITIONS OF THIS APPROVAL IS NECESSARY FOR THE PROJECT TO MEET THE STATUTORY CRITERIA FOR APPROVAL.

1. This approval is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation from the plans, proposals and supporting documents is subject to the review and approval of the Board prior to implementation. Further subdivision of proposed lots by the applicant or future owners is specifically prohibited, without prior approval by the Board of Environmental Protection, and the applicant shall include deed restrictions to this effect.

2. The applicant shall secure and comply with all applicable Federal, State and local licenses, permits, authorizations, conditions, agreements, and orders, prior to or during construction and operation as appropriate.

3. The applicant shall submit all reports and information requested by the Board or Department demonstrating that the applicant has complied or will comply with all conditions of this approval. All preconstruction terms and conditions must be met before construction begins.

4. Advertising relating to matters included in this application shall refer to this approval only if it notes that the approval has been granted WITH CONDITIONS, and indicates where copies of those conditions may be obtained.

5. Unless otherwise provided in this approval, the applicant shall not sell, lease, assign or otherwise transfer the development or any portion thereof without prior written approval of the Board where the purpose or consequence of the transfer is to transfer any of the obligations of the developer as incorporated in this approval. Such approval shall be granted only if the applicant or transferee demonstrates to the Board that the transferee has the technical capacity and financial ability to comply with conditions of this approval and the proposals and plans contained in the application and supporting documents submitted by the applicant.

6. If the construction or operation of the activity is not begun within two years, this approval shall lapse and the applicant shall reapply to the Board for a new approval. The applicant may not begin construction or operation of the development until a new approval is granted. Reapplications for approval shall state the reasons why the development was not begun within two years from the granting of the initial approval and the reasons why the applicant will be able to begin the activity within two years from the granting of a new approval, if granted. Reapplications for approval may include information submitted in the initial application by reference.

7. If the approved development is not completed within five years from the date of the granting of approval, the Board may reexamine its approval and impose additional terms or conditions or prescribe other necessary corrective action to respond to significant changes in circumstances which may have occurred during the five-year period.

8. A copy of this approval must be included in or attached to all contract bid specifications for the development.

9. Work done by a contractor pursuant to this approval shall not begin before the contractor has been shown by the developer a copy of this approval.

(2/81)/Revised November 1, 1979

DEPLW 148

NATURAL RESOURCE PROTECTION ACT (NRPA)
STANDARD CONDITIONS

THE FOLLOWING STANDARD CONDITIONS SHALL APPLY TO ALL PERMITS GRANTED UNDER THE NATURAL RESOURCE PROTECTION ACT, TITLE 38, M.R.S.A. SECTION 480-A ET.SEQ. UNLESS OTHERWISE SPECIFICALLY STATED IN THE PERMIT.

A. **Approval of Variations From Plans.** The granting of this permit is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation form these plans, proposals, and supporting documents is subject to review and approval prior to implementation.

B. **Compliance With All Applicable Laws.** The applicant shall secure and comply with all applicable federal, state, and local licenses, permits, authorizations, conditions, agreements, and orders prior to or during construction and operation, as appropriate.

C. **Erosion Control.** The applicant shall take all necessary measures to ensure that his activities or those of his agents do not result in measurable erosion of soils on the site during the construction and operation of the project covered by this Approval.

D. **Compliance With Conditions.** Should the project be found, at any time, not to be in compliance with any of the Conditions of this Approval, or should the applicant construct or operate this development in any way other the specified in the Application or Supporting Documents, as modified by the Conditions of this Approval, then the terms of this Approval shall be considered to have been violated.

E. **Initiation of Activity Within Two Years.** If construction or operation of the activity is not begun within two years, this permit shall lapse and the applicant shall reapply to the Board for a new permit. The applicant may not begin construction or operation of the activity until a new permit is granted. Reapplications for permits shall state the reasons why the applicant will be able to begin the activity within two years form the granting of a new permit, if so granted. Reapplications for permits may include information submitted in the initial application by reference.

F. **Reexamination After Five Years.** If the approved activity is not completed within five years from the date of the granting of a permit, the Board may reexamine its permit approval and impose additional terms or conditions to respond to significant changes in circumstances which may have occurred during the five-year period.

G. **No Construction Equipment Below High Water.** No construction equipment used in the undertaking of an approved activity is allowed below the mean high water line unless otherwise specified by this permit.

H. **Permit Included In Contract Bids.** A copy of this permit must be included in or attached to all contract bid specifications for the approved activity.

I. **Permit Shown To Contractor.** Work done by a contractor pursuant to this permit shall not begin before the contractor has been shown by the applicant a copy of this permit.

Revised (4/92)

DEP LW0428

(A)

2149/47

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE HOUSE STATION 17 AUGUSTA, MAINE 04333

DEPARTMENT ORDER

IN THE MATTER OF

MERCY HOSPITAL
Portland, Cumberland County
NEW HOSPITAL CAMPUS
L-20775-19-H-M (approval)
L-20775-TG-I-M

) SITE LOCATION OF DEVELOPMENT
) NATURAL RESOURCES PROTECTION
) WATER QUALITY CERTIFICATION
) MODIFICATION
) FINDINGS OF FACT AND ORDER

Pursuant to the provisions of 38 M.R.S.A. Sections 481 et seq. and 480-A et seq., and Section 401 of the Federal Water Pollution Control Act, the Department of Environmental Protection has considered the application of MERCY HOSPITAL with the supportive data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. PROJECT DESCRIPTION:

A. History: In Department Orders #L-20775-29-A-N & #L-20775-TG-B-N, dated June 26, 2002, the Department approved the development of a new Mercy Hospital campus located off Congress Street, adjacent to the Fore River in the City of Portland. Subsequent Department Orders approved several minor modifications to the project and two transfers of the permit.

B. Summary: The applicant proposes, before the permit expires, to extend by two years the time allowed for construction to start on the project approved by Department Orders #L-20775-29-A-N & #L-20775-TG-B-N.

C. Current Use of Site: The project site is currently undeveloped woodlands and scrub-shrub areas adjacent to the Fore River.

2. FINDING:

The proposed project is a minor change and will not significantly affect any issues identified during previous Department reviews of the project site.

Based on its review of the application, the Department finds the requested modification to be in accordance with all relevant Departmental standards. All other findings of fact, conclusions and conditions remain as approved in Department Orders #L-20775-29-A-N & #L-20775-TG-B-N, and subsequent orders.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S.A. Sections 480-A et seq. and Section 401 of the Federal Water Pollution Control Act:

A. The proposed activity will not unreasonably interfere with existing scenic, aesthetic, recreational, or navigational uses.

B. The proposed activity will not cause unreasonable erosion of soil or sediment.

C. The proposed activity will not unreasonably inhibit the natural transfer of soil from the terrestrial to the marine or freshwater environment.

D. The proposed activity will not unreasonably harm any significant wildlife habitat, freshwater wetland plant habitat, threatened or endangered plant habitat, aquatic habitat, travel corridor, freshwater, estuarine, or marine fisheries or other aquatic life.

E. The proposed activity will not unreasonably interfere with the natural flow of any surface or subsurface waters.

F. The proposed activity will not violate any state water quality law including those governing the classifications of the State's waters.

G. The proposed activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties.

H. The proposed activity is not on or adjacent to a sand dune.

I. The proposed activity is not on an outstanding river segment as noted in 38 M.R.S.A. Section 480-P.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S.A. Sections 481 et seq.:

A. The applicant has provided adequate evidence of financial capacity and technical ability to develop the project in a manner consistent with state environmental standards.

B. The applicant has made adequate provision for fitting the development harmoniously into the existing natural environment and the development will not adversely affect existing uses, scenic character, air quality, water quality or other natural resources in the municipality or in neighboring municipalities.

C. The proposed development will be built on soil types which are suitable to the nature of the undertaking and will not cause unreasonable erosion of soil or sediment nor inhibit the natural transfer of soil.

D. The proposed development meets the standards for storm water management in Section 420-D and the standard for erosion and sedimentation control in Section 420-C.

E. The proposed development will not pose an unreasonable risk that a discharge to a significant groundwater aquifer will occur.

F. The applicant has made adequate provision of utilities, including water supplies, sewerage facilities, solid waste disposal and roadways required for the development and the development will not have an unreasonable adverse effect on the existing or proposed utilities and roadways in the municipality or area served by those services.

G. The activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties nor create an unreasonable flood hazard to any structure.

THEREFORE, the Department APPROVES the application of MERCY HOSPITAL to extend the time allowed for construction to start on the project approved by Department Orders #L-20775-29-A-N & #L-20775-TG-B-N by two years from the date of this Order, SUBJECT TO THE FOLLOWING CONDITIONS and all applicable standards and regulations:

1. The Standard Conditions of Approval, a copy attached.

2. In addition to any specific erosion control measures described in this or previous orders, the applicant shall take all necessary actions to ensure that its activities or those of its agents do not result in noticeable erosion of soils or fugitive dust emissions on the site during the construction and operation of the project covered by this approval.

3. All other Findings of Fact, Conclusions and Conditions remain as approved in Department Orders #L-20775-29-A-N & #L-20775-TG-B-N, and subsequent orders, and are incorporated herein.

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DONE AND DATED AT AUGUSTA, MAINE, THIS 22nd DAY OF Aug, 2004.

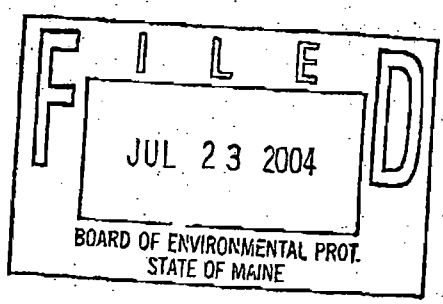
DEPARTMENT OF ENVIRONMENTAL PROTECTION

By: _____
DAWN R. GALLAGHER, COMMISSIONER

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES...

Date of initial receipt of application June 7, 2004
Date of application acceptance June 9, 2004

Date filed with Board of Environmental Protection
LK/ATS52643&52858/L20775HM&IM



NATURAL RESOURCE PROTECTION ACT (NRPA)
STANDARD CONDITIONS

THE FOLLOWING STANDARD CONDITIONS SHALL APPLY TO ALL PERMITS GRANTED UNDER THE NATURAL RESOURCE PROTECTION ACT, TITLE 38, M.R.S.A. SECTION 480-A ET.SEQ. UNLESS OTHERWISE SPECIFICALLY STATED IN THE PERMIT.

A. **Approval of Variations From Plans.** The granting of this permit is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation form these plans, proposals, and supporting documents is subject to review and approval prior to implementation.

B. **Compliance With All Applicable Laws.** The applicant shall secure and comply with all applicable federal, state, and local licenses, permits, authorizations, conditions, agreements, and orders prior to or during construction and operation, as appropriate.

C. **Erosion Control.** The applicant shall take all necessary measures to ensure that his activities or those of his agents do not result in measurable erosion of soils on the site during the construction and operation of the project covered by this Approval.

D. **Compliance With Conditions.** Should the project be found, at any time, not to be in compliance with any of the Conditions of this Approval, or should the applicant construct or operate this development in any way other the specified in the Application or Supporting Documents, as modified by the Conditions of this Approval, then the terms of this Approval shall be considered to have been violated.

E. **Initiation of Activity Within Two Years.** If construction or operation of the activity is not begun within two years, this permit shall lapse and the applicant shall reapply to the Board for a new permit. The applicant may not begin construction or operation of the activity until a new permit is granted. Reapplications for permits shall state the reasons why the applicant will be able to begin the activity within two years form the granting of a new permit, if so granted. Reapplications for permits may include information submitted in the initial application by reference.

F. **Reexamination After Five Years.** If the approved activity is not completed within five years from the date of the granting of a permit, the Board may reexamine its permit approval and impose additional terms or conditions to respond to significant changes in circumstances which may have occurred during the five-year period.

G. **No Construction Equipment Below High Water.** No construction equipment used in the undertaking of an approved activity is allowed below the mean high water line unless otherwise specified by this permit.

H. **Permit Included In Contract Bids.** A copy of this permit must be included in or attached to all contract bid specifications for the approved activity.

I. **Permit Shown To Contractor.** Work done by a contractor pursuant to this permit shall not begin before the contractor has been shown by the applicant a copy of this permit.

Revised (4/92)

DEP LW0428

SITE LOCATION OF DEVELOPMENT (SITE)
STANDARD CONDITIONS

STRICT CONFORMANCE WITH THE STANDARD AND SPECIAL CONDITIONS OF THIS APPROVAL IS NECESSARY FOR THE PROJECT TO MEET THE STATUTORY CRITERIA FOR APPROVAL.

1. This approval is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation from the plans, proposals and supporting documents is subject to the review and approval of the Board prior to implementation. Further subdivision of proposed lots by the applicant or future owners is specifically prohibited, without prior approval by the Board of Environmental Protection, and the applicant shall include deed restrictions to this effect.

2. The applicant shall secure and comply with all applicable Federal, State and local licenses, permits, authorizations, conditions, agreements, and orders, prior to or during construction and operation as appropriate.

3. The applicant shall submit all reports and information requested by the Board or Department demonstrating that the applicant has complied or will comply with all conditions of this approval. All preconstruction terms and conditions must be met before construction begins.

4. Advertising relating to matters included in this application shall refer to this approval only if it notes that the approval has been granted WITH CONDITIONS, and indicates where copies of those conditions may be obtained.

5. Unless otherwise provided in this approval, the applicant shall not sell, lease, assign or otherwise transfer the development or any portion thereof without prior written approval of the Board where the purpose or consequence of the transfer is to transfer any of the obligations of the developer as incorporated in this approval. Such approval shall be granted only if the applicant or transferee demonstrates to the Board that the transferee has the technical capacity and financial ability to comply with conditions of this approval and the proposals and plans contained in the application and supporting documents submitted by the applicant.

6. If the construction or operation of the activity is not begun within two years, this approval shall lapse and the applicant shall reapply to the Board for a new approval. The applicant may not begin construction or operation of the development until a new approval is granted. Reapplications for approval shall state the reasons why the development was not begun within two years from the granting of the initial approval and the reasons why the applicant will be able to begin the activity within two years from the granting of a new approval, if granted. Reapplications for approval may include information submitted in the initial application by reference.

7. If the approved development is not completed within five years from the date of the granting of approval, the Board may reexamine its approval and impose additional terms or conditions or prescribe other necessary corrective action to respond to significant changes in circumstances which may have occurred during the five-year period.

8. A copy of this approval must be included in or attached to all contract bid specifications for the development.

9. Work done by a contractor pursuant to this approval shall not begin before the contractor has been shown by the developer a copy of this approval.

(2/81)/Revised November 1, 1979

DEPLW 148

(2149/47)

RECEIVED
JUL 14 2005

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE HOUSE STATION 17 AUGUSTA, MAINE 04333

DEPARTMENT ORDER

IN THE MATTER OF

MERCY HOSPITAL	) SITE LOCATION OF DEVELOPMENT ACT
Portland, Cumberland	)
MERCY HOSPITAL CAMPUS	) MINOR REVISION/MODIFICATION
L-20775-19-J-M (approval)	) FINDINGS OF FACT AND ORDER

Pursuant to the provisions of 38 M.R.S.A. Sections 481 et seq., the Department of Environmental Protection has considered the application of MERCY HOSPITAL with the supportive data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. PROJECT DESCRIPTION:

A. History: In Department Orders #L-20775-19-A-N and #L-20775-TG-B-N, dated June 26, 2002, the Department approved the development of a new Mercy Hospital Campus on 85.5 acres off Congress Street, adjacent to the Fore River in Portland. In Department Orders #L-20775-19-C-T, #L-20775-19-D-M, and #L-20775-TG-E-M, the Department approved the partial transfer and modification of the original orders by the Maine Department of Transportation for the construction of a connector road across the property. In Department Order #L-20775-19-F-T, the Department approved the transfer of the original orders to Mercy Hospital. In Department Order #L-20775-19-G-M, the Department approved the modification of the original order by Mercy Hospital.

B. Summary: The applicant is requesting to modify Special Condition #3 of Department Order #L-20775-19-G-M to allow sufficient time to complete all the remedial tasks outlined in the Voluntary Response Action Plan (VRAP) workplan and submit the report required by Special Condition #3 to the Division of Remediation of the Bureau of Remediation and Waste Management (DR) and the Bureau of Land and Water Quality (BLWQ). The required submission date for the report is June 26, 2005. The applicant requests a two-year extension because project construction is scheduled to begin by May 2006.

C. Current Use of Site: The site of the proposed development is an undeveloped open area and woodland that includes an abandoned railroad yard and rail beds. The site also includes an old gravel pit that has become a freshwater wetland.

2. FINDING:

The proposed project is a minor change and will not significantly affect any issues identified during previous Department reviews of the project site.

Based on its review of the application, the Department finds the requested modification to be in accordance with all relevant Departmental standards. All other findings of fact, conclusions and conditions remain as approved in Department Order #L-20775-19-A-N, and subsequent orders.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S.A. Sections 481 et seq.:

A. The applicant has provided adequate evidence of financial capacity and technical ability to develop the project in a manner consistent with state environmental standards.

B. The applicant has made adequate provision for fitting the development harmoniously into the existing natural environment and the development will not adversely affect existing uses, scenic character, air quality, water quality or other natural resources in the municipality or in neighboring municipalities.

C. The proposed development will be built on soil types which are suitable to the nature of the undertaking and will not cause unreasonable erosion of soil or sediment nor inhibit the natural transfer of soil.

D. The proposed development meets the standards for storm water management in Section 420-D and the standard for erosion and sedimentation control in Section 420-C.

E. The proposed development will not pose an unreasonable risk that a discharge to a significant groundwater aquifer will occur.

F. The applicant has made adequate provision of utilities, including water supplies, sewerage facilities, solid waste disposal and roadways required for the development and the development will not have an unreasonable adverse effect on the existing or proposed utilities and roadways in the municipality or area served by those services.

G. The activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties nor create an unreasonable flood hazard to any structure.

THEREFORE, the Department APPROVES the application of MERCY HOSPITAL to modify Special Condition #3 of Department Order #L-20775-19-G-M, as outlined in Finding 1, SUBJECT TO THE FOLLOWING CONDITIONS and all applicable standards and regulations:

1. The Standard Conditions of Approval, a copy attached.

2. In addition to any specific erosion control measures described in this or previous orders, the applicant shall take all necessary actions to ensure that its activities or those of its agents do not result in noticeable erosion of soils or fugitive dust emissions on the site during the construction and operation of the project covered by this approval.

3. The applicant shall submit a final VRAP remediation report to the DR and the BLWQ by June 26, 2007.

4. All other Findings of Fact, Conclusions and Conditions remain as approved in Department Order #L-20775-19-A-N, and subsequent orders, and are incorporated herein.

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DONE AND DATED AT AUGUSTA, MAINE, THIS 12th DAY OF July, 2005.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

By: Deborah M. Garrett
DAWN R. GALLAGHER, COMMISSIONER

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES...

Date of initial receipt of application 5/16/2005
Date of application acceptance 6/7/2005

Date filed with Board of Environmental Protection
BC/ATS55404/L20775JM

FILED
JUL 13 2005
BOARD OF ENVIRONMENTAL PROT.
STATE OF MAINE

SITE LOCATION OF DEVELOPMENT (SITE)
STANDARD CONDITIONS

STRICT CONFORMANCE WITH THE STANDARD AND SPECIAL CONDITIONS OF THIS APPROVAL IS NECESSARY FOR THE PROJECT TO MEET THE STATUTORY CRITERIA FOR APPROVAL.

1. This approval is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation from the plans, proposals and supporting documents is subject to the review and approval of the Board prior to implementation. Further subdivision of proposed lots by the applicant or future owners is specifically prohibited, without prior approval by the Board of Environmental Protection, and the applicant shall include deed restrictions to this effect.

2. The applicant shall secure and comply with all applicable Federal, State and local licenses, permits, authorizations, conditions, agreements, and orders, prior to or during construction and operation as appropriate.

3. The applicant shall submit all reports and information requested by the Board or Department demonstrating that the applicant has complied or will comply with all conditions of this approval. All preconstruction terms and conditions must be met before construction begins.

4. Advertising relating to matters included in this application shall refer to this approval only if it notes that the approval has been granted WITH CONDITIONS, and indicates where copies of those conditions may be obtained.

5. Unless otherwise provided in this approval, the applicant shall not sell, lease, assign or otherwise transfer the development or any portion thereof without prior written approval of the Board where the purpose or consequence of the transfer is to transfer any of the obligations of the developer as incorporated in this approval. Such approval shall be granted only if the applicant or transferee demonstrates to the Board that the transferee has the technical capacity and financial ability to comply with conditions of this approval and the proposals and plans contained in the application and supporting documents submitted by the applicant.

6. If the construction or operation of the activity is not begun within two years, this approval shall lapse and the applicant shall reapply to the Board for a new approval. The applicant may not begin construction or operation of the development until a new approval is granted. Reapplications for approval shall state the reasons why the development was not begun within two years from the granting of the initial approval and the reasons why the applicant will be able to begin the activity within two years from the granting of a new approval, if granted. Reapplications for approval may include information submitted in the initial application by reference.

7. If the approved development is not completed within five years from the date of the granting of approval, the Board may reexamine its approval and impose additional terms or conditions or prescribe other necessary corrective action to respond to significant changes in circumstances which may have occurred during the five-year period.

8. A copy of this approval must be included in or attached to all contract bid specifications for the development.

9. Work done by a contractor pursuant to this approval shall not begin before the contractor has been shown by the developer a copy of this approval.

(2/81)/Revised November 1, 1979

DEPLW 148

SECTION 02001 – CIVIL ENGINEERING REQUESTS FOR INFORMATION

PART 1 – GENERAL

1.1 – SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for handling and processing "Requests for Information (RFI).

2. "Request for Information" form is attached at the end of this Section.

3. Request/limit of use for AutoCAD files.

1.2 - DEFINITION

A. Requests for Information: A formal process used during the construction phase to facilitate communication between the contractor, the Owner's representative, the Architect's Clerk of the Works, and the Civil Engineer with regard to requests for additional information and clarification of the intent of the Contract Documents (Drawings and Specifications).

B. Do not use "Request for Information" form during bidding. Direct questions during bidding phase as indicated in the bid documents.

1.3 - PROCEDURE

A. Conditions Requiring Clarification and the Contract Documents:

1. Contractor shall submit a "Request for Information" to the Owner and request review by the Civil Engineer.

2. Submit "Request for Information" from the Contractor's office or field office only. "Requests for Information" submitted directly from subcontractors or suppliers will not be accepted.

3. Generate "Requests for Information" by one source per project and number accordingly.

4. Submit one "Request for Information" per form.

B. Engineer will review RFI from the Contractor with reasonable promptness and the Contractor will be notified in writing of decisions made.

1. The Engineering Consultant's written response to the RFI shall not be considered as a Change Order or Change Directive, nor does it authorize changes in the Contract Sum or Contract Time.

C. Contractor shall maintain a log of "Requests for Information" sent to, and responses from Engineer "Requests for Information" log shall be sent, by Fax, every Friday to the Engineer.

D. All "Requests for Information" regarding scheduling, costing, and Owner provided equipment coordination shall be directed to the Architect.

1.4 - REQUEST FOR INFORMATION FORM

A. Submit "Requests for Information" on the attached "Request for Information" form, or format accordingly on letterhead. Engineer will not respond to requests for information unless this form or format is utilized.

Where submittal form or format does not provide space needed for complete information, additional sheets may be attached.

1.5 – REQUEST FOR ELECTRONIC MEDIA

Contractors may request AutoCAD disks for use in determining earthwork quantities. Contractors may obtain these disks by submitting the enclosed form to the Architect. This form restricts the use of this data.

DeLUCA HOFFMAN ASSOCIATES, INC.
CONSULTING ENGINEERS

778 MAIN STREET
SUITE 8
SOUTH PORTLAND, MAINE 04106
TEL. 207 775 1121
FAX 207 879 0896

- SITE PLANNING AND DESIGN
- ROADWAY DESIGN
- ENVIRONMENTAL ENGINEERING
- PERMITTING
- AIRPORT ENGINEERING
- CONSTRUCTION ADMINISTRATION
- LANDSCAPE ARCHITECTURE

ELECTRONIC MEDIA TRANSFER

Recipient: _____

Date: _____

Firm/Location: _____ **Fax:** _____

Sender: _____

Re: _____

Via: ☐ E-mail Address: _____

☐ Floppy Disk ☐ Zip Disk ☐ CD-R ☐ Data Cartridge Tape

☐ Other _____

☐ Individual ☐ Zipped File Name(s): _____

_____

File(s) Sent By: _____

Remarks: _____

_____

Copies To: _____

_____

Receipt and/or use of these files in whole or in part constitutes Recipient's agreement to the following:

a) This information is for use on the _____ project only. Reuse of the data without forwarding a print copy to, and without authorization and/or adaptation by DeLuca-Hoffman Associates, Inc. will be at the sole risk of the user and without liability or legal exposure to DeLuca-Hoffman Associates, Inc., its dependent consultants and professional associates. DeLuca-Hoffman Associates, Inc. does not represent that the data is suitable for reuse on the specific project or any other projects. Furthermore, the user shall indemnify and hold harmless DeLuca-Hoffman Associates, Inc., its independent consultants and professional associates from any and all claims, damages, losses and expenses, and including attorney's fees, through appeal, arising out of or resulting there from.

b) Copies that can be relied upon of data transferred between the Engineer and the Client are limited to printed copies (also known as hard copies). Files delivered in electronic format are only for the convenience of the receiving party. Any conclusion or information derived from such files shall be at the user's sole risk.

c) Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic data agrees that it will perform acceptance tests upon receipt, after which the receiving party shall be deemed to have accepted the data. Any errors detected upon receipt shall be corrected by the delivering party. DeLuca-Hoffman Associates, Inc. makes no representations to the Recipient or others as to the long-term usability or readability of electronic media or of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the creating party.

_____ _____

Authorized Representative Date

REQUEST FOR INFORMATION FROM THE ENGINEER

RFI NO. _____

DATE: _____ PROJECT: _____
(City, State)

TO: _____

FROM: _____ DRAWING NO. _____
(General Contractor)

_____ DETAIL NO. _____
(Project Superintendent)

_____ SPECS SECTION NO. _____
(Job Site Fax Number)

RFI Type:

( ) Demolition
( ) Site Preparation
( ) Earthwork
( ) Rock
( ) Erosion Control
( ) Storm Sewer
( ) Utilities
( ) Paving
( ) Landscape/ Irrigation
( ) Site Lighting
( ) Slope Stabilization Retaining Walls
( ) Traffic Related
( ) Other

Information Requested: _____

Requested By: _____

Reply: _____

_____ _____
Response By: Date:

File Distribution:

SECTION 02009 – LAYOUT OF WORK

PART 1 - GENERAL

1.01 - GENERAL PROVISIONS

A. The Owner has retained Owen Haskell Inc., licensed land surveyors, to establish a project benchmark and to establish the site property boundary on the Maine State Coordinate Grid. For the purposes of this specification, this shall be the limit of Owner provided survey control to the contractor.

B. The Contractor shall employ a licensed land surveyor in the State of Maine to lay out the work from the established reference points and bench marks, base lines, and the coordinate system indicated on the drawings, and shall be responsible for all measurements in connection with the layout. AutoCAD 2004 files will be furnished to the Contractor upon written request. The licensed land surveyor shall certify in writing that the layout was performed under his/her direct supervision and is correct and meets the requirements of the contract documents. A copy of the certificate shall be furnished to the Architect.

The Contractor shall furnish, at Contractor's own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Owner. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Owner until authorized to remove them. If such marks are destroyed by the Contractor or through Contractor's negligence before their removal is authorized, the Owner may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

C. The layout shall establish the locations of silt fence and areas of trees to be protected for review and approval of the Owner prior to clearing.

D. Establish and plainly mark center lines for the site work and such other lines and grades that are reasonably necessary to properly assure that location, orientation, and elevations established for each structure, roadways, utilities, and parking lots, are in accordance with lines and elevations shown on contract drawings.

E. Following completion of general mass excavation and before any other permanent work is performed, establish and plainly mark sufficient additional survey control points or system of points as may be necessary to assure proper alignment, orientation, and grade of all major features of work.

1. Such additional survey control points or system of points thus established shall be checked and certified by a registered land surveyor or registered civil engineer. Furnish such certification to the Owner before any work is placed.

2. A detailed check of all coordinates, resultant pipe lengths, backslopes, and appurtenant locations shall be made by the registered land surveyor or civil engineer and provided to the Owner prior to starting utility lines.

F. During progress of work, the Contractor shall have line grades and plumbness of all major work checked and certified by a registered land surveyor or registered civil engineer as meeting requirements of contract drawings. Furnish such certification to the Owner before any major items are placed. In addition, Contractor shall furnish to the Owner certificates from a registered land surveyor or registered civil engineer that the following work is complete in every respect as required by contract drawings.

1. Elevations of all pavement areas and building pads.

2. Lines and elevations of sewers, storm drains, utility systems.

3. Lines of elevations of all swales and drainage areas.

4. Lines of elevations of parking area.

5. Horizontal and alignment of all access drives.

6. Record conditions of the stormwater management system.

After binder pavement is placed, the Contractor shall have the binder surface surveyed to verify that grades have been established within Specification Section 02511. A profile of each drive with elevations at 50 stations and location of spot grades shown on the grading and drainage plan including all frames and covers shall be obtained by the surveyor, recorded on the plans, and provided to the Engineer for review. Any areas not meeting the design requirements shall be corrected by the Contractor by removal of binder pavement and replacement at no cost to the Owner.

G. Record Drawings:

1. The Contractor shall record the following information for buried utilities including the location of all appurtenances and controls including control or shutoff valves, manholes, head holes, inlets, and all changes in pipe direction.

2. All information shall be identified on a CAD reproducible drawing by a number or letter with a schedule of locations by coordinates tied to the Maine State Coordinate Grid.

H. The location of catch basins and manholes shall be accurately located by a registered land surveyor. Catch basins and manholes shall be located from the layout data and established on the contract drawings.

I. Whenever approved changes from contract drawings are made in line or grading requiring certificates, record such changes on a reproducible drawing bearing the registered land surveyor or registered civil engineer seal, and forward these drawings upon completion of work to the Architect.

J. Changes in location, additions and appurtenant items such as, but not limited to, manholes, inlets, pipe lines and conduits shall be shown in same manner as on contract drawings (by coordinates or dimensions from buildings); however, if no such locations are shown on contract drawings, changes in locations of items shall be shown by a sufficient number of right-angled dimensions from the nearest building.

K. Contractor is responsible for all costs associated with layout of work, and any costs associated with correcting non-conforming work or with restoring the landscape to its original condition.

L. The coordinates or data shown on the civil drawings for the building shall be for orientation only. Use the architectural and structural drawings for exact building dimensions and layout data for the building.

M. The survey data obtained for this section shall be incorporated into the project record drawings and profiles.

SECTION 02050 – DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Demolition and removal of designated site structures, existing utility poles, fencing, site lighting or other ancillary features from the site.

B. Demolition and removal of existing pavements, sidewalks, utilities, storm drains, signage or landscaping.

C. Disconnecting and capping or removal of identified utilities which are not proposed to be used as part of this project.

D. Filling voids in subgrade created as a result of removals or demolition.

E. Removal and disposal of solid waste in accordance with the Voluntary Response Action Program (VRAP).

1.02 RELATED SECTIONS

A. Section 02100 - Site Preparation.

B. Section 02200 – Earthwork.

C. The work shall comply with the erosion control plan appended to the end of Section 02270.

D. Section 02227 - Aggregate Materials: Backfill materials.

E. Construction drawings.

F. Stormwater Pollution Prevention Plan.

G. Voluntary Response Action Program (VRAP) including Environmental Site Assessment reports and remedial work plan.

1.03 PROJECT RECORD DOCUMENTS

A. Accurately survey record actual locations of capped utilities, and subsurface obstructions.

1.04 REGULATORY REQUIREMENTS

A. Conform to applicable local code for demolition of structures, safety of adjacent structures, dust control and runoff control.

B. Comply with all recommendations and findings outlined in the VRAP document and No Action Assurance letter from the DEP.

C. Obtain required permits and licenses from authorities. Pay associated fees including disposal charges.

Permits, fees, and licenses shall be secured and paid for by the General Contractor. It is the General Contractor's responsibility and obligation as part of the contract to pay for all charges for containers, transport, tipping fees, and disposal of all solid waste generated during the construction of the project. These fees shall be paid for by the General Contractor and included as part of the base bid. The Owner will not reimburse the General Contractor for these fees separately. The General Contractor shall provide the Owner with appropriate "bills of lading" demonstrating proper disposal of all waste. The Owner's agent for transport of all solid waste is identified in Section 4 of the Portland Site Plan Permit Application.

The State of Maine Department of Environmental Protection Site Location of Development Permit and Portland Site Plan approvals for this project have specific requirements for the transport and disposal of solid waste. The General Contractor shall review these requirements and enter into a contract for the transportation and disposal of all solid waste in accordance with representations made in the permit application as well as the conditions of the permit. This includes demolition debris, land clearing debris as well as construction debris. A copy of Section 4 of the permit application is appended to this section of the specifications. The quantities contained within Section 4 are for permitting purposes only and actual quantities may vary significantly. It is the responsibility of the General Contractor to determine actual quantities.

Any modification/revision to the representations made within Section 4 of the Site Plan Permit Application with regards to transport/disposal of solid waste requires the General Contractor to file an "Application for Project Modification" with the Maine Department of Environmental Protection. Any fees associated with preparing/processing of this application shall be the responsibility of the General Contractor.

D. Notify affected utility companies before starting work and comply with their requirements.

E. Do not close or obstruct roadways or sidewalks without permits.

F. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.

G. Test soils around buried tanks for contamination.

1.05 JOB CONDITIONS

A. The existing Metal Building will be demolished.

B. Owner assumes no responsibility for condition of items to be demolished.

C. Removed items of salvageable value to Contractor may be removed from the site with the Owner's permission except where noted on the Drawings to be salvaged or reused. Storage or sale of removed items on site will be permitted but shall not interfere with any other work in the contract documents.

D. Conditions existing at time of inspection for bidding purposes will be maintained by Owner in so far as practicable.

E. Explosives shall not be brought to site or used without written consent of authorities having jurisdiction. Such written consent will not relieve Contractor of total responsibility for injury to persons or for damage to property due to blasting operations. The performance of any required blasting shall comply with governing regulations.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

Aggregate materials specified in Section 02227.

PART 3 - EXECUTION

3.01 PREPARATION

A. Provide, erect, and maintain temporary barriers and security devices at locations indicated.

B. Protect existing landscaping materials, appurtenances and structures which are not to be demolished. Repair damage caused by demolition operations at no cost to Owner.

C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring.

D. Mark location of utilities. Protect and maintain in safe and operable condition the utilities to remain. Prevent interruption of existing utility service occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing authorities.

3.02 DEMOLITION REQUIREMENTS

A. Conduct demolition to minimize interference with adjacent structures or pavements.

B. Cease operations immediately if adjacent structures appear to be in danger. Notify authority having jurisdiction. Do not resume operations until directed.

C. Conduct operations with minimum interference to public or private access. Maintain access and egress at all times.

D. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon or limit access to their property.

E. Sprinkle work with water to minimize dust. Provide hoses and water connections for this purpose.

F. Comply with governing regulations pertaining to environmental protection.

G. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to start of work.

3.03 DEMOLITION

A. Proceed in the demolition and remove materials from site using methods as required to complete work within limitations of governing regulations.

B. Demolish concrete and masonry in small sections. Break up concrete slabs-on-grade that are two or more feet below finished grade. Remove slabs within 2 feet of finished grade.

3.04 FILLING VOIDS

A. Completely fill below grade areas and voids resulting from demolition using approved granular fill materials as specified in the Geotechnical Report, free from debris, trash, frozen materials, roots and other organic matter.

B. Ensure that areas to be filled are free of standing water, frost, frozen, or unsuitable material, trash and debris prior to fill placement.

C. Place fill materials in horizontal layers not exceeding 8" in loose depth and compact each layer at optimum moisture content of fill material to proposed density, unless subsequent excavation for new work is required.

D. Grade surface to match adjacent grades and to provide flow of surface drainage after fill placement and compaction.

3.05 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove from site debris, rubbish, and other materials resulting from demolition operations. All demolished or removed items shall be disposed of in accordance with the applicable State, Local and Federal regulations. Specific reference is made to Section 5 of the Maine Department of Environmental Protection Site Location of Development Permit Application and Section 4 of the Portland Site Plan application attached hereto.

B. Stumps and grubbings may be stockpiled in the area indicated on the Project Plans and in accordance with Local and State regulations.

C. Transport materials removed with appropriate vehicles and dispose off-site to areas which are approved for disposal by governing authorities and appropriate property owners.

D. The Site Location of Development Permit issued by the State of Maine for this project has specific requirements for the transport and disposal of solid waste. The Contractor shall review these requirements and enter into a contract for the transportation and disposal of all solid waste in accordance with representations made in the permit application as well as the conditions of the permit. A copy of Section 5 of the Permit Application can be made available upon request. If the Contractor desires to change the transportation or location of the disposal of solid waste, a permit modification to the Site Location of Development Permit shall be filed by the Contractor. The Owner shall assume no responsibility for the time required to process this modification nor any resultant delays.

E. The permits issued for this project prohibit the placement of any material in wetlands not specifically shown on the Contract Documents.

F. Areas of any existing on-site solid waste shall be disposed of in accordance with applicable State, Local and Federal regulations. The Contractor shall review the site conditions to determine the quantity and composition of waste.

3.06 UTILITY SERVICES

A. Demolish and remove outside utility lines as follows:

1. Any utility which is to be abandoned and located within 36 inches of the final finish grade.

2. Any storm drain which is to be abandoned.

3. Any overhead utility which is discontinued.

4. Other abandoned lines which would interfere with performance of this contract.

B. Plug and seal any abandoned utility lines not scheduled for removal as follows:

1. All pipelines shall be plugged at any appurtenant opening or point of breakage which occurs during construction of the work.

2. The portion of the appurtenant utility structures which is more than 36 inches below grade shall be dewatered, all entry lines shall be sealed, and the void shall be filled with clean stone gravel or sand and compacted.

PORTLAND SITE PLAN PERMIT APPLICATION

SECTION 4 - SOLID WASTE

SECTION 4

SOLID WASTE

The following information is provided in accordance with the City of Portland Code of Ordinances, Chapter 14, Land Use, Section 14-525 (c) (4).

4.0 Overview

This section of the application provides the estimates, the use of recycling, and the transport and disposal of solid wastes that will be generated by construction of the Mercy Hospital Project. This section also provides information on the disposition of solid wastes generated during operation of the hospital facilities. The applicant anticipates contracting with a local licensed waste hauler, both during construction and during normal operation of the site.

4.1 Solid Wastes Generated During Construction of the Site

The solid waste generated during the site work portion of the project is expected to consist of a substantial amount of household waste, building debris, car parts and household appliances that have been dumped throughout the site. Other solid wastes include building demolition debris from the metal-framed warehouse on the former Merrill property. This solid waste will need to be transported to an offsite location that is licensed for each type of materials disposed of.

Prior to building demolition, the asbestos or other hazardous materials (e.g., floor tile, roofing components) will be abated from the building and disposed of at a licensed hazardous waste landfill.

The building demolition will include the removal of the wood, metal and concrete floor slabs. These materials will be brought to the Portland Recycling Center on Riverside Street in Portland, Maine.

Special waste that must be removed from the site includes a small amount of old car parts such as fuel tanks. If encountered, petroleum-saturated soils will be excavated and delivered to a recycling facility such as Commercial Paving in Scarborough, Maine.

Old railroad ties will be salvaged to the extent practicable; otherwise they will be disposed of at Commercial Recycling in Scarborough, Maine.

Old pier and dock remnants along the shorefront will be removed to the extent practicable to improve the shoreline appearance.

Stumps and wood waste generated by the tree clearing will be chipped on site and the biomass used for erosion control.

The Applicant has proposed a Voluntary Response Action Plan (VRAP) that will address site contaminants including coal ash that will be left in place or excavated where necessary and placed as fill into low areas where it can be capped with clean fill and a bituminous asphalt surface.

The coal ash will be covered over by use of the following methods:

- Place 24" of clean fill over it
- Place 8" clean loam underlain by geotextile fabric
- Cover with paved or hard surfaces

Other solid waste will be minor. Some cardboard or kraft wrapping is anticipated for the light poles. Other solid waste could include various containers, short lengths of pipe, or conduit. Additionally, the construction workers may generate other solid wastes. The construction contract will require the Contractor to attempt a recycling level of 75%. Materials not recycled will be required to be disposed of at the locations specified in Section 4.2.

The volume of solid waste related to the site work and debris cleanup that will be hauled for disposal is estimated by DeLuca-Hoffman Associates, Inc. to be approximately 2,000 cubic yards, based simply on our visual reconnaissance. The estimated amount of stumps, brush, soil, rock and other earthwork waste is approximately 3,000 cubic yards. This material will be removed from the site and disposed of at a licensed facility or recycling area. The volumes of waste are estimates only. The contractor shall measure the actual volumes at the time of construction and be responsible for the proper handling and disposal of all solid waste.

4.2 Solid Waste Generated During the Construction of the Buildings

The building construction will generate wastes during construction that include excess building materials such as metals, plastic, glass and synthetic materials. Approximately 2,900 cubic yards of solid waste are estimated.

The computed solid waste which will be generated during construction of the buildings is as follows:

- Construction Debris and Waste: 355 c.y. after recycling
- The contract will provide a goal for recycling of solid waste of 75%.
- The contract will require a plan for recycling and the location of recycling facilities to be identified prior to removal of any solid wastes from the site.
- Unless otherwise changed by a MeDEP permit modification, the waste stream will be transported and disposed of at the following locations:

Asbestos and Mixed Construction Material:	Waste Management in Norridgewock, Maine or Sawyer Landfill in Hampden (Contractor option)
Separated Wood Construction Debris:	KTI Wood Recycling Facility in Lewiston, Maine or Riverside Recycling in Portland, Maine
Separated Metal/Ferrous Material:	EWS of Maine in Saco, Maine, Grimmel Industries in Topsham, Maine, or Riverside Recycling in Portland, Maine (Contractor option).
Masonry Debris:	Shaw Brothers – H – PIT, Gorham, Maine

- The collection, transfer, disposal, and payment of all fees for solid wastes shall be the responsibility of the Contractor.

4.3 Solid Waste Generated from the Operation of the Hospital

The Mercy Hospital Plant & Engineering Department was requested to provide information concerning the collection, transport, and disposal of solid wastes generated from the facilities operations. This information, in the form of a questionnaire, is provided in Attachment B. The waste from the existing Hospital operations is disposed of as follows:

Type	Disposal Facility/Hauler
Biomedical Waste	Stericycle in Massachusetts
Regular Trash	Waste Management
Recyclables	Wm. Goodman & Sons
Chemical Waste	Clean Harbors

4.4 Hazardous and Special Wastes

The Hospital has also summarized its anticipated use of cleaners, solvents, etc. as stated in Attachment B. Biomedical waste is segregated at the point of generation to prevent entrance into the non-infectious waste stream. Mercy Hospital maintains a Biomedical Waste Generator Registration (Reg. #0457) that will continue to apply with the proposed facility. Management of all hazardous chemical wastes will be in accordance with the State of Maine Hazardous Waste Management Rules as adopted pursuant to 30 M.R.S.A. Section 1301 et. seq. The Maine Hazardous Waste, Septage and Solid Waste Management Act, March, 1987.

The Hospital may maintain a nuclear medicine department. The current procedures will be maintained in the new hospital. These include the storage of materials in a lead-lined, secure cabinet. Hazardous materials associated with the nuclear medicine procedures have a short shelf life and are rendered to bio-medical solid waste normally within one month of use, after which they are disposed of with the ordinary bio-medical waste. The Hospital currently does not require removal of radioactive materials and does not anticipate such in the current proposal.

4.5 Attachments

A. Computations of Types and Volumes of Solid Wastes for Construction Project.

B. Information Pertaining to Solid Waste Generation, Collection and Disposal Resulting from the Operation of the School Facilities.

ATTACHMENT A

Computations of Types and Volumes of Solid Wastes For the Construction Project

SOLID WASTES COMPUTATIONS AND DISPOSAL

Wood Wastes from Clearing Operations:

The basis for the quantity computations assumes that there will be an estimated 200 cubic yards of stumps per acre.

Location	Area to be Cleared	Rate per Acre	Yield
Pasture	N/A	0 c.y. per acre	0 cubic yards
Wooded Area	14.3	400 c.y. per acre	5,739 cubic yards
		Total	**5,739 cubic yards**

Wastes Associated with Other Site Construction:

These wastes are such things as cardboard from packaging, short lengths of pipe or conduit, etc. The quantities of this should be limited. Construction documents will require a recycling program with a specified goal of 75% recycling.

New Building Construction:

Basis of Estimate: 10 cubic yards per 1,500 square feet of finished space.

Areas:
Medical Office: 75,000 +/- square feet
Ambulatory Care: 138,000 +/- square feet
Total: 213,000 +/- square feet

Solid Waste: 1,420 cubic yards

Set a goal in the construction documents to require segregation of cardboard and paper with a goal of 75%.

Total: 1,420 cubic yards before recycling

Net: 355 cubic yards if 75% of material is recycled

Require Contractor to: Provide 30 c.y. dumpster. Haul to facilities identified in Section 4.2 with shipping manifest. The contractor should identify recycling methods and sites prior to construction.

MeDEP VOLUNTARY RESPONSE ACTION PLAN

No Action Assurance Requirements

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

(D)

ANGUS S. KING, JR.
GOVERNOR

MARTHA KIRKPATRICK
COMMISSIONER

April 4, 2002

Dr. Steven Hess
Mercy Health System of Maine
144 State Street
Portland, Maine 04101

Re: Proposed Mercy Hospital a.k.a. Fore River Transportation Park, County Way, Portland, Maine-Voluntary Response Action Program
No Action Assurance Letter

Dr. Hess:

The Maine Department of Environmental Protection ("Department") has received and reviewed the environmental site assessment report and remedial workplan for the Proposed Mercy Hospital property located on County Way, Portland, Maine, submitted by your consultant, Hoffman Engineering Inc. (HEI). HEI forwarded the documents to the Department with the request that the site participate in the Voluntary Response Action Program ("VRAP"). The workplan outlines the remedial measures to be implemented at the property.

Based on the Department's review of the HEI assessment report the Department concurs with the proposed recommendations including:

- The existing AST will be pumped, cleaned and disposed of off site.
- The floor drain in the warehouse building will be investigated and if associated soils are determined to be contaminated they will be excavated and removed from the site.
- Asbestos will be removed from the two existing buildings to be demolished prior to demolition.
- The existing septic system will be pumped out and removed.
- Trash and debris will be segregated and disposed of appropriately off site.
- The dross pile area will be properly disposed of off site.
- The railroad ties and metal rails will be excavated and properly disposed of off site.
- Care will be taken during site preparation to control dust and erosion onsite.
- Trees and vegetation cut in the construction area will be properly disposed of off site.
- All trucks and equipment used in areas with ash or lead contamination will be decontaminated prior to leaving the site.
- Loam and subsoil excavated on the site that is stockpiled for reuse will be tested for lead. The lead must be below the Department remedial action guideline of 375mg/kg.
- Topsoil in the vegetated areas that will remain at the site will be spot checked at a minimum of 1 sample every 500 square feet for the presence of lead. Areas with visible ash will be considered contaminated. Areas with lead levels greater than 375mg/kg will be covered with

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688
RAY BLDG., HOSPITAL ST.

BANGOR
106 HOGAN ROAD
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769-2094
(207) 764-0477 FAX: (207) 764-1507

web site: www.state.me.us/dep

a minimum of 4 inches of clean soil, however 8 inches of clean soil is preferred where possible. The areas will then be seeded and mulched.

- Ash or lead contaminated soil excavated onsite will be capped by parking lot areas that will be constructed onsite.
- Unsaturated petroleum contaminated soil excavated onsite will be capped by parking lot areas. Saturated soils encountered onsite will be appropriately disposed of off site.
- Any subsurface utilities brought onto the site will be contained in clean bedding materials.
- Areas onsite used as containment for contaminated soils will be constructed as detailed in the VRAP.

Provided that the proposed recommendations are successfully implemented, Mercy Health System of Maine and their successors and/or assigns, will be granted the liability protection provided by 38 M.R.S.A. § 343-E(1) for the property located on County Way on Portland. The site is further identified as the following Tax Map/Block/Lot of the Portland Tax Assessor: 73/A/1, 74/A/2, 74/A/22, 74/A/1, 75/A/3, 75/A/17, 76/A/1 and 76/A/33. The Department will take no action against Mercy Health System of Maine and those persons identified in 38 M.R.S.A. § 343-E(6).

Once the recommended remedial measures to be implemented at the property are completed, a report demonstrating the successful implementation of the tasks should be sent to the VRAP. Upon determining successful conclusion of the remedial tasks, the Department will issue to Mercy Health System of Maine a Commissioner's Certificate of Completion (COC). The COC, the deed restrictions outlined in the VRAP as well as the "as built plans" of the site showing the areas of contaminated soils will be recorded at the Cumberland County Registry of Deeds.

If you have any questions regarding this letter, please feel free to call me at 207-287-7716.

Sincerely,

Jean Firth

Jean Firth, Environmental Specialist
Site Assessment and Support Services
Division of Remediation
Bureau of Remediation and Waste Management

cc: Robert Hoffman , HEI
Steve Bushey, DHAI
Matthew Manahan, Pierce Atwood
P.D. Merrill, Merrill Industries
Roland Theriault, Portland Terminal Company
Larry Plotkin, The Plotkin Company

SECTION 02100 – SITE PREPARATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Clearing site of debris, grass, trees and other plant life in preparation for site or building excavation work.

B. Protection of existing structures, trees or vegetation indicated on the contract documents to remain. Unless otherwise shown, the grading limit shown on the drawings is the work limit. The Owner reserves the right to adjust the layout or clearing limit to protect major trees.

C. Stripping topsoil from areas that are to be incorporated into the limits of the project and where so indicated on the construction drawings.

1.02 RELATED SECTIONS

A. Section 02000 - Site Location of Development Permit

B. Section 02050 – Demolition

D. Section 02200 – Earthwork

C. Section 02270 - Slope Protection and Erosion Control

E. Construction Drawings

F. Geotechnical Report

An erosion/sedimentation control program has been prepared for this project and is a part of the State Permit Applications. The program is appended to Section 02270, Slope Protection and Erosion Control, of these specifications. Scheduling constraints, stabilization of disturbed areas, and the other requirements of this program shall be strictly adhered to. Any and all penalties which are imposed on the Owner for the failure to comply with these provisions shall be paid by the Contractor.

A subsurface geotechnical investigation of the site was undertaken as a part of this project. A copy of the geotechnical investigation is being provided as part of the bid documents. This document was obtained only for the Owner's use in design, and interpretation of the data for purposes of construction is the responsibility of the Contractor. The report is being made available for information purposes, but is not a warranty of subsurface conditions. Bidders shall visit the site and acquaint themselves with existing conditions. Refer to the General Conditions, as amended for limitations to the use of the geotechnical data.

1.03 ENVIRONMENTAL REQUIREMENTS

A. Construct temporary erosion control systems as shown on the plans or as described in the erosion control report appended to Section 02270, and as required by the Permits to protect adjacent properties and water resources from erosion and sedimentation.

B. Site work on this project will disturb five (5) or more acres and the Contractor shall NOT begin construction without a "General Permit for Stormwater and Dewatering Wastewater from Construction Activities" governing the discharge of storm water from the construction site for the entire construction period. The permit requires a "Storm Water Pollution Prevention Plan" (SWP^3) to be in place during construction which includes monitoring of storm water flows during construction.

The Contractor shall be totally responsible for conducting the stormwater management practices in accordance with the General Permit and for any enforcement action taken or imposed by Federal or State agencies, including the cost of fines, construction delays, and remedial actions resulting from the Contractors failure to comply with all provisions of the General Permit.

The Contractors responsibilities for compliance with this plan are outlined in the Erosion/Sediment Control Plan for this project. A Notice of Intent to File Form must be sent to MeDEP 14 days prior to start of construction.

1.04 JOB CONDITIONS

A. Conditions existing at time of inspection for bidding purposes will be maintained by the Owner in so far as practical.

B. Variations to conditions or discrepancy in actual conditions as they apply to site preparation operations are to be brought to the attention of the Owner prior to the commencement of any site work.

PART 2 – PRODUCTS

Off-site materials shall be transported to the project site using well-maintained and operating vehicles. Once onsite, transporting vehicles shall stay on designated haul roads and shall at no time endanger improvements by rutting, overloading, or pumping.

PART 3 – EXECUTION

3.01 PREPARATION

A. Verify that existing plant life and clearing limits are clearly tagged, identified and marked in such a manner as to insure their safety throughout construction operations. Mark the clearing limits for review by the Owner.

3.02 PROTECTION

A. Locate and identify existing utilities that are to remain and protect them from damage.

B. Protect trees, plant growth and features designated to remain as final landscape.

C. Conduct operations with minimum interference to public or private accesses and facilities. Maintain access and egress at all times and clean or sweep any roadways daily or as required by the governing authority. At such times as deemed necessary by the Owner, dust control shall be provided with sprinkling systems or equipment provided by the Contractor.

D. Protect benchmarks, property corners and all other survey monuments from damage or displacement. If a marker needs to be removed it shall be referenced by a licensed land surveyor and replaced, as necessary, by the same.

E. Provide traffic control as required, in accordance with the U.S. Department of Transportation "Manual of the Uniform Traffic Control Devices" and the state highway department requirements. The Contractor shall be responsible for preparing, submitting and receiving approval of a traffic control plan, if required, from the Maine Department of Transportation and the City of Portland for all work within the public right-of-way.

3.03 CLEARING – GENERAL

A. The Contractor shall identify by means of flagging or other suitable measures the proposed work clearing limits for approval by the Owner prior to clearing activity. Clear areas required for access to site and execution of work.

B. Unless otherwise indicated on the drawings or modified by the Owner, remove trees, shrubs, grass, other vegetation, improvements, or obstructions interfering with installation of new construction. Removal includes digging out stumps and roots. Depressions caused by clearing and grubbing operations are to be filled to subgrade elevation to avoid water ponding. Satisfactory fill material shall be placed in horizontal layers not exceeding 8" loose depth, and thoroughly compacted per fill requirements of this section and Section 02200.

C. Stumps and grubbings may be burned on the site in the area designated on the Contract Drawings. The ash from burning shall be mixed with eight parts loam to one part ash and used for restoration.

3.04 TOPSOIL EXCAVATION – GENERAL

A. Strip topsoil from areas that are to be filled, excavated, landscaped or re-graded to such a depth that it prevents intermingling with underlaying subsoil or questionable materials. It is very important to avoid intermixing topsoil with underlying material.

B. Cut heavy growths of grass from areas before stripping and remove with the rest of the cleared vegetative material.

C. Topsoil shall consist of organic surficial soil found in depths of not less than 6". Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 1" in diameter, weeds, roots, and other objectionable material. It shall not be reused on the site unless augmented as necessary to meet the minimum organic content of the specification for topsoil.

D. Stockpile topsoil in storage piles in areas shown or where directed. Construct storage piles to freely drain surface water. Cover storage piles as required to prevent windblown dust. Stockpiles shall be stabilized in accordance with the Erosion and Sedimentation Control Report, appended to Specification Section 02270. Dispose of unsuitable topsoil as specified for waste material, unless otherwise specified by Owner. Excess topsoil shall be removed from the site by the Contractor unless specifically noted otherwise on the Drawings.

3.05 SITE PREPARATION: BUILDING PAD ZONES, PARKING AREAS AND PAVED DRIVES

Soil subgrade surfaces for foundations, slabs, and pavements are generally anticipated to be located in existing in-situ fill soils, glaciomarine deposits, or glaciofluvial deposits. The following table summarizes the anticipated generalized subgrade conditions expected for different elements and areas of the project.

Location	Anticipated Subgrade Soil
Hospital Foundations and Slabs	Med. Stiff to Stiff Glaciomarine Clay and Dense to Very Dense Glaciofluvial Sand
Parking Area A	Stiff to Very Stiff Glaciomarine Clay and Med. Dense Glaciofluvial Sand
Parking Area B	Soft to Stiff Glaciomarine Clay
Parking Areas D and E	Med. Dense In-situ Fill and Glaciofluvial Sand
Loading Dock Access Road and Retaining Walls No. 1 and 3	Med. Dense to Dense Glaciofluvial Sand
Site Access Road, North of Loading Dock Access Road	Soft to Stiff Glaciomarine Clay
Access Road, South of Loading Dock Access Road	Med. Dense In-situ Fill and Glaciofluvial Sand
MOB Entrance Roadway/Rotary and Earth Retaining Structure	Med. Dense In-situ Fill, Med. Dense Glaciofluvial Deposits and Stiff Glaciomarine Clay

The following guidelines are recommended to protect subgrade soils beneath footings, slabs, and parking areas.

- Make final excavations into natural bearing soils by hand or using smooth-bladed equipment to limit disturbance (particularly important in the glaciomarine clay soils).

- Prevent water from accumulating on soil surfaces to reduce the possibility of soil disturbance. All filling and concreting of slabs and footings should be performed in-the-dry. Subgrades that become disturbed due to water infiltration should be re-excavated and stabilized. Subgrade stabilization methods could include placement of crushed stone and filter fabric with approval of a geotechnical engineer.

- Exposed subgrades should be examined in the field by a geotechnical engineer to verify strength and bearing capacity. Excavation may be necessary to remove weak, disturbed or otherwise unacceptable soils. Additional excavation, where necessary, will be completed at no additional expense to the owner.

- Disturbance due to water and adverse weather could be reduced by maintaining footing excavations at least 12 in. above the final bearing level until immediately before placing footing reinforcement and concrete. Alternatively, it may be desirable to protect the exposed soil subgrade areas, as soon as possible after acceptance by a geotechnical engineer, by placing a 2 to 3-in. thick lean concrete mud-mat.

- Limit equipment traffic across the exposed soil bearing surfaces.

- Do not permit temporary drainage trenches or other dewatering facilities to extend below the bearing level near footings.

Footings

All excavation work shall be conducted in a manner that minimizes disturbance to the natural soils when excavating for footing bearing surfaces. After final excavation to the natural bearing soils, the exposed subgrade should be observed in the field by a geotechnical engineer to confirm the assumed foundation bearing conditions. It may be necessary to over-excavate and replace locally weak, disturbed or otherwise unacceptable foundation bearing soils. Following excavation to the bearing stratum, the exposed glaciofluvial sand and gravel soil surfaces should be proofrolled with a minimum of two passes of a self-propelled vibratory roller or heavy hand-guided vibratory compactor, until firm. To minimize disturbance, glaciomarine clay soils exposed at subgrade level shall not be proofrolled.

Soil bearing surfaces below completed foundations and slabs must be protected against freezing, before and after foundation construction. If construction is performed during freezing weather, footings should be backfilled to a sufficient depth (up to 4.5 ft.) as soon as possible after they are constructed. Alternatively, insulating blankets or other means may be used for protection against freezing.

Slabs

All topsoil, existing in-situ fill material, debris and organic matter should be removed from beneath the ground floor slabs and should be replaced with compacted granular fill. We recommend that fill subgrade surfaces be inspected by a geotechnical engineer prior to placement of fill. Glaciomarine soils present at subgrade level shall not be proofrolled.

Pavement Areas

All topsoil, debris and organic matter should be removed within the limits of access roads and parking areas. If glaciofluvial soils or existing man-placed fill is present at subgrade level, these surfaces shall be proofrolled with a minimum of four passes of a self-propelled vibratory roller or heavy hand-guided vibratory compactor, until firm. Any soft areas revealed by proofrolling should be removed and replaced by compacted granular fill or base course material.

Special Considerations for Weak, Saturated Clay

Soft to medium stiff, saturated glaciomarine clay will be encountered within the proposed hospital footprint, in Parking Area A and the nearby access road, and in some utility trenches. This material is very easily disturbed by construction activities and overexcavation and replacement of several feet of disturbed material could be necessary if typical rubber-tired earth-moving equipment such as articulated trucks, graders, and scrapers is used within a few feet of design subgrade elevations.

Based on these considerations, the use of lightweight tracked grading equipment, such as low ground-pressure bulldozers, within 2 ft. of subgrade elevation in areas underlain by soft to medium stiff clay is recommended to the extent possible. It may also be appropriate (or necessary) to overexcavate several feet of excess soft clay below subgrade elevation in these areas and place woven geotextile tensile fabric (Mirafi 600X or equivalent) overlain by granular fill material to provide suitable haul roads for heavy equipment. These measures shall be provided at no extra expense to the Owner.

Filling and Backing

Engineered fills up to 15 and 10 ft. in thickness will be necessary to raise grades beneath Parking Areas A and B. Fills on the order of 3 ft. thick or less will be required to raise grades beneath Parking Areas D and E, and up to 20 ft. of engineered fill will be required in the area between Parking Area A and the loading dock access road. Up to 10 ft. of engineered fill will be required beneath the loading dock access road.

Compacted granular fill (CGF) shall be used to raise site grades below the slabs and beneath the site roadway and parking areas. All topsoil, debris and organic matter should be removed as previously stated prior to placement of CGF.

Placement of compacted fills should not be conducted when air temperatures are low enough (approximately 30 degrees F., or below) to cause freezing of the moisture in the fill during or before placement. Fill materials should not be placed on snow, ice or uncompacted frozen soil. Compacted fill should not be placed on frozen soil. No fill should be allowed to freeze prior to compaction. At the end of each day's operations, the last lift of fill, after compaction, should be rolled by a smooth-wheeled roller to eliminate ridges of uncompacted soil.

3.06 PROTECTION OF PREPARED AREAS

Prepared areas of the site shall be protected with erosion control measures. Positive surface drainage away from prepared subgrade areas shall be maintained throughout the period of construction.

SECTION 02180 – SUBSURFACE INVESTIGATIONS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

Related documents: Drawings and General Provisions of Contract, including General and Supplementary Conditions apply to work of this Section.

1.02 DESCRIPTION OF WORK

Contractor shall review the geotechnical report and supplement prepared for the project by Haley & Aldrich, Inc. These reports are appended to the project manual specifications. During the Bidding Process, the Contractor may conduct his own subsurface investigations after requesting and receiving prior approval from the Owner. The request for approval shall be accompanied by a plan indicating the location and type of investigations to be undertaken by the Contractor. The Contractor is encouraged to verify Owner's subsurface investigations and shall notify the Owner in writing prior to the bid date of any discrepancies.

PART 2 - PRODUCTS

2.01 REPORT

A. Subsurface conditions have been investigated by test pits, borings and probes. Locations of the test pits are shown on the contract drawings. Logs of the explorations are appended to these specifications.

B. A report of subsoil conditions has been prepared by Haley & Aldrich, Inc. that is based on subsurface explorations. Said subsurface investigations are not warranted to show the actual subsurface conditions except at the location of said test pits or investigations, and at these points are subject to inaccuracies inherent in methods used and to variations in the classification and interpretation of soil layers.

Subsurface information is included only as an aid to the Bidder and it is the obligation of the Bidder to draw his own conclusions of subsurface conditions from his own investigations prior to submitting his proposal. The Contractor agrees, in signing his Contract, that he will make no claims against the Owner or Architect, if in carrying out the work he finds that the actual conditions encountered in performing the work do not conform to conditions presented, discussed, or anticipated prior to the commencement of work, the Contractor shall notify the Owner immediately of such differences in the conditions.

PART 3 - EXECUTION

3.01 REPORT REVIEW

A copy of the subsurface investigation report is appended to the project manual and shall be considered part of the Contract Documents.

SECTION 02200 – EARTHWORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Protection, modification and/or installation of utilities as sitework progresses paying particular attention to grade changes and any necessary staging of work.

B. Cutting, filling and grading to required lines, dimensions, contours and proposed elevations for proposed improvements.

C. Scarifying, compaction, drying and removal of unsuitable material to ensure proper preparation of areas for fills or proposed improvements.

D. Sequencing the construction is required to protect the subgrades, the work and to comply with the Erosion/Sediment Control Plan for this project.

E. Section 02100 of these specifications defines the building pad zones. Application of this specification shall be based upon the building pad zone description provided in Section 02100.

F. The footing zone shall be defined to be the area below footings and below imaginary lines that extend 2 feet laterally beyond the footing outer bottom edges and projecting outward and down away from the footing at an imaginary 1:1 slope.

G. Dewatering, trench protection, shielding, attendant safety measures, and protection of the work throughout construction required by the contract.

1.2 RELATED REQUIREMENTS

A. Section 02050 - Demolition

B. Section 02100 - Site Preparation

C. Section 02221 – Excavation, Backfilling and Compacting for Structures

D. Section 02222 – Excavation, Backfilling and Compacting for Utilities

E. Section 02227 – Aggregate Materials

F. Section 02229 – Rock Removal

G. Section 02270 – Slope Protection and Erosion Control

H. Geotechnical Report for boring locations and findings of subsurface materials and conditions.

I. Contract Drawings

A copy of the Erosion and Sedimentation Control Report is appended to Specification Section 02270 and shall be considered part of the Contract Document.

1.3 REFERENCE STANDARDS

American Society for Testing and Materials (ASTM), Latest Edition:

D422 Method for Particle Size Analysis of Soils

D1556 Test for Density of soil in Place by the Sand Cone Method

D1557 Test for Moisture-Density Relations of Soils using 10-lb (4.5 kg) Rammer and 18-inch (457 mm) Drop (**Modified Proctor)**

D1559 Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus

D2167 Test for Density of Soil in Place by the Rubber Balloon Method

D2216 Laboratory Determination of Moisture content of Soil

D2487 Classification of Soils for Engineering Purposes

D2922 Tests for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D3017 Test for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D4318 Test for Plastic Limit, Liquid Limit, & Plasticity Index of Soils

American Association of State Highway and Transportation Officials (AASHTO), Latest Edition:

T88 Mechanical Analysis of Soils

1.4 ENVIRONMENTAL REQUIREMENTS

Construct temporary erosion control systems as shown on the plans as directed by the Engineer or to comply with environmental permits to protect adjacent properties and water resources for erosion and sediment damages.

1.5 QUALITY ASSURANCE

A. Independent Testing Laboratory: Refer to General Conditions for Clarification if the testing firm to perform construction testing is to be selected and paid by Contractor or by the Owner. Site testing requirements shall be based on the following:

1. Building Subgrade Areas, including 10'-0" Outside Exterior Building Lines: In cut areas (not including naturally deposited clay subgrades), not less than one compaction test for every 5,000 square feet. In fill areas, same rate of testing for each lift of fill (measured loose). This area shall include all footing zones.

2. Areas of Construction exclusive of building subgrade: In cut areas (not including naturally deposited clay subgrades), not less than one compaction test for every 20,000 square feet. In fill areas, same rate of testing for each lift of fill (measured loose).

3. Compaction testing shall not be performed on undisturbed, naturally deposited clay subgrades. The Geotechnical Engineer shall examine exposed clay subgrades to verify suitable strength and bearing capacity.

B. If compaction requirements are not complied with at any time during construction process, remove and recompact deficient areas until proper compaction is obtained at no additional expense to the Owner.

C. The following tests shall be performed on each type of on-site or imported soil material used as compacted fill as part of construction testing requirements:

1.	Moisture and Density Relationship:	ASTM D 1557
2.	Mechanical Analysis:	AASHTO T-88
3.	Plasticity Index:	ASTM D 4318

D. Field density tests for in-place materials shall be performed according to one of the following standards as part of construction testing requirements:

1. Sand-Cone Method: ASTM D 1556

2. Balloon Method: ASTM D 2167

3. Nuclear Method: ASTM D 2922 (Method B- Direct Transmission)

E. Independent Testing Laboratory shall prepare test reports that indicate test location, elevation data, and test results. Owner, the project Site Engineer, Architect, Geotechnical Engineer of Record, and Contractor shall be provided with copies of reports within 96 hours of time test was performed. In the event that any test performance fails to meet these Specifications, the Owner and the Contractor shall be notified immediately by Testing Laboratory.

F. Unless stipulated otherwise, the following compaction requirements shall be required for this project and placed in accordance with the following maximum lift (layer) thicknesses.

Fill Placement Criteria – Mercy Hospital, Portland, Maine			
Fill Application or Use	**Allowable Material Type**	**Maximum Lift Thickness (in.)**	**Minimum Compaction in % of Maximum Dry Density (ASTM D-1557)**
1. Building Pad Fill Outside of Footing Zone and Lower than 12" Below the Finish Floor Slab.	Granular Fill	12	95
2. Building Pad for Slab	Granular Fill	12	95
3. Building Entryway and Contiguous Sidewalk	Granular Fill	12	95
4. Footing Zone	Granular Fill	12	95
5. Pavement Subbase Course	Aggregate Subbase	8	95
6. Pavement Base Course	Aggregate Base	6	95
7. Road Embankment Drainage Layers and Granular Shell Materials	Granular Borrow	12	95
8. Road Embankment Fill and Parking Area Subgrade Fill	Common Borrow, Granular Borrow, or Structural Fill	12 12	90 95

Fill Placement Criteria – Mercy Hospital, Portland, Maine (continued)			
Fill Application or Use	**Allowable Material Type**	**Maximum Lift Thickness (in.)**	**Minimum Compaction in % of Maximum Dry Density (ASTM D-1557)**
9. Foundation and Retaining Wall Backfill * Within 6 Feet of Wall Face	Granular Fill or Select Fill with Drainage Stone in Modular Block Voids	9	93 (Unless governed by other criteria) Hand-operated compaction equipment required.
* Beyond 6 Feet of Wall Face	Granular Borrow or Common Borrow	12	93 (Unless governed by other criteria)
10. Access Path Walkway	Reclaim Asphalt or Concrete	10	95
11. Turf	Loam w/Organic Admixture	N/A	N/A
12. Underdrain and Flexible Pipe Bedding	Crushed Stone	100%	100 ASTM C-29 not D1557

The fill material types listed above shall conform with the specifications presented in Section 02227.

The following fill material types correspond to the specifications presented in Section 02227 and are permitted for use as follows:

Material	Permissible Uses
Granular Fill	- Engineered Fill Beneath Buildings - Fill within the footing zone - Road Embankment Layers - Pavement Subgrade (below subbase) - Foundation and Retaining Wall Backfill Within 6 Feet of Outside Face and Above Perimeter Foundation Drains
Subbase Aggregate	- Backfill within 10 Feet of Backface of 1.5H:1V Riprap Slopes - Pond Aggregate Over Clay Layers - Pavement Subbase Course Layer - Also May be Used for all Applications where Granular Fill is Required.

Material	Permissible Uses
Aggregate Base	- Pavement Base Course Layer, Also May be Used for all Applications Where Subbase, Select, Common or Granular Borrow is Required.
Common Borrow	- General Sitework Outside of Building Pad and not within 3 feet below Pavement Subgrade Surface
Drainage Stone	- Filling Voids in Modular Block Walls - Backfill Around Foundation Drains - Bedding Around Storm Drain Pipe, Sewers and Water Mains - Soft Ground Working Mat
Granular Borrow	- Road Embankment Drainage Layers and Granular Shell Materials - Road Embankment Fill and Parking Area Subgrade Fill - Foundation and Retaining Wall Backfill Beyond 6 Feet of Outside Wall Face

All costs related to retesting due to failures shall be paid for by the Contractor at no additional expense to the Owner. The Owner reserves the right to employ an Independent Testing Laboratory and to direct any testing that is deemed necessary. Contractor shall provide free access to site for testing activities.

1.6 SUBMITTALS

A. Submit a sample and gradation test results of each type of off-site fill materials that is to be used at the site in an air tight, 10 lb container for the testing laboratory.

B. Submit the name of each material supplier and specific type and source of each material. Any change in source throughout the job requires approval of the Owner and engineer.

C. For use of fabrics or geogrids, an Owner approved design shall be submitted.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Excavated and re-used materials for subsoil fill as specified herein.

B. Aggregate fill as specified in Section 02227.

C. Imported subsoil material approved by the owner and specified herein or in Section 02227.

D. Topsoil fill as specified in Section 02900 with proper organic admixtures.

E. Acceptable stabilization fabrics and Geogrids for some (but not all) uses.

1. Mirafi 500X or 600X
2. Phillips 66 Supac 6WS
3. Dupont Typar 3401 and 3601
4. Trevira S1114 and S1120
5. Tensar SS-1 and SS-2
6. Exxon GTF-200 or 350
7. Geogrids specifically shown on the Contract Drawings for some (but not all) uses

F. Acceptable filter/drainage fabrics for some (but not all) uses:

1. Mirafi 140NS
2. Phillips 66 Supac 4NP
3. Dupont Typar 3341
4. Fabric Types Specifically Shown on the Contract Drawings

G. When the Contract Drawings show a specific fabric or geogrid type, that material shall be used unless otherwise approved by the Engineer and Owner in writing.

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours and datum.

B. Locate and identify existing utilities that are to remain and protect them from damage.

C. Notify utility companies to remove and/or relocate any utilities that are in conflict with the proposed improvements.

D. Protect plant life, lawns, fences, existing structures, sidewalks, paving and curbs from excavation equipment and vehicular traffic.

E. Protect benchmarks, property corners and all other survey monuments from damage or displacement. If a marker needs to be removed it shall be referenced by a licensed land surveyor and replaced, as necessary, by the same.

F. Remove from site material encountered in grading operations that, in opinion of Owner or Owner's representative, is unsuitable or undesirable for backfilling, subgrade or foundation purposes. Dispose of in a manner satisfactory to Owner and in accordance with the applicable State, Local, and Federal Regulations, including Section 5 "Solid Waste" of the MeDEP Site Location of Development Permit application.

G. Prepare the site as specified in Section 02100.

H. Prior to placing fill in low areas, such as previously existing streams, ponds, or wetlands, perform following procedures:

1. Drain water out by gravity with ditch having flow line lower than lowest elevation in low area. If drainage cannot be performed by gravity ditch, use adequate pump to obtain same results. Direct runoff to approved erosion control measures.

2. After drainage of low area is complete, remove muck, mud, debris, and other unsuitable material by using acceptable equipment and methods that will keep natural soils underlying low areas dry and undisturbed.

3. If proposed for fill, all muck, mud, and other materials removed from above low areas shall be dried on-site by spreading in thin layers for observation by the Owner's representative. Material shall be inspected and, if found to be suitable for use as fill material, shall be incorporated into lowest elevation of site filling operation, but not under or within 10'-0" of perimeter of building pad or paving subgrade. If, after observation by the Owner's representative, material is found to be unsuitable, all unsuitable material shall be removed from site.

3.2 EXCAVATION FOR FILLING AND GRADING

A. Classification of Excavation: Contractor by submitting bid acknowledges that he has investigated site to determine type, quantity, quality, and character of excavation work to be performed. All excavation shall be considered unclassified excavation except that defined as rock. Refer to Section 02900.

B. Perform excavation using capable, well-maintained equipment and methods acceptable to Owner and governing agencies.

C. When performing grading operations during periods of wet weather, provide adequate drainage and ground water management to control moisture of soils. Protect exposed clay soils from runoff, erosion or elevated moisture content.

D. Comply with the erosion control plan and special provisions shown on the Contract Drawings.

E. Shore, brace, and drain excavations as necessary to maintain safe, secure, and free of water at all times.

F. Excavated material containing rock or stone exceeding 6" in size limitations is unacceptable as fill within the proposed building and paving area.

G. Protect excavated materials from moisture and condition as required for placement in parking lot subgrades, embankments, and general site fills. (Material excavated from the site shall not be used in the building pad zones.)

H. Excavation shall consist of the removal of all materials encountered in grading the project and disposal where necessary.

I. Excavation shall be accomplished in a manner which complies with the erosion control measures for this site, meets all OSHA and related requirements, and maintains positive drainage of the subgrade throughout construction.

3.3 FILLING AND SUBGRADE PREPARATION

A. BUILDING SUBGRADE AREAS:

1. Building subgrade pad zones shall be as defined in Section 02100.

2. The building subgrade pad shall be prepared in strict accordance with the "site preparation notes" shown on the civil-site drawings and defined in Section 02100.

3. Unless specifically indicated otherwise on the Drawings, areas exposed by excavation or stripping and on which building subgrade preparations are to be performed shall be completed with a smooth-blade excavator. These areas shall then be proofrolled in areas of granular subgrade soil and examined in areas of clay subgrade to detect any areas of weak subgrade prior to placement of any fill. Proofrolling shall be accomplished by making a minimum of two (2) complete passes with a fully-loaded tandem-axle dump truck, or approved equivalent, in each of the two perpendicular directions under the supervision and direction of a field geotechnical engineer. Areas of failure shall be excavated, replaced with select fill and recompacted as stated above. Proofrolling shall not be performed on naturally deposited clay subgrades. See Section 02221 for additional specifications on subgrade preparation for structures.

4. Unless specifically indicated otherwise on the Drawings, fill materials used in preparation of building subgrade shall be placed in lifts or layers not to exceed 12" loose measure compacted to a minimum density of 95% of maximum dry density, in accordance with ASTM D 1557 at a moisture content of not less than 1% below and not more than 3% above the optimum moisture content. Naturally deposited clay subgrades shall not be compacted or tested.

B. AREA OF CONSTRUCTION EXCLUSIVE OF THE BUILDING SUBGRADE:

1. Unless specifically stated otherwise on the Drawings, areas exposed by excavation or stripping and on which the subgrade preparations are to be performed shall be completed with a smooth-blade excavator. These areas shall then be proofrolled in areas of granular subgrade soil and examined in areas of clay subgrade to compact the subgrade and/or detect any areas of weak subgrade prior to placement of any fill. Proofrolling shall be accomplished by making a minimum of two (2) complete passes with a fully-loaded tandem-axle dump truck, or approved equivalent, in each of the two perpendicular directions under the supervision and direction of a field geotechnical engineer. Areas of failure shall be excavated, replaced with select fill and recompacted as stated above. Proofrolling shall not be performed on naturally deposited clay subgrades. See Sections 02222 and 02223 for additional specifications on subgrade preparation for utilities and pavement and general site grading.

2. Unless specifically stated otherwise on the Drawings, fill materials used in preparation of subgrade shall be placed in lifts or layers not to exceed the lift thickness specified in Section 1.05 of this specification and compacted to a minimum density specified in Section 1.05 of this specification.

3. The following table stipulates maximum allowable values for plasticity index (PI) and liquid limit (LL) of suitable fill material in the specified areas; unless specifically stated otherwise on the Drawings:

Location*	PI	LL
Area below upper three feet, exclusive of building area	20	50
Upper three feet, exclusive of building area	15	40

*References to depth are to proposed subgrade elevations.

4. Material imported to the site shall meet the material specifications of Section 02227 of these specifications and Section 1.05 of this specification.

3.4 PLACEMENT OF EMBANKMENTS AND BUILDING PAD FILLS

Place embankments and fills in the lift thickness specified in Section 1.05 and compact to meet the density specified in Section 1.05. The embankments and fills shall be placed using the materials specified, incorporate the drainage and all special placement measures stipulated by the Erosion Control Plan, the Contract Documents, and Permits required by the drawings using appropriate compaction equipment. In building fill zones, the compaction equipment should include a vibratory drum compactor with a minimum static weight of 10,000 pounds and a minimum dynamic force of 20,000 lbs. In areas close to retaining walls and buried manholes or appurtenances, the use of hand-held vibratory equipment is anticipated. In parking lot embankments and other site fills, the use of steel drum rollers and/or sheepsfoot-type rollers to compact native borrow material from the site is anticipated.

The selection of compaction equipment, their use, and operation to achieve the specified compaction is the sole responsibility of the Contractor.

The embankments shall be protected from inclement weather including:

3.4.1 Rolling any exposed embankments and parking lot fills constructed of on-site material with a smooth drum roller at the end of each workday.

3.4.2 Covering all exposed embankments of parking lot fills with a compacted sand layer prior to any significant rainfall.

3.4.3 Maintaining positive drainage from the embankments and parking lot subgrades throughout construction.

3.4.4 Providing drainage chutes and windrowing the top edge of embankments to avoid concentrated runoff from traveling down embankment sideslopes.

3.4.5 Staging and phasing the work to meet the requirements of the erosion control plan and specific sequences shown on the drawings.

3.4.6 Compliance with the project geotechnical report.

3.5 MAINTENANCE OF SUBGRADE

A. Finished subgrades shall be verified to ensure proper elevation and conditions for construction above subgrade.

B. Protect subgrade from excessive wheel loading during construction, including concrete trucks and dump trucks.

C. Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in a manner that will comply with compaction requirements by use of material equal to or better than best subgrade material on site. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, and true to grade and cross-section.

D. Grading of building and paving areas shall be checked by string line from grade stakes (blue tops) set at not more than 50' centers. Tolerance of + 0.10 feet will be permitted. Contractor to provide engineering and field staking necessary for verification of lines, grades, and elevations.

E. Maintain subgrade for area to be paved and building pad subgrades. Make adjustments that may be required in accordance with Specifications at no additional expense to Owner.

The Contractor shall protect all soils, compacted gravel, sand, and drainage material under poured slabs and in areas where slabs will be poured within the building from surface runoff excessive moisture. All expenses associated with protective measures, temporary heating, and recompaction shall be at the expense of the Contractor.

3.6 RIPRAP

A. Place riprap in all areas where indicated on the Drawings. The stone for riprap shall be washed and consist of field stone or rough unhewn quarry stone as nearly uniform, in section as is practical. Exposed stones shall be angular. Rounded boulders or cobbles will not be permitted.

The stones shall be dense, resistant to the action of air and water, and suitable in all aspects for the purpose intended. The riprap shall be composed of a well-graded mixture down to the one-inch size particle such that 50 percent of the mixture by weight shall be larger than the D50 size specified on the drawings.

A well-graded mixture is defined as a mixture composed primarily of the larger stone size but with a sufficient mixture of other sizes to fill the progressively smaller voids between the stones. The diameter of the largest stone size in such a mixture shall be 1.5 times the D50 size. When subjected to the magnesium sulfate soundness test (ASTM C-88), the percent weight loss shall be less than 15%. When tested according to ASTM C-131, the crushed stone shall have a maximum loss of 45% at 5,000 revolution.

B. Slopes and other areas to be protected shall be dressed to the line and grade shown on the plans prior to the placing of riprap. Contractor shall then undercut the areas to receive riprap to an elevation equal to the final elevation less the specified thickness of riprap as shown on the drawings.

C. Filter fabric and bedding material shall be installed prior to the placement of the riprap if so indicated on the drawings. The bedding material shall be in accordance with Section 02227 and shall be 6" in depth. Filter fabric shall be as specified herein and as detailed on the plans.

D. Stones shall be placed so that the greater portion of their weight is carried by the earth and not by the adjacent stones. These stones shall be placed uniformly with close joints. The upright areas of the stone shall make an angle of approximately 90 degree with the embankment slope. The courses shall be placed from the bottom of the embankment upward, the larger stones being placed in the lower courses. Open joints shall be filled with spalls. Stones shall be embedded in the embankment as necessary to present a uniform top surface such that the variation between tops of adjacent stones shall not exceed 3".

3.7 FINISH GRADING

A. Grade all areas where finish grade elevations or contours are indicated on Drawings, other than paved areas and buildings, including excavated areas, filled and transition areas, and landscaped areas. Graded areas shall be uniform and smooth, free of rock, debris, or irregular surface changes. Finished subgrade surface shall not be more than 0.10 feet above or below established finished subgrade elevation, and all ground surfaces shall vary uniformly between indicated elevations. Finish ditches shall be graded to allow for proper drainage without ponding and in manner that will minimize erosion potential. For topsoil application, refer to Section 02900 (LANDSCAPING, SEEDING, AND SODDING).

B. Correct all settlement and eroded areas within one year after date of completion at no additional expense to owner. Bring grades to proper elevation. Replant or replace any grass, shrubs, bushes, or other vegetation disturbed by construction using corrective measures. Refer to Section 02270 for slope protection and erosion control.

C. Refer to Section 02245 for soil stabilization and geotextile fabric materials.

3.8 ROCK EXCAVATION

See Section 02229 - Rock Removal

SECTION 02221 – EXCAVATION, BACKFILLING AND COMPACTING FOR STRUCTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Excavate to line, grade and configuration as shown in the plans and specifications for proposed building or structures.

B. Fill to line, grade and configuration as shown in the plans and specifications for proposed structures.

C. Compacting for materials in an acceptable manner as stated herein.

D. The work of this section applies to the building pad zone as defined by Section 02100 of these specifications. The building pad zone includes all footing zones.

1.2 RELATED REQUIREMENTS

A. Section 02100 – Site Preparation

B. Section 02200 - Earthwork

C. Section 02227 - Aggregate Material

D. Section 02229 - Rock Removal

E. Section 02505 - Paving Base Course

F. Section 02511 - Asphaltic Concrete Paving

G. Geotechnical Report for boring locations and findings of subsurface materials and conditions.

H. Construction Drawings

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):

D422 Method for Particle and Size Analysis of Soils

D1556 Test for Density of soil in Place by the Sand Cone Method

D1557 Test for Moisture-Density Relations of Soils using 10-lb (4.5 kg) Rammer and 18-inch (457 mm) Drop **(Modified Proctor)**

D1559 Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus

D2167 Test for Density of Soil in Place by the Rubber Balloon Method

D2216 Laboratory Determination of Moisture content of Soil

D2487 Classification of Soils for Engineering Purposes

D2922 Tests for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D3017 Test for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D4318 Test for Plastic Limit, Liquid Limit, & Plasticity Index of Soils

C25 Chemical Analysis of Limestone, Quicklime and Hydrated Lime

B. American Association of State Highway and Transportation Officials (AASHTO) latest edition.

T88 Mechanical Analysis of Soils

1.4 QUALITY ASSURANCE

Independent testing laboratory approved by the Owner shall be retained to perform construction testing on filling operations and subgrade analysis as specified in Section 02200 and as stated herein. Refer to the general contract conditions for clarification on the cost for this independent laboratory.

1.5 SUBMITTALS

A. Shop drawings or details pertaining to excavating and filling for structures are not required unless otherwise shown on the drawings or specifications or if contrary procedures to the project documents are proposed.

B. Submit a sample of each type of off-site fill material that is to be used in backfilling in an air-tight, 10 lb. container and submit a gradation and certification of the aggregate material that is to be used to the testing laboratory for review.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fill material from on-site as specified in Section 02200 and approved by the owner or owner's representative.

B. Fill material from off-site as specified in Section 02200 and approved by the owner or owner's representative.

C. Aggregate material as specified in Section 02227.

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify all lines, elevations and grades necessary to construct building subgrades as shown in the plans and specifications. The Contractor's attention is directed specifically to Section 02200.

B. Carefully protect bench marks, property corners, monuments or other reference points.

C. Locate and identify all site utilities that have previously been installed and may be in danger of damage by grading operations.

D. Locate and identify all existing utilities that are to remain and protect them from damage.

E. Over excavate and properly prepare areas of subgrade that are not capable of supporting the proposed systems. These areas are to be stabilized by using acceptable backfill materials placed and compacted as specified, filter fabrics and/or aggregate materials.

3.2 EXCAVATION FOR FILLING AND GRADING

A. Excavate building areas to line and grade as shown in the plans and specifications being careful not to over excavate beyond the elevations needed for building subgrades. Refer to Sections 02000 and 02200.

B. Engage all suitable material into the project fill areas as specified in Section 02200.

C. Unsuitable excavated material is to be disposed of in a manner and location that is acceptable to the owner and local governing agencies and is in accordance with State, local and federal regulations including Section 5 "Solid Waste" of the MeDEP Site Location of Development Permit application. Prior to any off-site disposal of spoil material, the Contractor shall at a minimum notify the Owner of the proposed haul route, disposal location and quantity of materials.

D. Perform excavation using capable, well maintained equipment and methods acceptable to the owner and the project document requirements.

3.3 FILLING AND SUBGRADE PREPARATION

A. Building area subgrade zone shall be as defined in Section 02100 of these specifications. The footing zone shall be as defined by Section 02200 of these specifications.

B. The building area subgrade pads for the various buildings shall be prepared in strict accordance with paragraphs 3.3 E and 3.3F below and the building pad preparation notes provided on the drawings. Rock larger than six inches (6") shall not be part of building subgrade fill.

C. Stumps and the major portions of root systems (including all roots larger than 1 inch in diameter) and other deleterious material shall be removed in all building areas as defined in Section 02200. Topsoil, organic soils, and other unsuitable materials shall be stripped in all building areas to expose native soils or bedrock.

D. Construction dewatering shall begin as early as is practicable during site grading work to keep on-site soils as well drained as possible. Effective dewatering and surface runoff control shall be accomplished with a network of drains, swales, sumps, and DIRTBAGS®. Dewatering trenches or other dewatering facilities shall not extend below the bearing level for footings.

E. Dry subgrades exposed in fill areas after grubbing and stripping that consist of granular soil shall be proofrolled with at least two passes of a minimum 10,000 pound static weight roller until firm. Subgrade surfaces shall be covered with at least a 12" layer of compacted granular fill as early as practicable. The fill will provide a working mat to protect the subgrade from disturbance. Soft areas identified during proofrolling or under subsequent traffic prior to subsequent filling activities shall be excavated and replaced with compacted granular fill.

F. Where excavations encounter wet or naturally deposited clay soils, the work shall proceed carefully in a manner that avoids subgrade disturbance including: using smooth edged cutting buckets when making excavations within one foot of the final subgrade elevation, and placement of the compacted granular fill (floor slab areas) as soon as practicable to protect the subgrade from disturbance. Naturally deposited clays shall not be proofrolled; the Geotechnical Engineer shall examine exposed clay subgrades to verify strength and bearing capacity prior to placement of fill material. In fill areas, the initial lift of fill on wet, natural subgrades should consist of 12 inches of Granular Fill or Crushed Stone. Fill materials and/or subgrade materials that become contaminated with fines during construction shall be replaced with the appropriate clean materials immediately prior to placing overlying Subbase Course, Base Course, or engineered fill material.

G. Fill materials used in preparation of building subgrade shall be compacted granular fill meeting the gradation requirements of Section 02227. Fill should be placed in uniform lifts not exceeding 9 inches in uncompacted thickness and be compacted with large, self-propelled compaction equipment. In confined areas, the structural fill should be placed in uniform lifts not exceeding 6 inches in uncompacted thickness and compacted with hand operated compaction equipment. Compacted granular fill should be compacted to at least 95 percent of maximum dry density determined by ASTM D1557.

Only fill specified in Section 02220 and Section 02227 should be used as fill below the proposed buildings or building zones.

K. To aid in maintaining stable cut and fill slope conditions, surface water runoff shall be diverted away from the top of slopes. Likewise, surface runoff shall be diverted away from footing excavations and floor slab excavations.

L. Any fill materials that become wet or disturbed before the overlying lift of fill can be placed (e.g. due to a rainstorm during the work day, overnight, or over a weekend) shall be proofrolled, recompacted and/or excavated and replaced with drier fill.

3.4 COMPACTION

A. Maintain optimum moisture content of fill materials to attain required compaction density.

B. All material shall be tested in accordance with Section 02200.

C. An Independent Testing Laboratory shall be retained to perform testing on site. Refer to the General Contract provisions for the method of selection and payment for independent testing services.

D. Compaction tests will be as specified in Section 02200 together with the following for building subgrade areas including 10'-0" outside exterior building lines:

In cut areas, not less than one compaction test for every 5,000 square feet unless directed otherwise by Geotechnical Engineer. In fill areas, same rate of testing for each 12" lift (measured loose).

E. If compaction requirements are not complied with at any time during construction process, remove and recompact deficient areas until proper compaction is obtained at no additional expense to the Owner.

3.5 MAINTENANCE OF SUBGRADE

A. Finished subgrades shall be verified to ensure proper elevation and conditions for construction above subgrade.

B. Protect subgrade from excessive wheel loading during construction, including concrete trucks and dump trucks.

C. Remove areas of finished subgrade found to have insufficient compaction density of depth necessary and replace in a manner that will comply with compaction requirements by use of materials equal to or better than best subgrade materials on site. Surface of subgrade after compaction shall be hard, uniform, smooth, stable and true to grade and cross-section.

3.6 FINISH GRADING

A. Finish grading shall be in accordance with Section 02200 and as more specifically stated herein.

B. Grading of building areas shall be checked by string line from grade stakes (blue tops) set at not more than 50' centers. Tolerance of up to 0.05 feet, will be permitted. Contractor to provide engineering and field staking necessary for verification of lines, and elevations.

3.7 ROCK EXCAVATION

See Section 02229 - Rock Removal.

SECTION 02222 – EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Excavating trenches for the installation of utilities.

B. Backfilling trench with bedding materials as specified and indicated and finishing filling trench with suitable material to proposed subgrade.

C. Compacting backfill materials in an acceptable manner.

D. Within 5' of the building and under the building the Division 2 Contractor is responsible for excavation and backfill of the pipes and coordination with the work of other trades.

1.2 RELATED REQUIREMENTS

A. Section 02200 – Earthwork

B. Section 02227 - Aggregate Materials

C. Section 02229 - Rock Removal

D. Section 02605 - Sewer and Catch Basin Structures

E. Section 02660 - Water Distribution Systems

F. Section 02720 - Storm Sewer Systems

G. Section 02730 - Sanitary Sewer Systems

H. Geotechnical Report for boring locations and findings of subsurface materials and conditions

I. Construction Drawings

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):

D422 Method for Particle Size Analysis of Soils

D1556 Test for Density of soil in Place by the Sand Cone Method

D1557 Test for Moisture-Density Relations of Soils using 10-lb (4.5 kg) Rammer and 18-inch (457 mm) Drop **(Modified Proctor)**

D1559 Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus

D2216 Laboratory Determination of Moisture content of Soil

D2487 Classification of Soils for Engineering Purposes

D2922 Tests for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D3017 Test for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D4318 Test for Plastic Limit, Liquid Limit, & Plasticity Index of Soils

C25 Chemical Analysis of Limestone, Quicklime and Hydrated Lime

B. American Association of State Highway and Transportation Officials (AASHTO) latest edition.

T88 Mechanical Analysis of Soils

1.4 QUALITY ASSURANCE

Independent testing laboratory approved by the Owner shall be retained to perform construction testing on backfilling operations as specified in Section 02200 and as stated herein. It shall be the responsibility of the Contractor to accurately establish locations for all utilities. Refer to the general contract conditions for clarification on the cost for this independent laboratory.

1.5 SUBMITTALS

A. Shop drawings or details pertaining to the work of this section are not required unless use of materials, methods or procedures contrary to Drawings or these specifications are proposed. Do not perform work until required shop drawings have been accepted by Owner.

B. The Contractor shall contact all utility companies and determine if additional easements will be required to complete the project. Contractor shall provide written confirmation of the status of all easements to the Owner's at the time of the preconstruction conference.

C. Submit a sample of each type of off-site fill material that is to be used in backfilling in an air-tight container of a size appropriate for the material for the testing laboratory or submit a gradation and certification of the aggregate material that is to be used to the testing laboratory for review.

1.6 PROJECT RECORD DOCUMENTS

Accurately record actual locations of all subsurface utilities, structures and obstructions encountered.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aggregate Material as specified in Section 02227.

B. Acceptive Stabilization Fabrics and Geogrids for some (but not all) uses.

1. Mirafi 500x or 600x
2. Phillips 66 Supac 6WS
3. Dupont Typar 3401 and 3601
4. Trevira S1114 and S1120
5. Tensar SS-1 and SS-2
6. Exxon GTF-200 or 350
7. Geogrids specifically shown on the Contract Drawings for some (but not all) uses.

C. Filter/Drainage Fabrics

1. Mirafi 140 NS

2. Phillips 66 Supac 4NP

3. Dupont Typar 3341

4. Fabric Types

D. When the Contract Drawings show a specific fabric or geogrid type, that material shall be used unless otherwise approved by the Engineer and Owner in writing.

PART 3 - EXECUTION

3.1 SUMMARY

A. Set all lines, elevations, and grades for utility and drainage system work and control system for duration of work, including careful maintenance of bench marks, property corners, monuments, or other reference points.

B. Maintain in operating condition existing utilities, active utilities, and drainage systems encountered in utility installation. Repair any surface or subsurface improvements shown on Drawings.

C. Verify location, size, elevation, and other pertinent data required to make connections to existing utilities and drainage systems as indicated on Drawings. Contractor shall comply with local codes and regulations.

D. Over excavate and properly prepare areas of subgrade that are not capable of supporting the proposed systems. These areas are to be stabilized by using acceptable backfill material placed and compacted as specified, filter fabrics and/or additional bedding material.

E. Install dewatering systems that will be required to construct the proposed utilities in a manner that is described herein. Use proper sedimentation facilities to avoid turbid discharges.

3.2 EXCAVATION

A. The local utility companies shall be contacted before excavation shall begin. Dig trench at proper width and depth for laying pipe, conduit, or cable. Cut trench banks as nearly vertical as practical and remove stones as necessary to avoid point-bearing. Over excavate wet or unstable soil, if encountered, from trench bottom as necessary to provide suitable base for continuous and uniform bedding.

B. All trench excavation side walls greater than 5 feet in depth shall be sloped, shored, sheeted, braced or otherwise supported by means of the sufficient strength to protect the workmen within them in accordance with the applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration (OSHA), and by local ordinances. Lateral travel distance to an exit ladder or steps shall not be greater than 25 feet in trenches 4 feet or deeper.

C. Perform excavation as indicated for specified depths. During excavation, stockpile materials suitable for backfilling in orderly manner far enough from bank of trench to avoid overloading, slides, or cave-ins, with a minimum setback of any surcharging materials or equipment of 2 feet from the top edge of trench.

D. Remove excavated materials not required or not suitable for backfill or embankments and waste as specified. Any structures discovered during excavation(s) shall be disposed of as specified.

E. Utilities placed in embankment areas shall be placed by the induced trench method wherein the embankment is formed first and the utility is trenched into the embankment. In such situations, the embankment shall have been formed to a height at least 24" above the crown of the pipe.

F. Prevent surface water from flowing into trenches or other excavations by temporary grading or other methods, as required. Remove accumulated water in trenches or other excavations by pumping or other acceptable methods.

G. Open cut excavation with trenching machine or backhoe. Where machines other than ladder or wheel-type trenching machines are used, do not use clods for backfill. Dispose of unsuitable material and provide other suitable material at no additional cost to Owner.

H. Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on bedding material at every point along entire length, except where necessary to excavate for bell holes, proper sealing of pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer, or wider than needed to make joint connection properly.

I. Trench width requirements below the top of the pipe shall not be less than 12" nor more than 18" wider than outside surface of any pipe or conduit that is to be installed to designated elevations and grades. All other trench width requirements for pipe, conduit, or cable shall be least practical width that will allow for proper compaction of trench backfill.

J. Trench depth requirements measured from finished grade or paved surface shall meet the following requirements or applicable codes and ordinances unless otherwise shown on the Drawings:

1. Water Mains: 66" to top of pipe barrel or 6" below the frost line (established by the local building official), whichever is deeper except where insulation is shown on the drawings.

2. Sanitary Sewer: Depths, elevations, and grades as indicated on Drawings.

3. Storm Sewer: Depths, elevations, and grades as shown on Drawings.

4. Electrical Conduits: 29" minimum to top of conduit or as required by NEC 300-5, NEC 710-36 codes, or the local utility company requirements, whichever is deeper.

5. TV Conduits: 29" minimum to top of conduit or as required by the local utility company, whichever is deeper.

6. Telephone Conduits: 29" minimum to top of conduit, or as required by the local utility company, whichever is deeper.

7. Propane Gas Mains and Service: 24" minimum to top of pipe, or as required by the local utility company, whichever is deeper.

8. Fire Alarm Conduit: 29" minimum to top of conduit, or as required by the local Fire Department, whichever is deeper.

K. Provide sheeting and bracing, when necessary, in trenches and other excavations where protection of workmen is required. Sheeting may be removed after sufficient backfilling to protect against damaging or injurious caving.

3.3 PIPE BEDDING

A. Accurately cut trenches for pipe or conduit that is installed to designated elevations and grades to line and grade from 6" below bottom of pipe and to width as specified. Place 6" of bedding material, compact in bottom of trench, and accurately shape to conform to lower portion of pipe barrel. After pipe installation, place select backfill and compact in maximum 6" layers measured loose to the top of the trench.

B. Place geotextile fabrics as specified on the plans and specifications.

3.4 BACKFILLING

A. Criteria: Trenches shall not be backfilled until required tests are performed and the utility systems comply with and are accepted by applicable governing authorities. Backfill trenches as specified. If improperly backfilled, reopen to depth required to obtain proper compaction. Backfill and compact, as specified, to properly correct condition in an acceptable manner.

B. Backfilling: After pipe or conduit has been installed, bedded, and tested as specified, backfill trench or structure excavation with specified material placed in 8" maximum loose lifts.

C. Backfill trenches to the contours and elevations shown on the plans with unfrozen materials.

D. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

3.5 COMPACTION

A. Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.

B. Maintain optimum moisture content of fill materials to attain required in-place density.

C. An independent testing laboratory shall perform field density tests at intervals not exceeding 200'-0" of trench for the first and every other eight-inch (8") lift of compacted trench backfill and furnish copies of test results as specified. Compact to minimum density of 95% of maximum dry density as determined by ASTM D 1557.

D. All materials used for backfilling shall be tested in accordance with Section 02200.

3.6 ROCK EXCAVATION

See Section 02229 - Rock Removal

SECTION 02223 – EXCAVATION, BACKFILLING, AND COMPACTING FOR PAVEMENT AND GENERAL SITE GRADING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Conduct site preparation in accordance with Section 02100.

B. Excavate to line, grade and configuration as shown in the plans and specifications for proposed pavements.

C. Fill to line, grade and configuration as shown in the plans and specifications for proposed pavements.

D. Compacting fill materials in acceptable manner as stated herein.

1.2 RELATED REQUIREMENTS

A. Section 02200 – Earthwork

B. Section 02227 - Aggregate Material

C. Section 02229 - Rock Removal

D. Section 02505 - Paving Base Course

E. Section 02511 - Asphaltic Concrete Paving

F. Section 02525 - Curbs and Sidewalks

G. Geotechnical Report for boring locations and findings of subsurface materials and conditions

H. Construction Drawings

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM) latest edition:

D422 Method for Particle and Size Analysis of Soils

D1556 Test for Density of soil in Place by the Sand Cone Method

D1557 Test for Moisture-Density Relations of Soils using 10-lb (4.5 kg) Rammer and 18-inch (457 mm) Drop **(Modified Proctor)**

D1559 Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus

D2167 Test for Density of Soil in Place by the Rubber Balloon Method

D2216 Laboratory Determination of Moisture content of Soil

D2487 Classification of Soils for Engineering Purposes

D2922 Tests for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D3017 Test for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D4318 Test for Plastic Limit, Liquid Limit, and Plasticity Index of Soils

C25 Chemical Analysis of Limestone, Quicklime and Hydrated Lime

C110 Physical Testing for Quicklime and Hydrated Lime, Wet Sieve Method

C618 Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete

C977 Quicklime and Hydrated Lime for Soil Stabilization

B. American Association of State Highway and Transportation Officials (AASHTO) latest edition.

T88 Mechanical Analysis of Soils

1.4 QUALITY ASSURANCE

Independent Testing Laboratory selected and paid by Contractor and approved by the Owner shall be retained to perform construction testing on filling operations and subgrade analysis as specified in Section 02200 and as stated herein.

1.5 SUBMITTALS

A. Shop drawings or details pertaining to excavating and filling for pavement are not required unless otherwise shown on the drawings or specifications or if contrary procedures to the project documents are proposed.

B. Submit a sample of each type of off-site fill material that is to be used in backfilling in an air-tight, 10 lb. container for the testing laboratory or submit a gradation and certification of the aggregate material that is to be used to the testing laboratory for review.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fill material from on-site as specified in Section 02200 and approved by the owner or owner's representative.

B. Fill material from off-site as specified in Section 02200 and approved by the owner or owner's representative.

C. Aggregate material as specified in Section 02227.

D. Acceptable stabilization fabrics and Geogrids for some (but not all) uses.

1. Mirafi 500x or 600x
2. Phillips 66 Supac 6WS
3. Dupont Typar 3401 and 3601
4. Trevira S1114 and S1120
5. Tensar SS-1 and SS-2

6. Exxon GTF-200 or 350

7. Geogrids specifically shown on the Contract Drawings

E. Filter/Drainage Fabrics for some (but not all) uses.

1. Mirafi 140NS

2. Phillips 66 Supac 4NP

3. Dupont Typar 3341

4. Fabric Types

F. When the Contract Drawings show a specific fabric or geogrid type, that material shall be used unless otherwise approved by the Engineer and Owner in writing.

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify all lines, elevations and grades necessary to construct pavements, curb and gutter, bases, walkways and roadways as shown in the plans and specifications.

B. Carefully protect benchmarks, property corners, monuments or other reference points.

C. Locate and identify all site utilities that have previously been installed and may be in danger of damage by grading operations.

D. Locate and identify all existing utilities that are to remain and protect them from damage.

E. Over excavate and properly prepare areas of subgrade that are not capable of supporting the proposed systems. These areas are to be stabilized by using acceptable backfill materials placed and compacted as specified, filter fabrics and/or additional aggregate material.

3.2 EXCAVATION

A. Excavate roadway and pavement areas to line and grade as shown in the plans and specifications.

B. Engage all suitable materials into the project fill areas as specified in Section 02200.

C. Unsuitable excavated material is to be disposed of in a manner and location that is acceptable to the owner and the local governing agencies.

D. Perform excavation using capable, well maintained equipment and methods acceptable to the owner and the project document requirements.

3.3 FILLING

A. Stumps shall be removed in all parking lot areas and fill areas where the stumps are located within 4 feet of final grade. Topsoil, organic soils, and other unsuitable materials shall be stripped in all pavement areas to expose native soils of bedrock.

B. Construction dewatering shall begin as early as is practicable during site grading work to keep onsite soils as well drained as possible. Effective dewatering and surface runoff control shall be accomplished with a network of drains, swales, and sumps.

C. Dry subgrades in fill areas after grubbing and stripping that consist of granular soil shall be proofrolled with at least four passes of a minimum of 10,000 pound static weight roller and covered with a 12" layer of compacted Granular Fill, except as noted above, as early as practicable. The fill will provide a working mat to protect the subgrade from disturbance. Soft areas identified during proofrolling or under subsequent traffic prior to subsequent filling activities shall be excavated and replaced with compacted Granular Fill.

D. Where excavations encounter wet or naturally deposited clay soils, the work shall proceed carefully in a manner that avoids subgrade disturbance including: using smooth-edged cutting buckets when making excavations within one foot of the final subgrade elevation, and placement of the Subbase Course (pavement areas) as soon as practicable to protect the subgrade from disturbance. Naturally deposited clays shall not be proofrolled; the Geotechnical Engineer shall examine exposed clay subgrades to verify strength and bearing capacity prior to placement of fill material. In fill areas, the initial lift of fill on wet, natural subgrades should consist of 12 inches of Granular Fill or Crushed Stone.

Fill materials and/or subgrade materials that become contaminated with fines during construction shall be replaced with the appropriate clean materials immediately prior to placing overlying Subbase course, Base course, or engineered fill material.

E. To aid in maintaining stable cut and fill slope conditions, surface water runoff shall be diverted away from the top of slopes. Likewise, surface runoff shall be diverted away from footing excavations and floor slab excavations.

F. Any fill materials that become wet or disturbed before the overlying lift of fill can be placed (e.g., due to a rainstorm during the work day, overnight, or over a weekend) shall be proofrolled, recompacted and/or excavated and replaced with drier fill.

G. All fills consisting of on-site natural stiff olive-brown marine clays shall be placed at moisture contents no wetter than 3 or 4 percent of optimum in accordance with the criteria summarized below and Note 1. The maximum dry density of each fill material used should be determined in accordance with ASTM D-1557 (Modified Proctor):

Fill Application or Use	Allowable Material Type	Max. Lift Thickness (inches)	Min. Compaction in % of Max. Dry Density
1. Pavement base	Base Course Fill	6	95
2. Pavement subbase	Subbase Course Fill	8	95
3. General pavement subgrade fills	Engineered Fill Section or Granular Fill	8	92
4. General site fills	Engineered Fill Section, Granular Fill, or Common Borrow Fill	12	92
	Onsite Clay Borrow (1)	12	90

(1) Onsite clay borrow shall be compacted to 90 percent of its maximum dry and at a moisture within 2 percent above the optimum moisture content. These soils shall not be used within 3 ft. of the finished pavement level.

3.4 COMPACTION

A Maintain optimum moisture content of fill materials to attain required compaction density.

B. All material shall be tested in accordance with Section 02200.

C. An Independent Testing Laboratory selected and paid by the Contractor and approved by the Owner shall be retained to perform testing on-site.

D. Compaction test will be as specified in Section 02200 together with the following for paving areas:

1. In cut areas not less than one compaction test for every 20,000 square feet unless directed otherwise by Geotechnical Engineer.

2. In fill areas, same rate of testing for each 12" lift (measured loose).

E. If compaction requirements are not complied with at any time during construction process, remove and recompact deficient areas until proper compaction is obtained at no additional expense to owner.

3.5 MAINTENANCE OF SUBGRADE

A. Finished subgrades shall be verified to ensure proper elevation and conditions for construction above subgrade.

B. Protect subgrade from excessive wheel loading during construction including concrete trucks and dump trucks.

C. Remove areas of finished subgrade found to be disturbed or to have insufficient compaction density to depth necessary and replace in a manner that will comply with compaction requirements by use of material equal to or better than best subgrade material on site. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, true to grade and cross section.

3.6 FINISH GRADING

A. Finish grading shall be in accordance with Section 02200 and as more specifically stated herein.

B. Grading of paving areas shall be checked by string line from grade stakes (blue tops) set at not more than 50' centers. Tolerances of 0.10 feet, more or less, will be permitted, provided drainage regime is maintained. Contractor to provide engineering and field staking necessary for verification of lines, grades, and elevations.

C. All other areas shall be graded to achieve drainage. Tolerances shall be 0.16 foot, provided drainage flow rates are maintained.

3.7 ROCK EXCAVATION

See Section 02229 - Rock Removal.

SECTION 02227 – AGGREGATE MATERIAL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Aggregate Materials

1.2 RELATED SECTIONS

A. Section 02050 - Demolition

B. Section 02100 - Site Preparation

C. Section 02200 - Earthwork

D. Section 02221 - Excavation, Backfilling and Compacting for Structures

E. Section 02222 - Excavation, Backfilling and Compacting for Utilities

F. Section 02223 - Excavation, Backfilling and Compacting for Pavement

G Section 02270 - Slope Protection and Erosion Control

H. Construction Drawings

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM): latest edition ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Course Aggregates. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lbs (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

ASTM D2487 - Classification of Soils for Engineering Purposes.

ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

ASTM D4318 - Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

B. American Association of State Highway and Transportation Officials (AASHTO) latest edition. AASHTO T180 - Moisture-Density Relations of Soils Using A 10 lb (4.54 Kg) Rammer and an 18 inch (457 mm) Drop.

AASHTO M147 - Materials for Aggregate and Soil Aggregate.

1.4 QUALITY ASSURANCE

Test and analysis of aggregate material will be preformed in accordance with standard ASTM and AASHTO procedures listed herein.

1.5 SUBMITTALS

A. Submit in air tight containers a 10 pound sample of each aggregate or mixture that is to be incorporated into the project to the testing laboratory designated by the Owner.

B. Submit the names of each material supplier and specific type and source of each material. Any changes in source throughout the job requires approval of the Owner or Engineer.

C. Submit materials certificate to on-site Independent Testing Laboratory which is signed by material producer and Contractor, certifying that materials comply with, or exceed, the requirements herein.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All construction and materials shall meet or exceed the requirements of this section and any state highway department specification section referred to or noted on the drawings which pertain to paving base course design, materials, preparation, and/or execution. All materials shall be as indicated on Drawings and shall comply with applicable state highway specification regarding source, quality, gradation, liquid, limit, plasticity index, and mix proportioning.

B. The following tables serve as a guidance for the gradation of the various aggregate materials. Local availability and variances with each States requirements may change the gradations and parameters of these materials. The Contractor shall indicate when submitting material test results what the various applications will be.

	Percentage By Weight Passing A Square Mesh Sieve												
	Inch Sizes								**Numbered Sieves**				
Material Description	**6**	**3**	**2**	**1**	**3/4**	**1/2**	**3/8**	**1/4**	**No 4**	**No 10**	**No. 40**	**No. 100**	**No. 200**
Aggregate Base**	--	--	100	--	--	45-70	--	30-55	--	--	0-20	--	0-5
Granular Borrow*	--	--	--	--	--	--	--	--	--	--	0-70	--	0-20
Common Borrow	--	PER MDOT 703.18											
Safety Rail Stone	--	--	100	20-50	--	--	--	--	--	0-5	--	--	--
Select Backfill for pipes	--	--	--	--	--	--	85-100	--	--	--	0-5	--	--
Riprap Bedding Material & Structural Fill	--	100	--	--	--	--	--	25-70	--	--	0-30	--	0-7
Pipe Bedding / Crushed Stone/ Drainage Stone	--	--	--	100	90-100	--		25-90			0-30	--	0-5
Subbase Course Gravel***	--	100	--	--	--	--	--	25-70	--	--	0-30	---	0-5
Granular Fill (1)	100	100						30-80			10-50		0-8

* The maximum stone size shall be limited to 3 inches within two feet of walls, piers, footings and floor slabs; and 6 inch maximum stone size elsewhere.

** Aggregate base course shall not contain particles of rock which will not pass the 2 inch square mesh sieve.

*** Aggregate subbase course shall not contain particles of rock which are larger than 4 inches.

(1) Cobbles or boulders having a size exceeding 2/3 of the loose lift thickness should be removed prior to compaction.

PART 3 - EXECUTION

3.1 STOCKPILING

Stockpile on-site at locations indicated by the owner in such a manner that there will be no standing water or mixing with other materials.

3.2 BORROW SITES

Upon completion of borrow operations, clean up borrow areas as indicated on the plans and in neat and reasonable manner to the satisfaction of the property Owner or the Engineer.

3.3 TRANSPORTATION

Off-site materials shall be transported to the project using well maintained and operating vehicles. Once on the job site, all transporting vehicles shall stay on designated haul roads and shall at no time endanger any of the improvements by rutting, overloading or pumping the haul road.

SECTION 02229 – ROCK REMOVAL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Removal of identified and discovered rock during excavation.

B. Use of Explosives to assist rock removal.

C. Incorporating removed rock into fills and embankments.

1.02 RELATED SECTIONS

A. Section 02200 – Earthwork

B. Section 02221 – Excavation, Backfilling and Compacting for Structures

C. Section 02222 - Excavation, Backfilling and Compacting for Utilities

D Section 02223 – Excavation, Backfilling and Compaction for Pavement

E. Geotechnical Report for boring locations and findings of subsurface materials and conditions

F. Construction Drawings

1.03 REFERENCE STANDARDS

NFPA 495 - Code for Explosive Materials

1.04 ENVIRONMENTAL REQUIREMENTS

Determine all environmental effects associated with proposed work and safeguard those concerns as regulated by law and all others by reasonable and practiced methods.

1.05 JOB CONDITIONS

Rock is not anticipated on the project site. If rock is encountered, the removal will be accomplished by change order.

1.06 QUALIFICATIONS

Contractor to remove rock by blasting shall submit records of documented experience to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

Explosives, delay device and blast mat materials shall be the type recommended by the explosive firm that will comply with the requirements of this section.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify site conditions and note subsurface conditions affecting work of this section. The Contractor shall follow all procedures required by the City of Portland at no additional expense to the owner.

B. Identify required lines, levels, and elevations that will determine the extent of the proposed removals.

C. Conduct a pre-blast survey in accordance with the following requirements.

1. The Contractor shall conduct a Pre-Blast Survey of all structures within the Blasting Area and provide the Owner, MeDEP, and the City of Portland a written report of the Pre-Blast Survey and Blasting Plan. The Pre-blast Survey shall be filed, reviewed, and approved by the MeDEP and the City of Portland. This survey should include:

- All structures within a minimum distance of 500 feet from any blasting activity. The area extending beyond the 500 feet minimum shall be determined by the Contractor. This distance shall be confirmed after consultation of the General Contractor, Site Contractor, Blasting Contractor and Insurance Companies.

- A blasting plan which addresses:

  - Airblast limits
  - Ground vibrations
  - Maximum peak particle velocity

- The blasting plan shall meet criteria established in Chapter 3 (Control of Adverse Effects) in the Blasting Guidance Manual of the United States Dept. of the Interior.

- Provisions and measures to monitor and assure compliance with the blasting plan.

2. The Contractor shall provide the Engineer with a Blasting Log for the work. The Blasting Log shall contain the following information:

   - Location
   - Time and Date
   - Number of Holes
   - Amount and type of explosive used per hole
   - The names of persons, companies, corporations, or public utilities contacted, owning, leasing, or occupying property or structures in proximity to the site of the work of the Contractor's intention to use explosives.

3. Drilling equipment will be equipped with suitable dust control apparatus which must be kept in repair and used during all drilling operations.

   A copy of the MeDEP and City of Portland approvals of the pre-blast survey and blasting plan obtained by the Contractor shall be submitted to the Owner prior to blasting.

3.02 ROCK EXCAVATION

A. Rock Excavation - definition - Igneous, metamorphic or sedimentary rock that cannot be removed by rippers or other mechanical methods and, therefore, requires drilling and blasting. Cut rock to form level bearing at bottom of trench. In the utility trenches, excavate to 6" below invert elevation of pipe. This excludes pavement, concrete, and boulders less than 3 cubic yards.

   Reuse excavated materials on-site in accordance with Section 02200, if applicable.

B. Comply with all laws, rules, and regulations of Federal, State and local authorities and insurer which govern storage, use, manufacture, sale, handling, transportation, licensing, or other disposition of explosives. Take special precautions for proper use of explosives to prevent harm to human life and damage to surface structures, all utility lines, or other subsurface structures.

   Do not conduct blasting operations until persons in vicinity have had ample notice and have reached positions of safety.

All blasting shall be performed in accordance with all pertinent provisions of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc., of the "Construction Safety Rules and Regulations," ***as adopted by the State Board of Construction Safety, Augusta, Maine, and Maine Department of Transportation*** "Standard Specifications" Section 107.12, Use of Explosives. Blasting through the over burden will not be allowed.

C. Contractor shall save harmless owner, architect, and owner's representative from any claim growing out of use of such explosives. Removal of materials of any nature by blasting shall be done in such manner and such time as to avoid damage affecting integrity of design and to avoid damage to any new or existing structure included in or adjacent to work. It shall be the contractor's responsibility to determine method of operation to ensure desired results and integrity of completed work.

D. Perform rock excavation in a manner that will produce material of such size as to permit it being placed in embankments in accordance with Section 02200. Remove rock to limits as indicated. Remove loose or shattered rock, overhanging ledges and boulders which might dislodge.

E. When during the process of excavation, rock is encountered, such material shall be uncovered and exposed. Remove as much weathered rock as possible with conventional excavating equipment. Notify the Architect before proceeding with any excavating, blasting or removal of materials which might be claimed as rock. The Contractor shall not proceed with the removal of the material claimed as rock until the material has been classified by the Architect.

Failure to uncover such material or notify the Architect to take cross sections prior to any excavation shall forfeit the Contractor's claim for ledge removal.

The Contractor shall employ and pay for an approved registered civil engineer or land surveyor acceptable to the Architect to take cross sections of rock before removal of same and to provide computations of cross sections within the limit lines of the excavation. No material claimed as rock shall be excavated, blasted or removed until the following procedures have been performed:

Contractor shall quantify rock excavation and provide Architect with sections and profiles for review.

Architect shall provide to the Contractor a letter of authorization to proceed with the excavation of material claimed as rock. The letter shall indicate the agreed upon quantity of rock and the price for the entire process of excavation, hauling and disposal.

Blasting operations shall be accomplished in compliance with the "Blasting" clause of the Supplemental General Conditions. Rock shall be trimmed so that none protrudes within 6 inches of all utilities when said utilities are installed to correct line and grade.

F. Definition of Rock Removal Classifications

Rock excavation shall be classified as either open or trench. Trench rock shall be excavation classified as rock where the pay width is 5'-0" or less. Trench rock includes certain rock removal for footings. All other excavation classified as rock shall be considered open rock. Rock shall be classified as open rock in the upper zones above trenches when applicable.

G. No additional payment will be made for ledge encountered during the course of work.

H. VACANT.

I. Rock excavation for structures shall be measured by cross sectioning the ledge surface. The depth shall be between the sectioned surface and the bottom of the concrete or gravel base, if called for. The horizontal limits shall be twelve (12) inches beyond the concrete lines unless otherwise noted on the Contract Drawings. All overblast not specifically required by the Contract or over-excavation shall be at the Contractor's expense. Any sections over-excavated shall be brought to grade with materials which comply with the geotechnical report.

J. Rock excavation for roadways or pond areas shall be measured and computed using the average end area method.

K. Provisions for Blasting

Blasting shall be performed only after approval has been given by the Owner for such operations and must comply with the following provisions:

1. *The Contractor or any subcontractor shall use sufficient stemming, matting or natural protective cover to prevent flyrock from leaving property owned or under control of the owner or operator or from entering protected natural resources or natural buffer strips. Crushed rock or other suitable material must be used for stemming when available; native gravel, drill cuttings or other material may be used for stemming only if no other suitable material is available.*

2. *The maximum allowable airblast at any inhabited building not owned or controlled by the developer may not exceed 129 decibels peak when measured by an instrument having a flat response (+ or – 3 decibels) over the range of 5 to 200 hertz.*

3. *The maximum allowable airblast at an uninhabited building not owned or controlled by the developer may not exceed 140 decibels peak when measured by an instrument having a flat response (+ or – 3 decibels) over the range of 5 to 200 hertz.*

4. *Monitoring of airblast levels is required in all cases for which a preblast survey is required by paragraph F. The Contractor may file an MeDEP Permit Modification requesting the MeDEP waive the monitoring requirement if the Contractor or subcontractor secures the permission of affected property owners to increase allowable airblast levels on their property and the department determines that no protected natural resource will be adversely affected by the increased airblast levels. The cost to prepare the permit modification and the effect of project delay while MeDEP reviews the request shall be borne solely by the Contractor or his subcontractor.*

5. *If a blast is to be initiated by detonating cord, the detonating cord must be covered by crushed rock or other suitable cover to reduce noise and concussion effects.*

6. *A preblast survey is required and must extend a minimum radius of 2,000 feet from the blast site. The preblast survey must document any preexisting damage to structures and buildings and any other physical features within the survey radius that could reasonably be affected by blasting. Assessment of features such as pipes, cables, transmission lines and wells and other water supply systems must be limited to surface conditions and other readily available data, such as well yield and water quality. The preblast survey must be conducted prior to the initiation of blasting at the operation. The Contractor or subcontractor shall retain a copy of all preblast surveys for at least one year from the date of the last blast on the development site.*

   (a) *The Contractor or the subcontractor is not required to conduct a preblast survey on properties for which the owner or operator documents the rejection of an offer by registered letter, return receipt requested, to conduct a preblast survey. Any person owning a building within a preblast survey radius may voluntarily waive the right to a survey.*

7. *Blasting may not occur in the period between sundown and sunrise the following day or in the period 7:00 p.m. and 7:00 a.m., whichever is greater. Routine production blasting is not allowed in the daytime on Sunday. Detonation of misfires may occur outside of these times but must be reported to the department within 5 business days of the misfire detonation. Blasting may not occur more frequently than 4 times per day. Underground production blasting may be exempted from these requirements provided that a waiver is granted by the department.*

8. *Sound from blasting may not exceed the following limits at any protected location:*

Number of Blasts Per Day	*Sound Level Limit*
1	*129 dbl*
2	*126 dbl*
3	*124 dbl*
4	*123 dbl*

9. *The maximum peak particle velocity at inhabitable structures not owned or controlled by the developer may not exceed the levels established in Table 1 in paragraph J and the graph published by the United States Department of the Interior in "Bureau of Mines Report of Investigations 8507," Appendix B, Figure B-1. The Contractor or subcontractor may apply for a MeDEP Project Modification to request a variance to allow ground vibration levels greater than 2 inches per second on undeveloped property not owned or controlled by the applicant if the department determines that no protected natural resource, unusual natural area or historic site will be adversely affected by the increased ground vibration levels. If inhabitable structures are constructed on the property after approval of the MeDEP and prior to completion of blasting, the Contractor immediately must notify the department and modify blasting procedures to remain in compliance with the standards of this subsection. The cost to prepare the permit modification and the effect of project delay while MeDEP reviews the request shall be borne solely by the Contractor or his subcontractor.*

10. *Table 1 of this paragraph or the graph published by the United States Department of the Interior in "Bureau of Mines Report of Investigations 8507", Appendix B. Figure B-1 must be used to evaluate ground vibration effects for those blasts for which a preblast survey is required.*

    (a) *Either Table 1 of this paragraph or graph published by the United States Department of the Interior in "Bureau of Mines report of Investigations 8507", Appendix B, Figure B-1 may be used to evaluate ground vibration when blasting is to be monitored by seismic instrumentation.*

    (b) *Blasting measured in accordance with Table 1 of this paragraph must be conducted so that the peak particle velocity of any one of the 3 mutually perpendicular components of motion does not exceed the ground vibration limits at the distances specified in Table 1 of this paragraph.*

    (c) *Seismic instruments that monitor blasting in accordance with Table 1 of this paragraph must have the instrument's transducer firmly coupled to the ground.*

(d) *An owner or operator using Table 1 of this paragraph must use the scaled-distance equation, $W=(D/D_s)^2$, to determine the allowable charge weight of explosives to be detonated in any 8 millisecond or greater delay period without seismic monitoring, where W is equal to the maximum weight of explosives, in pounds, and D and Ds are defined as in Table 1 of this paragraph. The Contractor may apply for a Permit Modification to MeDEP to authorize the use of a modified scaled-distance factor for production blasting if the contractor can demonstrate to a 95% confidence level, based upon records of seismographic monitoring at the specific site of the mining activity covered by the permit, that use of the modified scaled-distance factor will not cause the ground vibration to exceed the maximum allowable peak particle velocities of Table 1 of this paragraph. The cost to prepare the permit modification and the effect of project delay while MeDEP reviews the request shall be borne solely by the Contractor or his subcontractor.*

(e) *Blasting monitored in accordance with the graph published by the United States Department of the Interior in "Bureau of Mines Report of Investigations 8507", Appendix B, Figure B-1 must be conducted so that the continuously variable particle velocity criteria are not exceeded.*

The Contractor may apply for a Permit Modification to MeDEP for a variance of the ground vibration monitoring requirement prior to conducting blasting at the development site if the Contractor agrees to design all blasts so that the weight of explosives per 8 millisecond or greater delay does not exceed that determined by the equation $W=(D/D_s)^2$, where W is the maximum allowable weight of explosives per delay of 8 milliseconds or greater, D is the shortest distance between any area to be blasted and any inhabitable structure not owned or controlled by the developer, and Ds equals 70 ft./lb.$^{1/2}$. As a condition of the variance, the department may require submission of records certified as accurate by the blaster and may require the owner or operator to document compliance with the conditions of this paragraph. The cost to prepare the permit modification and the effect of project delay while MeDEP reviews the request shall be borne solely by the Contractor or his subcontractor.

The following is Table 1.

Distance Versus Peak Particle Velocity Method		
Distance (D) from the blast area	***Maximum allowable peak particle velocity (Vmax) for ground vibration (in./sec.)***	***Scaled-distance factor (Ds) to be applied without seismic monitoring***
0 to 300	*1.25*	*50*
301-5000	*1.00*	*55*
Greater than 5000	*0.75*	*65*

11. *A record of each blast, including seismographic data, must be kept for at least one year from the date of the last blast, must be available for inspection at the development or at the offices of the owner or operator if the development has been closed, completed or abandoned before the one-year limit has passed and must contain at a minimum the following data:*

   (a) Name of blasting company or blasting contractor;

   (b) Location, date and time of blast;

   (c) Name, signature and social security number of blaster;

   (d) Type of material blasted;

   (e) Number and spacing of holes and depth of burden or stemming;

   (f) Diameter and depth of holes;

   (g) Type of explosives used;

   (h) Total amount of explosives used;

   (i) Maximum amount of explosives used per delay period of 8 milliseconds or greater;

   (j) Maximum number of holes per delay period of 8 milliseconds or greater;

   (k) Method of firing and type of circuit;

   (l) Direction and distance in feet to the nearest dwelling, public building, school, church or commercial or institutional building neither owned nor controller by the developer;

   (m) Weather conditions, including such factors as wind direction and cloud cover;

   (n) Height or length of stemming;

   (o) Amount of mats or other protection used;

   (p) Type of detonators used and delay periods used;

   (q) The exact location of each seismograph and the distance of each seismograph from the blast;

   (r) Seismographic readings;

   (s) Name and signature of the person operating each seismograph; and

   (t) Names of the person and the firm analyzing the seismographic data.

12. *All field seismographs must record the full analog wave form of each of the 3 mutually perpendicular components of motion in terms of particle velocity. All seismographs must be capable of sensor check and must be calibrated according to the manufacturer's recommendations.*

SECTION 02230 – SUBBASE AND BASE GRAVEL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Granular Base and Subbase (also referred to as base and subbase aggregates or base and subbase gravels).

1.02 RELATED REQUIREMENTS

A. Section 02100 - Site Preparation

B. Section 02200 - Earthwork

C. Section 02227 - Aggregate Materials

D. Section 02511 - Asphaltic Concrete Paving

E. Section 02525 - Curbs and Sidewalks

F. Geotechnical Report

1.03 REFERENCES

A. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

B. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lbs (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

C. ASTM D2167 - Test for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

D. ASTM D1556 - Test Method for Density of Soil in-place by the Sand-Cone Method.

E. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth) Method B (Direct Transmission).

F. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

Submit materials certificate to on-site independent testing laboratory which is signed by material producer and Contractor, certifying that materials comply with, or exceed, the requirements herein. Materials shall comply with the gradations specified in Section 02227, Aggregate Material.

PART 3 - EXECUTION

3.01 EXAMINATION

Verify substrate has been inspected, gradients and elevations are correct, and dry.

3.02 CONSTRUCTION

A. Perform base and subbase course construction in a manner that will drain surface properly at all times and at same time prevent runoff from adjacent areas from draining onto base course or subbase construction.

B. Compact base material to not less than 95% of maximum density as determined by ASTM D-1557 unless otherwise indicated on the Drawings.

C. Granular Subbase: Construct to thickness indicated on Drawings; apply in lifts or layers not exceeding 8", measured loose.

D. Granular Base: Construct to thickness indicated on Drawings. Apply in lifts or layers not exceeding 6" measured loose.

E. All work of this section shall conform to the requirements of Sections 304 of the Maine Department of Transportation Specification, latest revision, for furnishing, placing, and surface tolerance of aggregate base and subbase courses.

3.03 FIELD QUALITY CONTROL

A. An Independent Testing Laboratory, retained by the Owner, shall perform construction testing of in-place base courses for compliance with requirements for gradation and density. The Contractor shall retain an independent surveyor to verify paving base course tolerances (by rod and level readings on no more than fifty-foot centers) to +0.05' of design elevation that allow for paving thickness as shown in the Drawings. Contractor shall provide instruments and a suitable benchmark and perform all survey. The Contractor may, at his option, retain his own test laboratory for quality control, production schedules, or for any other reason at no cost to the Owner.

B. The following tests shall be performed on each type of material used as base and subbase course material:

1. Moisture and Density Relationship: ASTM D 1557

2. Mechanical Analysis: AASHTO T-88

3. Plasticity Index: ASTM D-4318-84

4. Base and subbase material thickness: Perform one test for each 20,000 square feet in-place base material area.

5. Base and subbase material compaction: Perform one test in each lift for each 20,000 square feet in-place base material area.

6. Test each source of base material for compliance with applicable state highway specifications.

C. Field density tests for in-place materials shall be performed according to one of the following standards as part of construction testing requirements:

1. Sand-Cone Method: ASTM D1556

2. Balloon Method: ASTM D2167

3. Nuclear Method: ASTM D2922, Method B (Direct Transmission).

D. Independent Testing Laboratory shall prepare test reports that indicate test location, elevation data, and test results. The Owner and Contractor shall be provided with copies of reports within 96 hours of time test was performed. In event that any test performed fails to meet these Specifications, the Owner and Contractor shall be notified immediately by Independent Testing Laboratory. The Owner reserves right to employ a separate testing laboratory and to direct any testing that is deemed by them to be necessary. Contractor shall provide free access to site for testing activities.

E. Any base or subbase courses which become contaminated due to weather, erosion, or other activities, whether or not such contamination is under the control of the Contractor shall be removed and replaced. Said removal and replacement shall be incidental to the work and no additional payment will be made to the Contractor.

SECTION 02240 – DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes construction dewatering.

1.2 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control ground-water flow into excavations, to permit construction to proceed on stable subgrades and to restrict the flow of surface water into the excavation.

1.3 SUBMITTALS

A. Shop Drawings for Information: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of headers and discharge lines; and means of discharge and disposal of water, piles, slurry walls, or other formal dewatering systems.

1. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction.

B. Comply with all OSHA and other safety regulations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.

2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed, or until dewatering is no longer required.

C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.

1. Maintain piezometric water level a minimum of 24 inches below surface of excavation.

E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, DIRTBAGS and other flow-control devices as required by authorities having jurisdiction.

F. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.

1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

SECTION 02242 - CONCRETE MODULAR RETAINING WALL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Work includes designing furnishing and installing modular block retaining wall units, geogrid reinforcement, wall fill and backfill to the lines and grades designated on the construction drawings and as specified herein.

B. Work includes preparing foundation soil, furnishing and installing leveling pad, unit fill and backfill to the lines and grades designated on the construction drawings.

C. Furnishing and installing all appurtenant materials required for construction of the geogrid reinforced soil retaining wall as shown on the construction drawings.

1.02 RELATED SECTIONS

SECTION 02200 – EARTHWORK (Includes Riprap)
SECTION 02720 – STORM SEWER SYSTEMS

1.03 REFERENCE STANDARDS

The following most current publications form part of the specification to the extent indicated by references thereto and shall be followed for all construction testing:

ASTM C90 – 85 Hollow Load Bearing Masonry Units
ASTM C140 – 75 Sampling and Testing Concrete Masonry Units
ASTM C145 – 85 Solid Load Bearing Concrete Masonry Units

1.04 DELIVERY, STORAGE AND HANDLING

A. Contractor shall check the materials upon delivery to assure that proper material has been received.

B. Geogrids shall be stored above –20 Degrees F.

C. Contractor shall prevent excessive mud, wet cement, epoxy, and like materials which may affix themselves, from coming in contact with the materials.

D. Contractor shall protect the material from damage. Damaged material shall not be incorporated into the retaining wall structure.

E. Rolled geogrid material may be laid flat or stood on end for storage.

1.05 SUBMITTALS

A. Samples of all products used in the work of this section. Available colors and texture shall be provided to the Owner for selection.

B. Latest edition of manufacturer's specifications for proposed materials, method of installation and list of material proposed for use.

C. The design of the wall stamped by a registered professional engineer. The wall shall be designed for highway surcharge. The design shall be presented as a submittal for review by the engineer and shall include the following items:

D. Assumed naturally-deposited soil and backfill physical and strength properties.

E. Local stability calculations, including calculated safety factors against sliding and overturning failure.

1.06 QUALITY ASSURANCE

A. Soil testing and inspection services for quality control testing during earthwork operation will be supplied by the independent test laboratory retained by the Contractor and approved by the Owner. Refer to general contract provisions for clarification on who pays for the independent test site.

B. Qualifications – The Engineer's approval of the system and the supplier will be based upon the following considerations:

1. The geogrid reinforcement, drainage details, and erosion control system for the system have each been reviewed and approved for use.

2. The supplier has a large enough operation and the necessary experience to supply and support the construction on a timely basis.

3. Past experience in the design and construction of at least 10 projects of a similar magnitude of the proposed system can be documented.

C. The design shall be signed by a registered Professional Engineer who shall demonstrate a minimum Errors and Omissions insurance coverage of $2,000,000 by furnishing the Engineer with a current certificate of insurance.

D. Pre-Construction Conference – Prior to the installation of the geogrid, the Contractor shall arrange a meeting at the site with the geogrid material supplier and, where applicable, the geogrid installer. The Owner and the Engineer shall be notified at least 3 days in advance of the time of the meeting. The representative of the geogrid supplier shall be available on an "as-needed" basis during construction.

PART 2 - PRODUCTS

2.01 CONCRETE UNITS

A. Masonry units shall be Retaining Wall Units designed to create a modular block wall.

B. Concrete retaining wall units shall have a minimum net 28-day compressive strength of 3,000 psi. The concrete shall have a maximum moisture absorption of 6 to 8 lbs/ft.^{3}.

C. Exterior dimensions may vary in accordance with ASTM C90-85. Standard and Compac units shall have a minimum of 1 square foot face area each. Mini units shall have a minimum ½ square foot face area each.

D. Units shall have angled sides capable of concave and convex alignment curves with a minimum radius of 10 feet. NOTE: Where applicable, for straight walls use non-angled straight side cap units.

E. Units shall be interlocked with non-corrosive fiberglass pins.

F. Units shall be interlocked as to provide a 6 degree setback per each course of wall height.

2.02 GEOGRID

A. Geogrid to be used as soil reinforcement shall be TENSAR UX1100 or approved equal.

2.03 FIBERGLASS CONNECTING PINS

A. Connecting pins shall be ½ inch diameter thermoset isopthalic polyester resin/pultruded fiberglass reinforcement rods.

B. Pins shall have a minimum flexural strength of 128,000 psi and short beam shear of 6400 psi.

2.04 BASE LEVELING PAD MATERIALS

A. Material shall consist of compacted granular fill, ¾" crushed stone, and underdrains as shown on the construction drawings. The compacted leveling pad shall be a minimum 12 inches thick for each layer (compacted granular fill and crushed stone).

2.05 UNIT FILL

A. Fill for units and within the geogrid behind the units shall be compacted granular fill.

2.06 BACKFILL

A. Material shall be compacted granular fill as approved by the Engineer.

B. Where additional fill is required, Contractor shall submit sample and specifications to the Engineer to determine if acceptable.

C. Backfill zone shall extend to encapsulate all Geogrids.

2.07 FILTER FABRIC

Filter fabric shall be installed as shown on the plans and shall meet the requirements of Section 02200 of these Specifications.

PART 3 - EXECUTION

3.01 PREPARATION

A. Contractor shall excavate to the lines and grades shown on the construction drawings. Over excavation shall not be paid for and replacement with compacted fill and/or wall system components will be required at contractor expense. Contractor shall be careful not to disturb embankment materials beyond lines shown.

3.02 FOUNDATION SOIL PREPARATION

A. Foundation soil shall be excavated as required for footing dimensions shown on the construction drawings or as directed by the Engineer.

B. Foundation soil shall be examined by the Engineer to assure that the actual foundation soil strength meets or exceeds assumed design strength. Soils not meeting required strength shall be removed and replaced with acceptable material.

C. Over-excavated areas shall be filled with approved compacted granular fill backfill material.

D. Foundation shall be proofrolled prior to fill and geogrid placement.

3.03 BASE LEVELING PAD

A. Leveling pad materials shall be placed as shown on the construction drawings, upon undisturbed in-situ soil.

B. Material shall be compacted so as to provide a level hard surface on which to place the first course of units. Compaction shall be to 95% of modified proctor.

C. Leveling pad shall be prepared to insure complete contact of retaining wall unit with base.

D. Leveling pad materials shall be to the depths and widths shown.

3.04 UNIT INSTALLATION

A. First course of concrete wall units shall be placed on the base leveling pad. The units shall be checked for level and alignment. The first course is the most important to ensure accurate and acceptable results.

B. Ensure that units are in full contact with base.

C. Units are placed side by side for full length of wall alignment. Alignment may be done by means of a string line or offset from base line.

D. Install fiberglass connecting pins and fill all voids at units with unit fill material. Tamp fill.

E. Sweep all excess material from top of units and install next course. Ensure each course is completely unit filled backfilled and compacted prior to proceeding to next course.

F. Lay up each course insuring that pins protrude into adjoining courses above a minimum of one inch. Two pins are required per unit. Pull each unit forward, away from the embankment, against pins in the previous course and backfill as the course is completed. Repeat procedure to the extent of wall height.

G. The top two courses of wall units below the cap shall also have an adhesive or epoxy to provide a permanent bond of the upper blocks.

H. As appropriate where the wall changes elevation, units can be stepped with grade or turned into the embankment with a convex return end. Provide appropriate buried units on compacted leveling pad in area of convex return end.

3.05 CAP INSTALLATION

A. Place Modular Block Cap units over projecting pins from units below. Pull forward to set back position. Back fill and compact to finished grade.

B. As required, provide permanent mechanical connection to wall units with construction adhesive or epoxy. Apply adhesive or epoxy bottom surface of cap units and install on units below.

3.06 GEOGRID INSTALLATION

A. The geogrid soil reinforcement shall be laid horizontally on compacted backfill. Connect to the concrete wall units by hooding geogrid over fiberglass pins. Pull taut, and anchor before backfill is placed on the geogrid.

B. Slack in the geogrid at the wall unit connections shall be removed.

C. Geogrid shall be laid at the proper elevation and orientation as shown on the construction drawings or as directed by the Engineer.

D. Correct orientation (roll direction) of the geogrid shall be verified by the contractor.

E. To pretension geogrid, pull pinned geogrid taut to eliminate loose folds. Stake or secure back edge of geogrid prior to and during backfill and compaction.

F. Follow manufacturer's guideline relative to overlap requirement of uniaxial and biaxial geogrids.

3.07 FILL PLACEMENT

A. Backfill material shall be placed in 8 inch lifts and compacted to 95% of Modified Proctor.

B. Backfill shall be placed, spread, and compacted in such a manner that minimizes the development of slack or loss of pretension of the geogrid.

C. Only hand-operated compaction equipment shall be allowed within 3 feet of the back surface of the Modular Block units.

D. Backfill shall be placed from the wall rearward into the embankment to ensure that the geogrid remains taut.

E. Tracked construction equipment shall not be operated directly on the geogrid. A minimum backfill thickness of 6 inches is required prior to operation of tracked vehicles over geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.

F. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds, less than 10 MPH. Sudden braking and sharp turning shall be avoided.

G. Fill placed one foot behind the geogrid units shall be wrapped in filter fabric as shown on the plans. A 6" overlap of the filter fabric shall be provided at the top of each layer of stone backfill.

H. The fill placement shall be coordinated with the installation of handrails, fences, or guiderails.

SECTION 02270 – SLOPE PROTECTION AND EROSION CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary and permanent erosion control systems.

B. Slope Protection Systems.

1.2 RELATED SECTIONS

A. Section 02000 - Site Location of Development Permit

B. Section 02100 - Site Preparation

C. Section 02200 - Earthwork

D. MeDEP Site Location of Development Permit application, Section 24, Erosion and Sedimentation Control Report (Appended to this Specification Section)

E. Construction Requirements

1.3 ENVIRONMENTAL REQUIREMENTS

A. The Contractor shall protect adjacent properties and water resources from erosion and sediment damage throughout the life of the contract in accordance with the Erosion and Sediment Control Report prepared for this project and in accordance with the requirements of the MeDEP Site Location of Development Permit and special conditions of the permits. The Erosion and Sediment Control Report and Site Permits have specific restrictions on seasonal work limits, the amount of area which can be exposed at a given time, the general sequence of construction, and contractor monitoring.

B. The general contractor will be required to designate, by name, a Registered Professional Engineer or equivalent person responsible for implementation of all erosion control measures as required by the MeDEP Site Location of Development Permit and Maine Construction General Permit for this project. Specific responsibilities will include:

1. Assuring and certifying the contractor's construction sequence is in conformance with the specified schedule. In addition, a weekly certification stating compliance, any deviations, and corrective measures shall be filed with the owner by this person. A copy of the certification form is contained the Erosion and Sedimentation Control Report which is appended to this Specification Section.

2. Inspection of the project work site on a weekly basis, with the installation of added erosion control measures in areas which appear vulnerable to erosion.

3. Inspection of all erosion control measures and drainage inlets after any significant rainfall. Accumulated silt/sediment should be removed when the depth of sediment reaches 50 percent of the barrier height. Accumulated silt/sediment should be removed from behind silt fencing when the depth of the sediment reaches 6 inches. A significant rainfall shall be defined as over ½ inch of precipitation in any consecutive 24-hour period.

4. Inspect areas for catch of grass. A minimum catch of 75 percent is required prior to removal of erosion control measures.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Quick growing grasses for temporary seeding (see seed mixes contained in Erosion and Sedimentation Report).

B. Hay or straw bales.

C. Fencing for siltation control as specified on the plans.

D. Erosion Control blankets with wood excelsior constrained in a photodegradable ***net*** or natural fibers sewn together with cotton thread.

E. Bale stakes shall be a minimum of 4 feet in length and 1" in width.

F. Temporary mulches such as loose hay, straw, netting, wood cellulose or agricultural siltage.

G. Fence stakes shall be metal stakes a minimum of 8 feet in length.

H. Stone check dams shall be spaced according to the Erosion Control Detail Plan.

I. Stone Sediment Barriers or SiltSacks™, or approved equal for inlet protection.

J. A stabilized construction entrance shall be constructed temporarily.

K. Riprap for slopes, culvert, storm drain inlet, and outlet aprons.

L. Sand blankets, of native material, to protect clay subgrades.

M. Reinforced turf.

N. Inlet risers for ponds.

O. Wood mulch.

P. Calcium chloride and water for dust control.

Q. DIRTBAGS as outlined on the contract drawings.

R. Erosion Control Netting/Matting: Neutral Fiber Biodegradable netting: COIR or Jute.

S. Filter Fabric shall be constructed of post consumer plastic geotextile.

PART 3 - EXECUTION

3.1 PREPARATION

A. Review site erosion control plan attached to this section of the specifications.

B. Deficiencies or changes in the erosion control plan as it is applied to current conditions will be brought to the attention of the Engineer for remedial action.

3.2 EROSION CONTROL AND SLOPE PROTECTION IMPLEMENTATION

A. Provide catalog cuts and information concerning the erosion control products which will be used for construction for review by the Owner.

B. Provide information concerning the installation of the erosion sedimentation control including anchorage trench provisions and anchorage devices and spacing for review by the Owner.

C. Place erosion control systems in accordance with the erosion control plan and in accordance with approved installation procedures.

D. This contract limits the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations. The Owner has the authority to direct the Contractor to provide immediate permanent or temporary pollution control measures. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practical time to minimize the need for temporary controls. Cut slopes shall be permanently seeded and mulched as the excavation proceeds to the extent considered desirable and practical.

E. The temporary erosion control systems installed by the Contractor shall be maintained as directed by the Engineer to control siltation at all times during the life of the Contract. The Contractor must respond to any maintenance or additional work ordered by the Engineer within a 48 hour period.

F. Any additional material work required beyond the extent of the erosion control plan shall be paid for by the Owner except where such measures are required to correct deficiencies caused by the failure of the Contractor to construct the work in accordance with the erosion sediment control plan.

G. Slopes that erode easily shall be temporarily seeded as the work progresses with a cereal grain of wheat, rye or oats.

MEDEP SITE LOCATION OF DEVELOPMENT PERMIT APPLICATION

Section 24 - Erosion and Sedimentation Control Report

PART C OF SECTION 6

(AN EXCERPT OF SECTION 24)

EROSION AND SEDIMENTATION CONTROL REPORT

Prepared for:

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Portland, Maine 04101

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April 2006

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Attachments

(EXCERPT OF)
SECTION 24

EROSION AND SEDIMENTATION CONTROL REPORT

24.0 Introduction

DeLuca-Hoffman Assoc., Inc. has been retained by Mercy Hospital to prepare plans and provide permit application assistance associated with the proposed building, parking, access, and other facility improvements for the proposed Mercy Hospital at the Fore River Site Project. The proposed hospital will be sited on the north side of the Veterans Memorial Bridge with the Fore River to the west, I-295 to the north, and St. John Street to the east. The new hospital will occupy the central portion of the site along with the proposed Medical Office building. Figures depicting the project location are provided with this application. The proposed hospital will consist of three to five stories with a building footprint of approximately 30,000 square feet. The Medical Office building will consist of two to four stories with an approximate building footprint of 25,000 square feet. Parking for approximately 900 or more Hospital/Medical Office patients/visitors will be provided, as well as service areas and access roads. The construction of the Mercy Hospital Project will disturb approximately 25 acres of the parcel.

This narrative contains the stormwater management and water quality requirements for the project.

24.1 Existing Site Conditions

The lands consist of approximately 43 acres of mudflats along the Fore River and 42 acres of undeveloped or semi-developed land located prominently along the Fore River waterfront. Figure 2 contains an excerpt of the USGS Quadrangle map that identifies the site location.

The site generally extends from just east of the recently constructed I-295 Exit 5 Interchange ramps easterly along the Fore River to the Veterans Memorial Bridge. The site is bounded to the north and east by an active railroad line operated by Guilford Industries. Farther to the northeast, St. John Street is primarily commercial development. Existing commercial establishments along St. John Street include Barber Foods, Century Tire, Redlon and Johnson and the Union Station Plaza.

Merrill Industries operates a marine terminal to the southeast of the Veterans Bridge and the development site. Merrill Industries also formerly used their portion of the development site for the temporary storage of materials resulting from the operations of the marine terminal. A single existing structure occupies the southerly end of the property. The structure dates back to at least pre-1970 when the site was leased by Cianbro Construction as an office and construction yard area. The Cumberland Country Correctional Facility was constructed a few years ago on land that is between the development site and Congress Street to the north. The Fore River extends across the site's southwestern portion.

Historically, various railroad companies have owned portions of the property for at least the past 50 years. Up until the 1980s, the site contained a railroad yard that included multiple tracks and other ancillary rail features. In the late 1980s and 90s the railroad activity ceased and all but one set of abandoned tracks were removed from the site.

The site also contains an abandoned gravel pit. Representatives of the Portland Terminal Company have stated that the gravel pit was operated by the railroad as a source of gravel materials for railroad operations. The pit was originally excavated to provide gravel materials for the construction of the Veteran's Memorial Bridge.

The pit was initially excavated as a primary source of gravel material for the Veterans Bridge construction, beginning around 1951-52. The railroad continued to actively mine gravel from the site through the 1970s. Lesser amounts of gravel continued to be excavated from the existing pit areas even to the mid 1980s. The former pit has never been reclaimed, hence many of the sideslopes are not fully stabilized and continue to erode into the bottom of the pond.

The land formerly owned by Portland Terminal includes the abandoned gravel pit and remaining wooded area. The land is generally characterized as moderately sloped except for the pit area and knolls to the northeast of the pit. The site's river frontage is generally flat for a distance of approximately 250' from the high water line. This river front area formerly contained up to 5 sets of railroad tracks and the area was used as a railroad stockyard for the storage and exchange of rail cars. All the tracks except for one abandoned set have been removed from the riverfront area. This riverfront area is now occupied by the I-295/Commercial Street connector roadway.

The site's topography ranges from approximately elevation 20' along the active rail tracks that are on the north and east side of the site. The site generally slopes to the riverfront, where the elevation is approximately 10'. The higher knolls on the Portland Terminal site rise to elevation 38' towards the northeast center of the site. It is anticipated that the knolls will be lowered as part of the proposed project. The bottom of the former gravel pit is approximately elevation 8' (NGVD).

The site's wooded areas are characterized by deciduous tree growth and dense undergrowth. Approximately one half of the site is densely vegetated. The southerly side is mostly open area that contains ground vegetative cover with grasses and stockpiles of topsoil, aggregate, and miscellaneous debris. Much of the ground area on the southerly end is bare earth.

Overall the site can generally be classified as undeveloped. The property is currently accessed by a paved drive off County Way and Congress Street. This drive passes adjacent to the Cumberland County Jail and crosses at grade over the railroad tracks into the site. In addition, the MDOT has constructed the two primary entrances off the connector roadway, although neither is currently in use as access to the site.

USDA Soils Map and other soils resource maps are provided as Figures 8, 9, and 10 that accompany this report.

Photographs of the site are also provided as an attachment to this report.

24.2 Overview of Soil Erosion and Sedimentation Concerns

The susceptibility of soils to erosion is indicated on a relative "K" scale of values over a range of 0.02 to 0.69. The "K" value is frequently used with the universal soil loss equation. The higher values are indicative of the more erodible soils.

Soil Type	Soil Description	K Value
Cu – Cut and Fill Land	Gravelly sandy loam	0.02
Gp- Gravel Pit	Gravelly sandy loam	0.02
HIC- Hinckley	Gravelly sandy loam	0.17

Based on a review of the K values, the onsite soils in the cut area where construction is focused are highly susceptible to erosion after the cover material is stripped. The soils in the wetland areas are highly erosive.

The primary emphasis of the erosion and sedimentation control plan to be implemented for this project is as follows:

1. Development of a careful construction sequence.
2. Rapid stabilization of denuded areas to minimize the period of soil exposure.
3. Rapid stabilization of drainage paths to avoid rill and gully erosion.
4. The use of on-site measures to capture sediment (wood ship barriers hay bales/silt fence, etc.).
5. Protection of natural resource areas including wetlands through buffering and BMPs.
6. The implementation of long-term measures for erosion/sediment and pollutant treatment through the construction of permanent water quality measures.

24.3 Description and Location of Limits of All Proposed Earth Movements

The construction of the development will require the following on-site improvements to serve the proposed Mercy Hospital and Medical Office building:

1. Construction of parking lots for staff parking and Hospital, and Medical Office Building (MOB) facilities parking respectively.
2. Construction of an access drive around the perimeter of the proposed Hospital and MOB facilities.
3. Construction of three entrances off of the MDOT interconnector road.
4. Construction of a service drive on the backside of the Hospital and MOB.
5. Construction of utilities to serve the Hospital and MOB.
6. Construction of stormwater conveyance and management systems.

These improvements and the building construction will disturb approximately 20 to 25 acres of land.

24.4 Existing and Proposed Drainage Features

The existing site has features that flow to discharge areas on three locations on the site. Approximately 20 percent of the site flows overland into two wetland areas on the northern portion of the site; the wetlands are currently internally drained as a result of the connector road construction. Approximately 40 percent of the site flows overland to the southwest and discharging directly to the Fore River. The remaining 40 percent of

the site flows overland into the existing wetland in the central portion of the site. This wetland drains to a swale in the midwestern portion of the site, eventually discharging to the Fore River via new culverts under the connector road. Erosion problems are evident in the area from the noticeable sediment deposits in the standing water of the wetland.

The proposed drainage will capture runoff from the hardened surface (roof or pavement) and convey it through formal storm drain systems to several outlets along the Fore River. Measures including Casco traps within the catch basins and proprietary water quality units will serve to collect and treat surface runoff prior to discharge to the basin.

24.4A Resource Areas

Resource project areas include the wetlands on the project site as well as the unstabilized slopes around the perimeter of the former gravel pit. These areas have been delineated by Eco-Analysts, Inc. and are depicted on the Existing Conditions Plan.

24.5 Erosion/Sedimentation Control Devices

The following erosion and sediment control devices will be implemented by the Contractor as part of the site development. These devices shall be installed as indicated on the plans or as described within this report. For further reference, see the Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices.

1. Siltation fence shall be installed downslope of any disturbed areas to trap runoff-borne sediments until the site is revegetated. The silt fence shall be installed per the detail provided in the plan set and inspected immediately after each rainfall and at least daily during prolonged rainfall. Repairs shall be made immediately by the Contractor if there are any signs of erosion or sedimentation below the fence line. Proper placement of stakes and keying the bottom of the fabric into the ground is critical to the fence's effectiveness. If there are signs of undercutting at the center or the edges, or impounding of large volumes of water behind the fence, the barrier shall be replaced with a stone check dam.

2. An erosion control wood chip barrier shall be installed as the primary non-structural measure along disturbed slopes and exposed soils. The barrier shall be installed per the detail in the plan set and inspected on a daily basis. Repairs shall be made immediately by the Contractor if there are any signs of erosion or sedimentation through the barrier. The barrier shall be installed along the work limits and adjacent to the fringes of the existing wetland pond adjacent to the work zone. Double rows of wood chip barrier shall be installed at points along identified concentrated runoff. Temporary wood chip barriers may be required along areas of active excavation, i.e., within the building pad zones, so that the maximum length of sheet flow off exposed soils areas is less than 150'.

3. Straw or hay mulch including hydroseeding is intended to provide cover for denuded or seeded areas until revegetation is established. Mulch placed on slopes of less than 10 percent shall be anchored by applying water; mulch placed on slopes steeper than 10 percent shall be covered with a fabric netting and anchored with staples in accordance with the manufacturer's recommendations. Proposed drainage channels that are to be revegetated shall receive Curlex blankets by American Excelsior or equal. Mulch application rates are provided in Attachment A of this section. Hay mulch shall be available on site at all times in order to provide

immediate temporary stabilization when necessary. Where necessary, a temporary stone channel pipe sluice shall be used to convey runoff down the slope.

4. Riprap slopes, ditch linings, stone check dams, hay bale barriers, and culvert outlet aprons are intended to reduce runoff velocities and protect denuded soil surfaces from concentrated flows. Installation details and stone sizes are provided in the construction plan set on the erosion control detail sheets.

5. A construction entrance will be constructed at access points onto the site to prevent tracking of soil onto adjacent local roads.

6. Stone sediment traps or a premanufactured SiltSack™ will be installed at catch basin inlets to prevent silt from entering the storm drain system. Installation details are provided in the plan set on the erosion control detail sheets.

7. Reinforced turf will be used as necessary on extremely steep slopes and in the yard areas.

8. Loam and seed is intended to serve as the primary permanent revegetative measure for all denuded areas not provided with other erosion control measures, such as riprap. Specific areas as shown on the landscape plan will receive sod. Application rates are provided in Attachment A of this section for temporary and permanent seeding in non-wetland areas.

9. Dirtbags™ shall be made available to allow the discharge of trench dewatering flows or other sediment-laden runoff prior to discharge to the ponds or undisturbed areas.

24.6 Temporary Erosion/Sedimentation Control Measures

The following are planned as temporary erosion/sedimentation control measures during construction:

1. Two crushed stone-stabilized construction entrances shall be placed at the site access points off of the MDOT interconnector.

2. A wood chip barrier and siltation fence shall be installed along the downgradient side of the proposed improvement areas. The siltation fence will remain in place and properly maintained until the site is acceptably revegetated.

3. Temporary stockpiles of stumps, grubbings, or common excavation will be protected as follows:

   a) Temporary stockpiles shall not be located within 100 feet of any drainage ditches and at least 50 feet upgradient of the perimeter silt fence.

   b) Inactive stockpiles shall be stabilized within 5 days by either temporarily seeding the stockpile with a hydroseed method containing an emulsified mulch tackifier or by covering the stockpile with mulch. If necessary, mesh shall be installed to prevent wind from removing the mulch.

4. All denuded areas which have been rough graded shall receive mulch or erosion control mesh fabric within 14 days of initial disturbance of soil.

5. All soils disturbed between November 1 and April 1 will be covered with mulch within 5 days of disturbance, prior to any predicted storm event of the equivalent of ½" of equivalent rainfall in a 24-hour period, or prior to any work shutdown lasting more

than 35 hours (including weekends and holidays). The mulch rate shall be double the normal rate.

For work that is conducted between November 1 and April 15 of any calendar year, all denuded areas will be covered with hay mulch, applied at twice the normal application rate and (in areas over 10% grade) anchored with a fabric netting. The time period for applying mulch shall be limited to 5 days for all areas or immediately in advance of a predicted rainfall event.

6. The access road and the MDOT interconnector road shall be swept to control mud and dust as necessary. Additionally, in the event mud and/or dust migrates off of the site onto the interconnector, the affected area shall be swept. A street sweeper shall be available on immediate notice.

7. During grubbing operations stone check dams or hay bale barriers will be installed at any evident concentrated flow discharge points.

8. Silt fencing with a maximum stake spacing of 6 feet should be used, unless the fence is supported by wire fence reinforcement of minimum 14 gauge and with a maximum mesh spacing of 6 inches, in which case stakes may be spaced a maximum of 10 feet apart. The bottom of the fence should be properly anchored a minimum of 6" per the plan detail and backfilled. Any silt fence identified by the owner or reviewing agencies as not being properly installed during construction shall be immediately repaired in accordance with the installation details.

9. Storm drain catch basin inlet protection shall be provided through the use of stone sediment barriers or a premanufactured SiltSack™ as distributed by A. H. Harris Company, Portland, Maine. Stone sediment barrier installation details are provided in the plan set. The barriers shall be inspected after each rainfall and repairs made as necessary. Sediment shall be removed and the barrier restored to its original dimensions when the sediment has accumulated to ½ the design depth of the barrier. Sediment shall be removed from SiltSacks™ as necessary. Inlet protection shall be removed when the tributary drainage area has been stabilized.

10. Disturbed slopes over 4:1 shall receive erosion control mesh.

11. Slopes steeper than 3:1 shall receive reinforced turf.

24.6A Standards for Stabilizing Sites for the Winter

1. Standard for the timely stabilization of ditches and channels: The contractor shall construct and stabilize all stone-lined ditches and channels on the site by November 15. The contractor shall construct and stabilize all grass-lined ditches and channels on the site by September 15. If the contractor fails to stabilize a ditch or channel to be grass-lined by September 15, then the contractor shall take one of the following actions to stabilize the ditch for late fall and winter.

   i. Install a sod lining in the ditch. The contractor shall line the ditch with properly installed sod by October 1. Proper installation includes the applicant pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, watering the sod to promote root growth into the disturbed soil, and anchoring the sod with jute or plastic mesh to prevent the sod strips from sloughing during flow conditions.

ii. Install a stone lining in the ditch. The contractor shall line the ditch with stone rip rap by November 15. The contractor shall hire a registered professional engineer to determine the stone size and lining thickness needed to withstand the anticipated flow velocities and flow depths within the ditch. If necessary, the contractor shall regrade the ditch prior to placing the stone lining so as to prevent the stone lining from reducing the ditch's cross-sectional area.

2. Standard for the timely stabilization of disturbed slopes: The contractor shall construct and stabilize stone-covered slopes by November 15. The contractor shall seed and mulch all slopes to be vegetated by September 15. The department will consider any area having a grade greater than 15% to be a slope. If the contractor fails to stabilize any slope to be vegetated by September 15, then the contractor shall take one of the following actions to stabilize the slope for late fall and winter.

   i. Stabilize the soil with temporary vegetation and erosion control mesh. By October 1 the contractor shall seed the disturbed slope with winter rye at a seeding rate of 3 pounds per 1000 square feet and apply erosion control mats over the mulched slope. The contractor shall monitor growth of the rye over the next 45 days. If the rye fails to grow at least three inches or fails to cover at least 75% of the disturbed slope by November 15, then the contractor shall cover the slope with a layer of woodwaste compost as described in item iii of this standard or with stone rip rap as described in item iv of this standard.

   ii. Stabilize the slope with sod. The contractor shall stabilize the disturbed slope with properly installed sod by October 1. Proper installation includes the contractor pinning the sod onto the slope with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil. The contractor shall not use late-season sod installation to stabilize slopes having a grade greater than 33% (3H:1V) or having groundwater seeps on the slope face.

   iii. Stabilize the slope with woodwaste compost. The contractor shall place a six-inch layer of woodwaste compost on the slope by November 15. Prior to placing the woodwaste compost, the contractor shall remove any snow accumulation on the disturbed slope. The contractor shall not use woodwaste compost to stabilize slopes having grades greater than 50% (2H:1V) or having groundwater seeps on the slope face.

   iv. Stabilize the slope with stone rip rap. The contractor shall place a layer of stone rip rap on the slope by November 15. The contractor shall hire a registered professional engineer to determine the stone size needed for stability and to design a filter layer for underneath the rip rap.

3. Standard for the timely stabilization of disturbed soil: By September 15, the contractor shall seed and mulch all disturbed soils on areas having a slope less than 15%. If the contractor fails to stabilize these soils by this date, then the contractor shall take one of the following actions to stabilize the soil for late fall and winter.

   i. Stabilize the soil with temporary vegetation. By October 1, the contractor shall seed the disturbed soil with winter rye at a seeding rate of 3 pounds per 1000 square feet, lightly mulch the seeded soil with hay or straw at 75 pounds per 1000 square feet, and anchor the mulch with plastic netting. The contractor shall

monitor the growth of the rye over the 45 days. If the rye fails to grow at least three inches or fails to cover at least 75% of the disturbed soil before November 15, then the contractor shall mulch the area for over-winter protection as described in item iii of this standard.

ii. Stabilize the soil with sod. The contractor shall stabilize the disturbed soil with properly installed sod by October 1. Proper installation includes the contractor pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil.

iii. Stabilize the soil with mulch. By November 15, the contractor shall mulch the disturbed soil by spreading hay or straw at a rate of at least 150 pounds per 1000 square feet on the area so that no soil is visible through the mulch. Prior to applying the mulch, the contractor shall remove any snow accumulation on the disturbed area. Immediately after applying the mulch, the contractor shall anchor the mulch with plastic netting to prevent wind from moving the mulch off the disturbed soil.

24.7 Sedimentation Sumps

The use of shallow sediment sumps on the downgradient side of erodible stockpiles and areas where denuded conditions will be prolonged is encouraged.

24.8 Permanent Erosion Control and Sediment Control Measures

The following permanent erosion control measures have been designed as part of the Erosion/Sedimentation Control Plan:

1. All storm drain pipes shall have riprap aprons at their outlet to protect the outlet and receiving channel of the culverts from scour and deterioration. Installation details are provided in the plan set. The aprons shall be installed and stabilized prior to directing runoff to the tributary pipe or culvert.

2. All areas disturbed during construction, but not subject to other restoration (paving, riprap, etc.) will be loamed, limed, fertilized, mulched, and seeded. Fabric netting, anchored with staples, shall be placed over the mulch in areas where the finish grade slope is greater than 10 percent. Native topsoil shall be stockpiled and temporarily stabilized with seed and mulch and reused for final restoration when it is of sufficient quality.

3. Catch basins will be provided with sediment sumps for all outlet pipes that are 12" in diameter.

4. Permanent manufactured water quality units will be utilized. These will consist of routing stormwater through manufactured treatment units such as a Vortechnics treatment tank or other approved device prior to discharge to the Fore River. The applicant or its assigns will be responsible for the long-term maintenance and operation of the treatment units.

24.9 Timing and Sequence of Erosion/Sedimentation Control Measures

The following construction sequence shall be required to insure the effectiveness of the erosion and sedimentation control measures is optimized.

Note: For all grading related activities, the Contractor shall exercise extreme caution not to overexpose the site by limiting the disturbed area.

1. Install crushed stone-stabilized construction entrance as shown on the Erosion and Sedimentation Control Plan at the access roads.
2. Install wood chip barrier and siltation fence and conduct land clearing activity.
3. Complete the sideslope restoration around the perimeter of the former gravel pit as outlined on the plans.
4. Construct diversion and drainage channels to direct flow to the proposed collection system.
5. Install stone and hay bale check dams at any concentrated flow discharge points.
6. Clear and grub foundation areas.
7. Install storm drain, underground electric, foundations and other utility work. Install inlet and outlet protection immediately after the installation of any culverts.
8. Bring site to subgrade including extension of embankments and temporary slope stabilization.
9. Construct other site improvements, utilities, and buildings.
10. Raise catch basins to grade and install inlet protection devices.
11. Install pavement as detailed on the site plans.
12. Loam, lime, fertilize, seed, and mulch all disturbed and denuded areas.
13. Remove accumulated sediment from silt barriers.
14. Review stability of the site. If a 75% catch of grass is achieved, remove temporary erosion control devices.

Soil will be considered disturbed if it does not have an established stand of vegetation covering at least 75% of the soil surface or has not been mulched with hay applied at a rate of 230 lb./1000 sq. ft.

24.10 Contracting Procedure

The project will be constructed by a General Contractor under contract to Mercy Hospital. The Contractor shall submit a schedule for the completion of the work that will satisfy the following criteria:

1. The above construction sequence should generally be completed in the specified order; however, several separate items may be constructed simultaneously. Work must also be scheduled or phased to prevent the extent of the exposed areas as specified below. The intent of this sequence is to provide for erosion control and to have structural measures such as silt fence and construction entrances in place before large areas of land are denuded.
2. The work shall be conducted in sections which will:
   a) Limit the amount of exposed area to those areas in which work is expected to be undertaken during the proceeding 30 days.

b) Revegetate disturbed areas as rapidly as possible. All areas shall be permanently stabilized within 7 days of final grading or before a predicted storm event; or temporarily stabilized within 7 days of initial disturbance of soil for areas identified as critical (refer to paragraph 24.4.A) and 14 days for all other areas.

c) Incorporate planned inlets and drainage system as early as possible into the construction phase. The ditches shall be immediately lined or revegetated as soon as their installation is complete.

3. Once final grade has been established, the Contractor may choose to dormant seed the disturbed areas prior to placement of mulch and placement of fabric netting anchored with staples.

   a. If dormant seeding is used for the site, all disturbed areas shall receive 4" of loam and seed at an application rate of 5#/1000 s.f.

      All areas seeded during the winter months will be inspected in the spring for adequate catch. All areas insufficiently vegetated (less than 75 percent catch) shall be revegetated by replacing loam, seed and mulch.

   b. If dormant seeding is not used for the site, all disturbed areas shall be revegetated in the spring.

4. The area of denuded non-stabilized construction shall be limited to the minimum area practicable. An area shall be considered to be denuded until the subbase gravel is installed in parking areas, or the areas of future loam and seed have been loamed, seeded, and mulched. The mulch rate shall be twice the rate specified in the seeding plan. [For example, 115#/1,000 s.f. x 2 = 230#/1,000 s.f.]

5. Within the exposed work area, temporary sedimentation sumps shall be provided at the interface between parking areas and graded slopes (refer to paragraph 24.7). This shall be accomplished by creating an area 18" below adjacent temporary grades. The sedimentation area shall have a bottom width of 3' and 3:1 side slopes. Culverts to allow access shall be installed by the Contractor. Along the sedimentation sumps, barriers shall be provided at sufficient intervals to permit runoff to be accumulated to a minimum depth of 12" before overflowing.

6. The schedule shall be subject to the approval of the Owner.

The Contractor must install any added measures which may be necessary to control erosion/sedimentation from the site dependent upon the actual site and weather conditions.

The Contractor shall note that no area within 50 feet of the perimeter side slope shall remain denuded for a period of over 5 days before it is temporarily stabilized. Temporary stabilization shall be the installation of mulching. All other areas shall be stabilized within 14 days. For construction between November 1 and April 15 of any calendar year, all areas shall be temporarily stabilized at the earlier time frames specified above.

24.11 Provisions for Maintenance of the Erosion/Sedimentation Control Features

The project will be contracted by the Owner. The project is subject to the requirement of a MeDEP Site Location of Development Permit and a Maine Construction General Permit. These permits require the Contractor to prepare a list and designate by name, address and telephone number all individuals who will be responsible for

implementation, inspection, and maintenance of all erosion control measures identified within this section and as contained in the Erosion and Sedimentation Control Plan of the contract drawings. Specific responsibilities of the inspector(s) will include:

1. Execution of the Contractor/Subcontractor Certification contained in Attachment B by any and all parties responsible for erosion control measures on the site as required by the MeDEP.
2. Assuring and certifying the Owner's construction sequence is in conformance with the specified schedule of this section. A weekly certification stating compliance, any deviations, and corrective measures necessary to comply with the erosion control requirements of this section shall be prepared and signed by the inspector(s).
3. In addition to the weekly certifications, the inspector(s) shall maintain written reports recording construction activities on site which include:
   - Dates when major grading activities occur in a particular areas.
   - Dates when major construction activities cease in a particular area, either temporarily or permanently.
   - Dates when an area is stabilized.
4. Inspection of this project work site on a weekly basis and after each significant rainfall event (0.5 inches or more within any consecutive 24-hour period) during construction until permanent erosion control measures have been properly installed and the site has been stabilized. Inspection of the project work site shall include:
   - Identification of proper erosion control measure installation in accordance with the erosion control detail sheet or as specified in this section.
   - Determine whether each erosion control measure is properly operating. If not, identify damage to the control device and determine remedial measures.
   - Identify areas that appear vulnerable to erosion and determine additional erosion control measures that should be used to improve conditions.
   - Inspect areas of recent seeding to determine percent catch of grass. A minimum catch of 75 percent is required prior to removal of erosion control measures.

   Accumulated silt/sediment should be removed when the depth of sediment reaches 50 percent of the barrier height. Accumulated silt/sediment should be removed from behind silt fencing when the depth of the sediment reaches 6 inches.
5. If inspection of the site indicates a change should be made to the erosion control plan, either to improve effectiveness or correct a site-specific deficiency, the inspector shall immediately implement the corrective measure and notify the owner of the change.

Once construction has been completed, long-term maintenance of the detention pond and catch basins will be the responsibility of the applicant. The catch basin sumps shall be inspected in April and October of each year. Sediment shall be removed when the depth of sediment reaches one half the depth of the sump.

All certifications, inspection forms and written reports prepared by the inspector(s) shall be filed with the Owner, and the MeDEP Permit File contained on the project site. All written certifications, inspection forms, and written reports must be filed within one (1) week of the inspection date.

24.12 Preconstruction Conference

Prior to any construction at the site, representatives of the Contractor and the site design engineer shall arrange for and meet with the Owner to discuss the scheduling of the site construction. On or before that meeting, the Contractor will prepare a detailed schedule and a marked-up site plan indicating areas and components of the work and key dates showing date of disturbance and completion of the work. If disturbed areas are not to be finished (loamed, seeded, and mulched) within seven (7) days, the scheduling shall indicate those areas to be protected with temporary seeding/mulch. Three copies of the schedule and marked-up site plan shall be provided to the Owner. Temporary seed mixture shall be annual rye grass applied at the rate of 0.9 lbs/1000 sq. ft.

24.13 Attachments

Attachment A Seeding Plan
Attachment B Sample MeDEP Certification and Inspection Forms

24.14 Plan References

Sheet C-12 Erosion/Sediment Control Plan (North)
Sheet C-13 Erosion/Sediment Control Plan (South)
Sheet C-14 Erosion/Sediment Control Details (North)
Sheet C-15 Erosion/Sediment Control Details (South)

ATTACHMENT A

Seeding Plan

PERMANENT SEEDING PLAN NON-WETLAND AREAS

Project Mercy Hospital Relocation Project
Site Location Portland, Maine
X Permanent Seeding _____ Temporary Seeding

1. Area to be seeded: 5 acres, OR _____ M Sq. Ft.
2. Instructions on preparation of soil: Prepare a good seed bed for planting method used.
3. Apply lime as follows: _____ #/acres, OR _____#/M Sq. Ft.
4. Fertilize with _____ pounds of - - N-P-K/ac. OR
   15 pounds of 20 - 4 - 12 N-P-K/M Sq. Ft.
5. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
6. Seed with the following mixture:

   See Sheet C-13 A of Plan Set

When using small grain as nurse crop seed it at one-half the normal seeding rate.

7. Mulching instructions: Apply at the rate of _____ tons per acre. OR
   115 pounds per M. Sq. Ft.

	Amount	Unit #, Tons, Etc.
8. TOTAL LIME	0	#/1000 sq. ft.
9. TOTAL FERTILIZER	15	#/1000 sq. ft.
10. TOTAL SEED	3 to 4	#/1000 sq. ft.
11. TOTAL MULCH	115	#/1000 sq. ft.
12. TOTAL other materials, seeds, etc.		

13. REMARKS

Spring seeding is recommended, however, late summer (prior to September 1) seeding can be made. Permanent seeding should be made prior to August 5 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.

Fertilizer requirements shall be subject to actual test results of the topsoil used for the project. The Contractor shall be responsible for providing topsoil test results for pH and recommended fertilizer application rates to the owner.

Seed mixture shall be fresh, clean, new crop seed. Seed may be mixed by an appropriate method on the site or may be mixed by the dealer. If the seed is mixed on the site, each variety shall be delivered in the original containers bearing the dealer's guaranteed analysis. If seed is mixed by the dealer, the Seeding Contractor shall furnish to the Owner the dealer's guaranteed statement of the composition of the mixture and the percentage of purity and germination of each variety.

Seed shall be purchased from a recognized distributor and shall test to a minimum percentage of 95% for purity and 85% for germination.

TEMPORARY SEEDING PLAN NON-WETLAND AREAS

Project Mercy Hospital Relocation Project
Site Location Portland, Maine

_____ Permanent Seeding __X__ Temporary Seeding

1. Area to be seeded: __5__ acres, OR _____ M Sq. Ft.
2. Instructions on preparation of soil: Prepare a good seed bed for planting method used.
3. Apply lime as follows: _____ #/acres, OR _____ #/M Sq. Ft.
4. Fertilize with _____ pounds of __-__-__ N-P-K/ac. OR
   __15__ pounds of _20 - 4 - 12_ N-P-K/M Sq. Ft.
5. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
6. Seed with the following mixture:

   50% Perennial Ryegrass
   50% Winter Rye

When using small grain as nurse crop seed it at one-half the normal seeding rate.

7. Mulching instructions: Apply at the rate of _____ tons per acre. OR
   _230_ pounds per M. Sq. Ft.

	Amount	Unit #, Tons, Etc.
8. TOTAL LIME	0	#/1000 sq. ft.
9. TOTAL FERTILIZER	15	#/1000 sq. ft.
10. TOTAL SEED	3.5	#/1000 sq. ft.
11. TOTAL MULCH	230	#/1000 sq. ft.
12. TOTAL other materials, seeds, etc.		

13. REMARKS

- Recommended seeding dates after August 15.
- For areas with slopes >10%, waterways, areas within 100 feet of the stream, and fall and winter erosion control areas, mulch netting shall be used per manufacturer's specifications.

  Fertilizer requirements shall be subject to actual test results of the topsoil used for the project. The Contractor shall be responsible for providing topsoil test results for pH and recommended fertilizer application rates to the owner

ATTACHMENT B

Sample MeDEP Certification and Inspection Forms

STORMWATER POLLUTION PREVENTION PLAN

CONTRACTOR/SUBCONTRACTOR CERTIFICATION

PROJECT INFORMATION

Project Name: Mercy Hospital Relocation Project

Address: Portland, Maine 0101

CONTRACTOR/SUBCONTRACTOR INFORMATION

Firm Name:

Address:

Telephone:

Type of Firm:

CERTIFICATION STATEMENT

"I certify under penalty of law that I understand the terms and conditions of the Maine Construction General Permit that authorizes the stormwater discharges associated with industrial activity from the construction site identified as part of this certification."

_____

Signature

_____

Typed Name

_____

Title

_____

Date

STORMWATER POLLUTION PREVENTION PLAN

INSPECTION REPORT

PROJECT INFORMATION

Project Name: Mercy Hospital Relocation Project

Address: Portland, Maine 04101

INSPECTOR INFORMATION

Inspector Name: _____

Firm: _____

Title: _____

Qualifications: _____

INSPECTION SUMMARY

Date of Inspection: _____

Major Observations: _____

_____

_____

_____

THE FACILITY IS IN COMPLIANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN WITH THE FOLLOWING EXCEPTIONS:

_____

_____

_____

_____

ACTIONS NECESSARY TO BRING FACILITY INTO COMPLIANCE:

_____

_____

REQUIRED MODIFICATIONS TO STORMWATER POLLUTION PREVENTION PLAN (MUST BE IMPLEMENTED WITHIN 7 DAYS OF INSPECTION):

_____

_____

_____

_____

CERTIFICATION STATEMENT:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the systems, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of find and imprisonment for knowing violations."

_____
Signature

_____
Typed Name

_____
Title

_____
Date

SECTION 02271 – DIRTBAG® SPECIFICATIONS FOR CONTROL OF SEDIMENT

PART 1 - GENERAL

1.1 DESCRIPTION

This work shall consist of furnishing, placing and removing the DIRTBAG® pumped sediment control device for erosion-sediment control. The DIRTBAG® pumped-silt control system is marketed by:

ACF Environmental, Inc.
2831 Cardwell Drive
Richmond, Virginia 23234
Phone: 800-448-3636
Fax: 804-743-7779

PART 2 - MATERIALS

2.1 DIRTBAG®

A. The DIRTBAG® shall be a non-woven bag which is sewn with a double needle matching using a high strength thread.

B. The DIRTBAG® seams shall have an average wide width strength per ASTM D-4884 as follows.

DIRTBAG® Style	Test Method	Test Result
DIRTBAG® 53	ASTM D-4884	60 LB/IN
DIRTBAG® 55	ASTM D-4884	100 LB/IN

C. Each standard DIRTBAG® shall be supplied with fill spout large enough to accommodate a 4" discharge hose and straps to secure the hose and prevent pumped water from escaping without being filtered.

D. The geotextile fabric shall be non-woven fabric with the following properties:

Properties	Test Method	Units	Non-Woven	
			53	55
Weight	ASTM D-3776	Oz/yd	8	10
Grab Tensile	ASTM D-4632	Lbs.	203	250
Puncture	ASTM D-4833	Lbs.	130	165
Flow Rate	ASTM D-4491	Gal/Min/Ft^2	80	70
Permittivity	ASTM D-4491	$Sec.^{1}$	1.5	1.3
Mullen Burst	ASTM D-3786	$Lbs.^{in2}$	400	550
UV Resistant	ASTM D-4355	%	70	70
AOS % Retained	ASTM D-4751	%	100	100

All properties are minimum average roll value except the weight of the fabric which is given for information only.

PART 3 – CONSTRUCTION SEQUENCE

3.1 Install DIRTBAG® on a prepared crushed stone pad overlying Mirafi 600X as shown on the contract drawings. Strap the neck of the DIRTBAG® tightly to the discharge hose.

3.2 The DIRTBAG® is full when it no longer can efficiently filter sediment or pass water at a reasonable rate. Flow rates will vary depending on the size of the DIRTBAG®, the type and amount of sediment discharged into the DIRTBAG®, the type of ground, rock or other substance under the bag and the degree of the slope on which the bag lies. Under most circumstances, the vendor claims DIRTBAGS® will accommodate flow rates of 1,500 gallons per minute. Use of excessive flow rates or overfilling DIRTBAG® with sediment will cause ruptures of the bags or failure of the hose attachment straps.

3.3 Dispose of DIRTBAG® in accordance with Local, State, and Federal regulations. If allowed, the DIRTBAG® may be cut open and the contents seeded after removing visible fabric. DIRTBAG® is strong enough to be lifted with added straps if it must be hauled away (extra option). Off-site disposal may be facilitated by placing the DIRTBAG® in the back of the dump truck or flatbed prior to use and allowing the water to drain from the bag in place, thereby dismissing the need to lift the DIRTBAG®.

SECTION 02511 – ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Provide all material and labor for the placement of surface course and binder course on roads, access drives, parking lots, sidewalks, and walkways. Reference Appendix A for Superpavement requirements which, if used, replaces this and MDOT Section 401 in their entirety.

1.02 REFERENCES

A. December 2002 MDOT Standard Specifications, including relevant updates, except as modified herein.

B. April 1997 MDOT Standard Details, Highways & Bridges.

C. MS-2 - Mix design methods for asphalt concrete and other hot mix types - The Asphalt Institute (AI).

D. MS-3 - Asphalt Plant Manual - The Asphalt Institute (AI).

E. Hot Mix Asphalt Paving Handbook - US Army Corp of Engineers, UN-13 (CE MP-ET).

F. MS-19 - Basic Asphalt Emulsion Manual - The Asphaltic Institute (AI).

G. ASTM D946 - Penetration - Graded Asphalt Cement for use in Pavement Construction.

H. AASHTO M-226/ASTM D3381 Asphalt Cement

I. AASHTO M-140/ASTM D997 or AASHTO M-208/ASTM D-2397 Tack Coat

J. AASHTO M-117/ASTM D242 Mineral Filler

K. AASHTO T-245/ASTM D1559 Marshall Mix Design

L. Approved and released for construction plans.

1.03 RELATED SECTIONS

A. Section 02223 - Excavation, Backfilling and Compacting for Pavement

B. Section 02230 – Subbase and Base Gravel

C. Section 02525 - Curbs and Side Walks

E. Section 02584 - Pavement Markings

1.04 SUBMITTALS

A. Design Mix: Before any asphaltic concrete paving is constructed, the Contractor shall submit the proposed actual design mix to the Owner for review and/or approval. Design mix submittal shall follow the format as indicated in the Asphalt Institute Manual MS-2, Marshall Stability Method; and shall include the type/name of the mix, gradation analysis, asphalt cement grade used, Marshall Stability (lbs), flow, effective asphalt content (percent), and direct references to the applicable highway department specifications sections for each material. Design shall be for a mixture listed in the most recent edition of roadway specifications of the state in which the project is to be constructed. In no case shall a mix design over three years old be submitted.

B. Material Certificates: Submit materials certificate to an independent testing laboratory retained by the Owner. The certificates shall be signed by the material producer and contractor, certifying that materials comply with, or exceed, the requirements herein.

C. Field density test results, minimum 1 per 200 tons of bituminous pavement placed including sta/offset of test.

D. Plant inspection reports to verify pavement batch plant and paving equipment meets or exceeds MDOT Specification 401. The inspections shall be conducted by an independent testing firm retained by the Owner.

1.05 JOB CONDITIONS

A. Weather Limitations:

1. Apply tack coats when ambient temperature is above 40 degrees F, and when temperature has been above 35 degrees F for 12 hours immediately prior to application.

2. Construct asphaltic concrete paving when atmospheric temperature is above 40 degrees F base, 50 degrees F surface.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide asphaltic concrete mixture as recommended by local or state paving authorities to suit project conditions. Use locally available materials and gradations which meet State Department of Transportation specifications and exhibit satisfactory record on previous installations.

B. Asphalt Cement: Comply with AASHTO M-226/ASTM D 3381; Table 2 AC-10, AC-20, or AC-30, AR-80, viscosity grade, depending on local mean annual air temperature. (See following chart):

Temperature Condition	Asphalt Grades
Cold, mean annual air temperature < 7° C (45° F)	AC-10 85/100 pen.
Warm, mean annual air temperature between 7° C (45° F) and 24° C (75° F)	AC-20 60/70 pen.
Hot, mean annual air temperature > 24° C (57° F)	AC-30

Final acceptance of the proper grade of A.C. shall be made by the Owner's Engineer.

C. Tack Coat: Emulsified asphalt; AASHTO M-140/ASTM D 997 or M 208/ASTM D 2397, SS-1h, CSS-1, or CSS-1h, diluted with one part water to one part emulsified asphalt.

D. Mineral Filler: Rock or slag dust, hydraulic cement, or other inert material complying with AASHTO M-17/ASTM D242, if recommended by applicable state highway standards.

E. Asphalt-Aggregate Mixture: Unless otherwise noted on the Drawings, the Design Mix shall have a minimum stability based on a 50-blow Marshall complying with ASTM D 1559 of 1000 lbs. with a flow between 8 and 16. The Design Mix shall be within sieve analysis and bitumen ranges below:

SIEVE ANALYSIS OF MIX

Square Sieve	Total Percent Passing	Percent Tolerance
3/4"	100	
1/2"	80-100%	5%
3/8"	65-93%	4%
#8	40-55%	4%
#50	12-27%	2%
#200	0-10%	0%

Percent bitumen by weight of total mix: 5.0 - 8.5.
Air voids: 3-6%
Percent aggregate voids filled with asphalt cement: 70-82%
Allowable variance of percent bitumen by weight of total mix=0.4

2.02 EQUIPMENT

Maintain all batch plant and paving equipment in satisfactory operating condition and correct breakdowns in a manner that will not delay or be detrimental to progress of paving operations.

PART 3 - EXECUTION

3.01 PREPARATION

A. Remove loose material from compacted base material surface immediately before applying prime coat.

B. Proof roll prepared base material surface to check for areas requiring additional compaction and areas requiring removal and recompaction.

C. Do not begin paving work until deficient base material areas have been corrected and are ready to receive paving.

3.02 APPLICATIONS

A. Tack Coat:

1. Apply to contact surfaces of previously constructed asphaltic concrete base courses or Portland cement concrete and surfaces abutting or projecting into asphalt concrete and surfaces abutting or projecting into asphalt concrete pavement.

2. Apply tack coat to asphaltic concrete base course or sand asphalt base course. Apply emulsified asphalt tack coat on the surface of all such bases where asphaltic concrete paving will be constructed.

3. Apply emulsified asphalt tack coat in accordance with APWA Section 2204 and applicable state highway specifications.

4. Apply at minimum rate of 0.05 gallon per square yard of surface.

5. Allow to dry until at proper condition to receive paving.

3.03 ASPHALTIC CONCRETE PLACEMENT

A. Place asphalt concrete mixture on completed compacted subgrade surface, spread, and strike off. Spread mixture at following minimum temperatures:

1. When ambient temperature is between 40 degrees F and 50 degrees F: 285 degrees F.

2. When ambient temperature is between 50 degrees F and 60 degrees F: 280 degrees F.

3. When ambient temperature is higher than 60 degrees F: 275 degrees F.

B. Whenever possible, all pavement shall be spread by a finishing machine. Inaccessible or irregular areas, pavement may be placed by hand methods. The hot mixture shall be spread uniformly to the required depth with hot shovels and rakes. After spreading, the hot mixture shall be carefully smoothed to remove all segregated coarse aggregate and rake marks. Rakes and lutes used for hand spreading shall be of the type designed for use on asphalt mixtures. Loads shall not be dumped faster than they can be properly spread. Workers shall not stand on the loose mixture while spreading.

C. Paving Machine Placement: Apply successive lifts of asphaltic concrete in transverse directions with the surface course placed in the direction of surface-water flow. Place in typical strips not less than 10'-0" wide.

D. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

3.04 WEATHER AND SEASONAL LIMITATIONS

For weather limitations the State of Maine will be considered to be divided into two paving zones:

(a) Zone 1: All area north of US Route 2 from Gilead to Brewer and north of Route 9 from Brewer to Calais.

(b) Zone 2: All area south of Zone 1 including the US Route 2 and Route 9 boundaries.

Bituminous plant mix for use other than traveled way wearing course may be placed in either zone between the dates of April 15th and November 15th, provided that the air temperature as determined by an approved thermometer placed in the shade at the paving location is 35 degrees F or higher and the area to be paved is not frozen. Plant mix to be placed as traveled way wearing course may be placed in Zone 1 between the dates of May 1st and the Saturday following October 1st and in Zone 2 between the dates of April 15th and the Saturday following October 15th provided the air temperature determined above is 50 degrees F or higher.

Any hot bituminous base or binder course that is to be subject to traffic during the winter months shall have its gradation densified or asphalt content (percent of mix) adjusted through a change in the job mix formula as submitted by the Contractor and approved by the Owner.

3.05 ROLLING AND COMPACTION

A. The mixture, after being spread, shall be thoroughly compacted by rolling as soon as it will bear the weight of the rollers without undue displacement. Mixture shall be compacted to a minimum, of 92% theoretical maximum density. The number, weight, and types of rollers and sequences of rolling operations shall be such that the required density and surface are consistently attained while the mixture is in a workable condition.

B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

C. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.

D. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.

E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.

F. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot asphalt concrete. Compact by rolling to maximum surface density and smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.06 FIELD QUALITY CONTROL

A. An Independent Testing Laboratory, shall be retained to perform construction testing of in-place asphaltic concrete courses for compliance with requirements for thickness, density, composition and surface smoothness. Asphaltic surface and asphaltic base/binder courses shall be randomly cored at a minimum rate of one core for every 20,000 square feet of paving. In no event shall less than three cores in light duty areas and three cores in heavy duty areas shall be obtained. Coring holes shall be immediately filled with full-depth asphalt or with concrete. Asphaltic Concrete pavement samples shall be tested for conformance with the mix design. Refer to the general contract conditions for clarification on the cost for the independent laboratory.

B. Grade Control: Establish and maintain required lines and elevations.

C. Thickness: In-place compacted thickness shall not be less than thickness specified on the drawings. Areas of deficient paving thickness shall receive a tack coat and a minimum 1" overlay; or shall be removed and replaced to the proper thickness, at the discretion of the Owner's; until specified thickness of the course is met or exceeded at no additional expense to the Owner.

D. Surface Smoothness: Testing shall be performed on the finished surface of each asphalt concrete course for smoothness, using 10'-0" straightedge applied parallel with, and at right angles to centerline of paved area. The results of these tests shall be made available to the owner upon request. Surfaces will not be acceptable if exceeding following tolerances for smoothness:

Base Course Surface:	1/4"
Wearing Course Surface:	3/16"

E. Check surface areas at intervals necessary to eliminate ponding areas. Remove and replace unacceptable paving as directed by Owner.

F. Compaction: Field density tests for in-place materials shall be performed by examination of field cores in accordance with one of the following standards:

1. Bulk specific gravity of paraffin-coated specimens: ASTM D-1188.

2. Bulk specific gravity using saturated surface-dry specimens: ASTM D-2726.

Rate of testing shall be one core per 20,000 square feet of pavement, with a minimum of 3 cores from heavy-duty areas and 3 cores from standard-duty areas. Cores shall be cut from areas representative of the project.

Areas of insufficient compaction shall be delineated, removed, and replaced in compliance with the specifications at no expense to the Owner.

G. Pavement Plant Inspection: The paving plant shall be inspected a minimum of one week prior to pavement placement to verify the plant meets the requirements outlined in Section 401. Random inspection and sampling during pavement placement shall be conducted and documented by a testing firm hired and paid for by the Owner.

H. After the binder pavement is placed, the Contractor shall retain an independent surveyor to profile the centerline of the access drive at a minimum of 25-foot stations plus survey the elevations at the locations of any pavement spot grades shown on the drawing and all catch basin inlets. This survey information shall be plotted on the drawing access drive profile and a grading plan. The Contractor shall supply this information in triplicate to the Engineer with copies to the Owner, Architect and Construction Manager. A narrative identifying any areas which do not meet the specification tolerances of subsection E of this specification with an outline of corrective measures shall accompany the submission. The Owner shall have four working days upon certified receipt of these data to issue a letter authorizing surface pavement to be placed.

END OF SECTION 02511

APPENDIX A

SECTION 401

HOT MIX ASPHALT PAVEMENT

Section 401 of MDOT Standard Specifications and the preceding Asphaltic Concrete section are deleted in their entirety and replaced by the following:

401.01 Description. The Contractor shall furnish and place one or more courses of Superpave Hot Mix Asphalt Pavement (SHMA) on an approved base in accordance with the Contract documents and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans or established. The Owner will accept this Work under Quality Assurance (QA) provisions, in accordance with these specifications and the requirements of Section 106.

For the purposes of this Section, the Owner shall be defined as the developer or their assigned agent in charge of construction supervision and inspection.

MATERIALS

401.02 Composition of Mixtures. The Contractor shall compose the Hot Mix Asphalt Pavement with aggregate, Performance Graded Asphalt Binder (PGAB), and mineral filler if required. SHMA shall be designed and tested according to AASHTO TP-4. The Contractor shall size, uniformly grade, and combine the aggregate fractions in proportions that provide a mixture meeting the grading requirements of the Job Mix Formula (JMF). The Contractor may use a maximum of 20 percent reclaimed asphalt pavement in any base, binder or shim course, and in any wearing course placed on shoulders (excluding Urban areas).

The Contractor shall submit a JMF for approval. A JMF shall be submitted for testing to a laboratory selected by the Owner for each mixture to be supplied at least 15 calendar days prior to production. The JMF shall establish a single percentage of aggregate passing each required sieve size within the limits shown in Table 1, and shall not cross the restricted zone. The general composition limits given in Table 1 indicate the control points of mixtures permissible under this specification. The JMF shall state the source, gradation, and percentage to be used of each portion of the aggregate, and mineral filler if required. It shall also state the proposed PGAB content, the name and location of the refiner and the supplier for the source of PGAB submitted for approval, and the type of PGAB modification if applicable.

In addition, the Contractor shall provide the following information in the proposed JMF.

Superpave Stockpile Gradation Summary
Superpave Design Aggregate Structure Consensus Property Summary
Superpave Design Aggregate Structure Trial Blend Gradation Plots
Superpave Trial Blend Results (summary)
PGAB Specific Gravity and temperature/viscosity charts and Recommended mixing and compaction temperatures from supplier
Material Safety Data Sheets (MSDS) for PGAB

Table 1: COMPOSITION OF MIXTURES – CONTROL POINTS

	GRADING			
	TYPE 25 mm	TYPE 19 mm	TYPE 12.5 mm	TYPE 9.5 mm
SIEVE SIZE	PERCENT BY WEIGHT PASSING – COMBINED AGGREGATE			
37.5 mm	100			
25 mm	90-100	100		
19 mm	-90	90-100	100	
12.5 mm	-	-90	90-100	100
9.5 mm	-	-	-90	90-100
4.75 mm	-	-	-	-90
2.36 mm	15-41	23-49	28-58	32-67
1.18 mm	-	-	-	-
0.60 mm	-	-	-	-
0.30 mm	-	-	-	-
0.075 mm	1-7	2-8	2-10	2-10

	RESTRICTED ZONES			
	TYPE 25 mm	TYPE 19 mm	TYPE 12.5 mm	TYPE 9.5 mm
SIEVE SIZE	PERCENT BY WEIGHT PASSING – COMBINED AGGREGATE			
37.5 mm	-	-	-	-
25 mm	-	-	-	-
19 mm	-	-	-	-
12.5 mm	-	-	-	-
9.5 mm	-	-	-	-
4.75 mm	39.5	-	-	-
2.36 mm	26.8-30.8	34.6	39.1	47.2
1.18 mm	18.1-24.1	22.3-28.3	25.6-31.6	31.6-37.6
0.60 mm	13.6-17.6	16.7-20.7	19.1-23.1	23.5-27.5
0.30 mm	11.4	13.7	15.5	18.7
0.075 mm	-	-	-	-

At the time of JMF submittal, the Contractor shall identify and make available the stockpiles of all proposed aggregates at the plant site. The Owner shall obtain samples for laboratory testing. The Contractor shall also make available to the Owner the PGAB proposed for use in the mix in sufficient quantity to test the properties of the asphalt and to produce samples for testing of the mixture. Prior to the start of paving, the Contractor and the Owner shall split a production sample for evaluation. The Contractor shall test its split of the sample and determine if the results meet the requirements of the MDOT's written policy for mix design verification (Available at the Central Lab in Bangor). If the results are found to be acceptable, the Contractor will forward their results to the Owner's laboratory, which will test the Owner's split of the sample. The results of the two split samples will be compared and shared between the Owner and the Contractor. If the Owner finds the mixture acceptable, an approved JMF will be forwarded to the Contractor and paving may commence.

The Contractor shall submit a new JMF for approval each time a change in aggregate source, a significant change in proportions, or a change in PGAB is proposed. The same approval process shall be followed.

TABLE 2 – SUPERPAVE Volumetric Design Criteria

Estimated Traffic, million 80 kN ESALs	%G @$N_{initial}$	Voids in the Mineral Aggregate (VMA)					Voids Filled With Binder (VFB)		Fines to Effective Binder Ratio ($P_{0.075}/P_{be}$)	
		9.5 mm	12.5 mm	19.0 mm	25.0 mm	37.5 mm				
		Minimum					Min.	Max.	Min.	Max.
<0.3	<91.5	15.0%	14.0%	13.0%	12.0%	11.0%	70	80	0.6	1.2
0.3 to <1.0	<90.5						65	78		
1.0 to <3.0	<89.5						65	78		
3.0 to <10	<89						65	75*		
10 to <30							65	75*		
30 to <100							65	75*		
≥100							65	75*		

*For 9.5 mm nominal maximum aggregate size mixtures, the maximum VFB is 76.

As design criteria, Voids @ N_{des} shall be 4.0%, Voids @ N_{max} shall be ≥ 2.0%

401.03 Aggregates. Fine aggregate, that material passing the 2.36 mm sieve, shall not exceed an absorption of 3.0 percent by weight as determined by AASHTO T84. The composite blend, minus any reclaimed asphalt pavement used, shall have a minimum degradation value of 30 as determined by the Washington State Degradation Test of 1967, or a Micro-Deval value of under 18 as determined by the AASHTO Provisional Standard available from the Owner's Central Lab in Bangor. If the Contractor elects to use the Micro-Deval, it shall be indicated in the proposed JMF.

Aggregates shall also meet the following consensus properties. The Owner reserves the right to sample and test the composite aggregate for any of the following properties at any time.

TABLE 3 – SUPERPAVE Aggregate Consensus Properties Criteria

Estimated Traffic, Million 80 kN ESALs	ASTM D 5821 Coarse Aggregate Angularity (Minimum)		AASHTO TP33 Method A Uncompacted Void Content of Fine Aggregate (Minimum)		ASTM D 4791 (8.4) Flat and Elongated Particles (Maximum)	AASHTO T176 Clay Content/ Sand Equivalent (Minimum)
	Depth from Surface					
	<100mm	>100mm	<100mm	>100mm		
<0.3	60/60	60/60	-	-	-	45
0.3 to <1.0	65/60	60/60	40	-	-	45
1.0 to <3.0	75/60	60/60	40	40	10	45
3.0 to <10	85/80	60/60	45	40	10	45
10 to <30	95/90	80/75	45	40	10	45
30 to <100	100/100	95/90	45	45	10	50
≥ 100	100/100	100/100	45	45	10	50

ASTM D 5821 – "85/80" denotes that 85% of the coarse aggregate has one fractured face and 80% has two fractured faces.

AASHTO TP33 – Criteria are presented as percent air voids in loosely compacted fine aggregate, (U).

ASTM 4791 – Criteria are presented as maximum percent by weight of flat and elongated particles. (5:1 ratio).

401.04 – Vacant

401.05 Temperature Requirements. After the JMF is established, the temperatures of the mixture shall conform to the following tolerances:

In the truck at the mixing plant ± 10° C*
At the Paver ± 10° C*

* If noted in the Quality Control Plan, these may be increased or decreased due to extraordinary considerations, but temperature shall in no case vary by more than 15° C.

The JMF and the mix subsequently produced shall meet the requirements of Tables 2 and 3.

401.06 Performance Graded Asphalt Binder. PGAB shall be as specified in Special Provision 403. The PGAB shall meet the applicable requirements of AASHTO Provisional Standard MP1 – Standard Specifications for PGAB, in accordance with Section 702. The Contractor shall provide the Owner with an approved copy of the Quality Control Plan for PGAB in accordance with AASHTO PP-26.

CONSTRUCTION REQUIREMENTS

401.07 Weather and Seasonal Limitations. The State is divided into 2 paving zones as follows:

(a) Zone 1. Areas north of U.S. Route 2 from Gilead to Bangor and north of Route 9 from Bangor to Calais.

(b) Zone 2. Areas south of Zone 1 including the U.S. Route 2 and Route 9 boundaries.

The Contractor may place Hot Mix Asphalt Pavement for use other than a traveled way wearing course in either Zone between the dates of April 15th and November 15th, provided that the air temperature as determined by an approved thermometer (placed in the shade at the paving location) is 2° C or higher and the area to be paved is not frozen. The Contractor may place Hot Mix Asphalt Pavement as traveled way wearing course in Zone 1 between the dates of May 1st and the Saturday following October 1st and in Zone 2 between the dates of April 15th and the Saturday following October 15th, provided the air temperature determined as above is 10° C or higher. For the purposes of this Subsection, the traveled way includes truck lanes, ramps, approach roads and auxiliary lanes.

Hot Mix Asphalt Pavement used for curb, driveways, sidewalks, islands, or other incidentals is not subject to seasonal limitations, except that conditions shall be satisfactory for proper handling and finishing of the mixture. Unless otherwise specified, the Contractor shall not place Hot Mix Asphalt Pavement on a wet or frozen surface, and the air temperature shall be 2° C or higher.

401.08 Hot Mix Asphalt Plant.

401.081 General Requirements. Mixing plants shall conform to AASHTO M 156. The mixing plant shall include an efficient dust collecting system to prevent loss of fine material. The material collected may be returned to the mixture at a uniform rate and/or be discarded.

(a) Truck Scales. When the bituminous mixture is to be weighted on scaled meeting the requirements of Section 109 – Measurement and Payment, the scales shall be inspected and sealed by the State Sealer as often as the Owner deems necessary to verify their accuracy.

(b) Performance Graded Asphalt Binder. The Contractor shall provide a valve for sampling the bituminous material, located in a circulating feed line connecting the storage tank with the mixing plant or in a line of the storage circulation system. The valve shall be in a readily accessible location offering protection from damage. The Contractor shall maintain this valve in a workable condition and provide a drainage receptacle.

401.083 Automation of Batching. Batch plants shall be automated for weighing, recycling and the monitoring system. In the case of a malfunction of the printing system, the requirements of Subsection 109.013(c) will apply.

The batch plant shall accurately proportion the various materials in the proper order by weight. The entire batching and mixing cycle shall be continuous and shall not require any manual operations. The batch plant shall use auxiliary interlock circuits to trigger an audible alarm whenever an error exceeding the acceptable tolerance occurs. Along with the alarm, the printer shall print an asterisk on the delivery slip in the same row containing the out-of-tolerance weight. The automatic proportioning system shall be capable of consistently delivering material within the full range of batch sizes.

Tolerances are based on the total batch weight of the Hot Mix Asphalt Pavement. The batch plant shall be able to automatically or manually adjust for all desired batch sizes. The first or last bin drawn shall be the sand bin. Allowable tolerances are as follows:

Each aggregate component	± 2.5 percent from the cumulative target, each bin
Last Bin Drawn	± 1.5 percent
Mineral Filler	± 0.5 percent
Performance Graded Asphalt Binder	± .25 percent, -.15 percent
Zero Return (aggr.)	± 0.5 percent
Zero Return (bit. Material)	± 0.1 percent

All plants shall be equipped with an approved digital recording device. The delivery slip load ticket shall contain information required under 1 through 4 of Section 109.01(f), and sections (a) and (b) of 109.012.

401.085 Drum Plant Recordation of Proportions. The plant shall utilize an approved recordation system. In the case of a malfunction of this recordation system, the Contractor may continue production for up to two working days while the system is repaired, after which time production shall cease until repairs are completed. The recorder shall simultaneously record the accumulated weights of the dry aggregates, the mineral filler (if added separately) and the Performance Graded Asphalt Binder, all at 5 minute intervals during production and on demand, unless the Owner approves otherwise. The printed record shall include the actual Performance Graded Asphalt Binder content quantity as a percentage of the total mixture weight. The maximum resolution shall be 90 kg of dry aggregate, 9 kg of mineral filler, 9 kg of Performance Graded Asphalt Binder, and 0.1 percent for Performance Graded Asphalt Binder content. The printout shall indicate the amount of moisture programmed into the moisture compensation by total weight. All printed records shall show the day, month, year, and the time to the nearest minute when the printout was generated. The Contractor shall provide the Owner with a clear and legible copy of the recordings at the end of each day.

401.09 Hauling Equipment. Trucks for hauling Hot Mix Asphalt Pavement shall have tight, clean, smooth metal dump bodies which have been thinly coated with a small amount of lime solution or an approved soap solution or detergent to prevent the mixture from adhering to the bodies.

All truck dump bodies shall have a cover of canvas or other water repellent material capable of heat retention which completely covers the mixture. The cover shall be securely fastened on the loaded truck except when unloading.

All truck bodies shall have an opening on both sides which will accommodate a thermometer stem. The opening shall be located near the midpoint of the body, at least 300 mm above the bed.

401.10 Pavers. Pavers shall be self-contained, self-propelled units with an activated screen (heated if necessary) capable of placing courses of Hot Mix Asphalt Pavement in lane widths on the main line, or shoulder width for shoulders and similar construction.

The Contractor shall place Hot Mix Asphalt Pavement on the main line with a paver using an automatic grade and slope controlled screed, unless otherwise authorized by the Owner. The controls shall automatically adjust the screed and increase or decrease the layer thickness to compensate for irregularities in the preceding course. The controls shall maintain the proper transverse slope and be readily adjustable so that transitions and superelevated curves can be properly paved. The controls shall operate from a fixed or moving reference such as a grade wire or ski type device (floating beam) with a minimum length of 9 M, except that a 12 M ski shall be used on Expressway projects.

The Contractor shall operate the paver at speeds which produce a uniform mat. The paver shall have a receiving hopper with sufficient capacity for a uniform spreading operation and a distribution system to place the mixture uniformly, without segregation in front of the screed. The screed assembly shall produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. Pavers with extendible screeds shall have auger extensions and tunnel extenders as necessary.

The Contractor shall have the paver at the project site sufficiently before the start of paving operations to be inspected and approved by the Owner. The Contractor shall repair or replace any paver found worn or defective, either before or during placement, to the satisfaction of the Owner.

401.11 Rollers. Rollers shall be static steel, pneumatic tire, or approved vibrator type. Rollers shall be in good mechanical condition, capable of starting and stopping smoothly, and be free from backlash when reversing direction. Rollers shall be equipped and operated in such a way as to prevent the picking up of hot mixed material by the roller surface. Use of rollers which result in crushing of the aggregate or displacement of the mixture will not be permitted. Any Hot Mix Asphalt Pavement that becomes loose, broken, contaminated, shows an excess or deficiency of Performance Graded Asphalt Binder, or is in any other way defective shall be removed and replaced at no additional cost with fresh Hot Mix Asphalt Pavement which shall be immediately compacted to conform with the adjacent area.

The type of rollers to be used and their relative position in the compaction sequence shall generally be the Contractor's option, provided specification densities are attained and with the following requirements:

1) At least one roller shall be pneumatic-tired on bridges and variable depth courses as well as the first lift of pavement over gravel or a reclaimed pavement or other irregular surface.
2) Compaction with a vibratory or steel wheel roller shall precede pneumatic-tired rolling, unless otherwise authorized by the Owner.
3) Vibratory rollers shall not be operated in the vibratory mode when checking or cracking of the mat occurs, or on bridge decks.
4) Any method which results in cracking or checking of the mat will be discontinued, and corrective action taken.

The maximum operating speed for a steel wheel roller shall not exceed the manufacturer's recommendations.

401.111 Surface Tolerances. The Owner will check surface tolerance with a 4.9 m straightedge or string line placed parallel to the centerline of pavement and with a 3 m straightedge or string line placed transverse to the centerline of pavement. The Contractor shall correct variations exceeding 6 mm by removing defective work and replacing it with new material as directed by the Owner. The Contractor shall furnish a 3 m straightedge for the Owner's use.

401.12 Conditioning of Existing Surface. The Contractor shall thoroughly clean the surface upon which Hot Mix Asphalt Pavement is to be placed of all objectionable material. When the surface of the existing base or pavement is irregular, the Contractor shall bring it to uniform grade and cross section.

401.13 Hot Mix Asphalt Material Documentation. The Contractor and the Owner shall agree on the amount of Hot Mix Asphalt Pavement that has been placed each day.

401.14 Preparation of Aggregates. The Contractor shall dry and heat the aggregates for the mixture to the required temperature. The Contractor shall properly adjust flames to avoid physical damage to the aggregate and to avoid depositing soot on the aggregate.

401.15 Mixing. The Contractor shall combine the dried aggregate in the mixer in the amount of each fraction of aggregate required to meet the JMF. The Contractor shall measure the amount of PGAB and introduce it into the mixer in the amount specified by the JMF.

The Contractor shall produce the mixture at the temperature established by the JMF.

The Contractor shall dry the aggregate sufficiently so that the mixture will not flush, foam excessively, or displace excessively under the action of the rollers. The Contractor shall introduce the aggregate into the mixer at a temperature of not more than 14° C above the temperature at which the viscosity of the bituminous material being used is 0.150 Pas.

The Contractor shall store and introduce into the mixer the Performance Graded Asphalt Binder at a uniformly maintained temperature at which the viscosity of the material is between 0.150 Pas and 0.300 Pas. The aggregate shall be completely and uniformly coated with a thorough distribution of the PGAB. The Contractor shall determine the wet mixing time for each plant and for each type of aggregate used.

401.16 Spreading and Finishing. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the Contractor shall spread, rake, and lute the mixture with hand tools to provide the required compacted thickness.

On the roads opened to two way traffic, the Contractor shall place each course over the full width of the traveled way section being paved that day, unless otherwise approved by the Owner.

401.17 Compaction. Immediately after the Hot Mix Asphalt Pavement has been spread, struck off, and any surface irregularities adjusted, the Contractor shall thoroughly and uniformly compact the mixture by rolling.

The Contractor shall roll the surface when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking, or shoving. The Contractor shall prevent adhesion of the mixture to the rollers or vibrating compactors without the use of oil.

The Contractor shall immediately correct any displacement occurring as a result of the reversing of the direction of a roller or from other causes to the satisfaction of the Owner. Any operation other than placement of variable depth shim course that results in breakdown of the aggregate shall be discontinued.

Along forms, curbs, headers, walls, and other places not accessible to the roller, the Contractor shall thoroughly compact the mixture with mechanical vibrating compactors. The Contractor shall only use hand tamping in areas inaccessible to all other compaction equipment. On depressed areas, the Contractor may use a trench roller or cleated compression strips under a roller to transmit compression to the depressed area.

401.18 Joints. The Contractor shall construct wearing course transverse joints in such a manner that minimum tolerances shown in section 401.111 are met when measured with a straightedge.

The paver shall always maintain a uniform head of material during the joint construction. The bituminous mix shall be free of segregation and meet temperature requirements. Transverse joints of the wearing course shall be straight and neatly trimmed. The Contractor may form a vertical face exposing the full depth of the course by inserting a header, by breaking the bond with the underlying course, or by cutting back with hand tools. The Owner may allow feathered or "lap" joints on lower courses or when matching existing low type pavements.

The Contractor shall apply a coating of emulsified asphalt immediately prior to paving all joints, except those formed by pavers operating in echelon. The Contractor shall use an approved spray apparatus designed for covering a narrow surface. The Owner may approve application by a brush for small surfaces, or in the event of a malfunction of the spray apparatus, but for a period of not more than one working day.

Where pavement under this Contract joins an existing pavement of when the Owner directs, the Contractor shall cut the existing pavement along a smooth line, producing a neat, even, vertical joint. The Owner will not permit broken or raveled edges. The cost of all work necessary for the preparation of joints is incidental to related Contract items.

401.19 Quality Control Method A & B.

The Contractor shall operate in accordance with the approved Quality Control Plan (QCP) to assure a product meeting the Contract requirements. The QCP shall meet the requirements of 106.031 and these Special Provisions. The Contractor shall not begin paving operations until the QCP is approved in writing by the Owner.

Prior to placing any mix, the Owner and the Contractor shall hold a Pre-paving conference to discuss the paving schedule, source of mix, type and amount of equipment to be used, sequence of paving pattern, rate of mix supply, and traffic control. All field and plant supervisors including the responsible onsite paving supervisor shall attend this meeting.

The QCP shall address all elements which affect the quality of the Plant Mix Pavement including, but not limited to, the following:

(a) JMF(s)
(b) Hot asphalt mix plant details
(c) Stockpile Management (to include provisions for a minimum 2 day stockpile)
(d) Make & type of paver(s)
(e) Make & type of rollers including weight, weight per inch of steel wheels, and average contact pressure for pneumatic tired rollers
(f) Name of QCP Administrator, and certification number
(g) Name of Process Control Technician(s), and certification number(s)
(h) Name of Quality Control Technician(s), and certification number(s)
(i) Mixing & transportation including process for ensuring that truck bodies are clean and free of debris or contamination that could adversely affect the finished pavement.
(j) Frequency of and tests for Quality Control pavement.

(k) Laydown operations including longitudinal joint construction, procedures for avoiding paving in inclement weather, tacking of all joints, methods to ensure that segregation is minimized, procedures to determine the maximum rolling and paving speeds based on best engineering practices as well as past experience in achieving the best possible rideability of the pavement.

(l) Examples of Quality Control Forms

(m) Process for compacting paved shoulders and traveled way for method B projects

(n) Silo management and details (can show storage for use on project of up to 36 hours)

(o) Provisions for varying mix temperature due to extraordinary conditions.

(p) Name and responsibilities of the Responsible onsite Paving Supervisor

The QCP shall include the following technicians together with these minimum requirements:

(a) QCP Administrator – A qualified individual shall administer the QCP. The QCP Administrator must be a full-time employee of or a consultant engaged by the Contractor or paving subcontractor. The QCP Administrator shall have full authority to institute any and all actions necessary for the successful operation of the QCP. The QCP Administrator (or its designee in the QCP Administrator's absence) shall be available to communicate with the Owner at all times. The QCP Administrator shall be certified as a Plant Technician or Paving Technician certified by the New England Transportation Technician Certification Program.

(b) Process Control Technician(s) (PCT) shall utilize test results and other quality control practices to assure the quality of aggregates and other mix components and control proportioning to meet the JMF(s). The PCT shall periodically inspect all equipment used in mixing to assure it is operating properly and that mixing conforms to the mix design(s) and other Contract requirements. The QCP shall detail how these duties and responsibilities are to be accomplished and documented and whether more than one PCT is required. The Plan shall include the criteria to be utilized by the PCT to correct or reject unsatisfactory materials. The PCT shall be certified as a Plant Technician by the New England Transportation Certification Program.

(c) Quality Control Technician(s) (QCT) shall perform and utilize quality control tests at the job site to assure that delivered materials meet the requirements of the JMF(s). The QCT shall inspect all equipment utilized in transporting, laydown, and compacting to assure it is operating properly and that all laydown and compaction conform to the Contract requirements. The QCP shall detail how these duties and responsibilities are to be accomplished and documented, and whether more than one QCT is required. The QCP shall include the criteria utilized by the QCT to correct or reject unsatisfactory materials. The QCT shall be certified as a Paving Technician by the New England Transportation Technician Certification Program.

The QCP shall detail the coordination of the activities of the Plan Administrator, the PCT and the QCT. The project Superintendent shall be named in the QCP, and his responsibilities for successful implementation of the QCP shall be outlined.

The Contractor shall sample, test, and evaluate Hot Mix Asphalt Pavement in accordance with the following minimum frequencies:

Table 4: MINIMUM QUALITY CONTROL FREQUENCIES

Test or Action	Frequency	Test Method
Temperature of mix	6 per day at street and plant	-
Temperature of Mat	4 per day	-
% TMD (Surface)	1 per 150 Mg	ASTM D-2950*
% TMD (Base)	1 per 600 Mg	AASHTO T-166
Fines/Effective Binder	1 per 1200 Mg	AASHTO TP-4
Gradation	1 per 600 Mg	AASHTO T-30
PGAB content	1 per 600 Mg	AASHTO T-164, T-287 or TP 53
Voids at N_{design}	1 per 600 Mg	AASHTO TP-4
Voids in Mineral Aggregate at N_{design}	1 per 600 Mg	AASHTO TP-4
Rice Specific Gravity	1 per 600 Mg	AASHTO T-209
Coarse Aggregate Angularity	1 per 6000 Mg	ASTM D 5821
Flat and Elongated Particles	1 per 6000 Mg	ASTM D-4791
Fine Aggregate Angularity	1 per 6000 Mg	AASHTO TP33

* May be modified according to the MDOT's policy on file at the Central Lab in Bangor.

The Contractor may utilize innovative equipment or techniques not addressed by the Contract documents to produce or monitor the production of the mix, subject to approval by the Owner.

The Contractor shall record all Hot Mix Asphalt Pavement plant test results in writing, signed by the appropriate technician and present them to the Owner by 10:00 AM on the next working day, except when otherwise noted in the QCP due to local restrictions. The Contractor shall make density test results, including randomly sampled densities, available to, and summaries of each day's results shall be recorded and signed by the QCT and presented to the Owner by 10:00 AM the next working day.

The Contractor shall have a testing lab at the plant site, equipped with all testing equipment necessary to complete the tests in Table 4. The Contractor shall locate an approved SHRP Gyratory Compactor at the plant testing lab or within 30 minutes of the plant site.

The Contractor shall fill all holes in the pavement resulting from cutting cores by the Contractor or the Owner with an acceptable mixture no later than the following working day. Before filling, the Contractor shall carefully clean the holes and apply a coating of emulsified asphalt. On surface courses, cores shall not be cut except for calibration of the Nuclear Density Gauge, or as directed by QA testing by the Owner. On a daily basis, the Contractor shall perform nuclear density testing across the mat being placed, at 300 mm intervals. If the values vary by more than 2.0% from the mean, the Contractor shall make adjustments until the inconsistencies are remedied.

The Contractor shall monitor plant production using control charts as specified in Section 106. If plotted test results indicate a production problem, the Contractor shall notify the Owner and take corrective action acceptable to the Owner. The Contractor shall keep control charts up to date and available for review by the Owner at any time.

The Contractor may construct a pavement test strip on a given project at the option of the Contractor for each individual JMF. Prior to test strip placement the Contractor shall deliver a written notice to the Owner notifying that a test strip will be scheduled. Prior to placement of the test strip, a passing verification test is required.

The test strip shall not exceed 800 M. The quantity of Hot Mix Asphalt produced for the test strip shall not exceed 700 MG, 4 hours production, or 4% of the total quantity for the project, as determined by the Owner.

The test strip is intended to allow the Contractor to establish rolling patterns to achieve optimum density for the mat being laid. The Owner will not test the first third of the mat, allowing the plant to "balance itself". The Owner will calibrate thin lift densometers against cut cores. For surface mixes, the Owner will select 3 test sites and take 4 shots at each site. For base and binder mixes, 3 cores shall be run for density verification. The Contractor shall not commence full production until the calibrations are complete and the test strip has attained its minimum values for percent voids and percent TMD.

Should the test strip fail to meet an average density of 89% or greater (minimum of 3 tests, maximum of 7 including re-tests) or should the volumetrics, based on QC results, be outside of the 3-6% range, the Owner will reject the test strip. The Contractor shall remove and replace rejected test strips at their expense. The test strip shall be considered part of the project pavement and no separate payment will be made.

The Contractor shall cease paving operations whenever one of the following occurs on a lot in progress:

(1) The Pay Factor (which will be used for QA purposes only) for VMA, Voids @ N_d, Percent PGAB, composite gradation, VFB, fines to effective binder or density using all available tests is less than 0.90.

(2) The Coarse Aggregate Angularity or Fine Aggregate Angularity value falls below the requirements of Table 3 for the design traffic level.

(3) The first 2 control tests for the lot fall outside the upper or lower limits.

(4) The Flat and Elongated Particles value exceeds 10 percent by ASTM D-4791.

(5) There is any visible damage to the aggregate due to over-densification other than on variable depth shim courses.

(6) The Contractor fails to follow the approved QCP.

Paving operations shall not resume until the Contractor and the Owner determine that material meeting the Contract requirements will be produced. The Owner will consider corrective action acceptable if the Pay Factor for the failing property increases. If the Owner determines that the resumption of production involves a significant change to the production process, the current lot will be terminated and a new lot will begin.

401.20 Quality Assurance.

Method A

This method utilizes Quality Level Analysis and Pay Factor specifications. However, the pay factor shall be utilized to evaluate pavement performance only. Payment for all material and labor to place the payment shall be included in the Lump Sum contract. No separate payment will be made.

For asphalt pavement designated for acceptance under Quality Assurance (QA) provisions, the Owner will sample once per sublot on a statistically random basis, test, and evaluate in accordance with the following Acceptance Criteria:

Table 5: ACCEPTANCE CRITERIA

PROPERTIES	POINT OF SAMPLING	LOT SIZE	SUBLOT SIZE	TEST METHOD
Gradation	Paver Hopper	JMF*	1200 Mg	AASHTO T-30
PGAB Content	Paver Hopper	JMF*	1200 Mg	AASHTO TP-53
% TMD (Surface)	Mat behind all Rollers	JMF*	300 Mg	ASTM-2950/ AASHTO T-166
% TMD (Base or Binder)	Mat behind all Rollers	JMF*	600 Mg	AASHTO T-166
Air Voids at N_d	Paver Hopper	JMF*	1200 Mg	AASHTO TP-4
Voids in Mineral Aggregate at N_d	Paver Hopper	JMF*	1200 Mg	AASHTO TP-4
Fines to Effective Binder	Paver Hopper	JMF*	1200 Mg	AASHTO TP-4
Voids Filled with Binder	Paver Hopper	JMF*	1200 Mg	AASHTO TP-4

* Not to exceed 6,000 Mg, unless an unplanned overrun less than 2400 MG, or agreed to at the Pre-Construction Conference.

On the first day of production the Owner will take 3 random samples which will be used to calculate the quality level of the in-place material in the event the lot is terminated prematurely. Only 1 of the 3 will be for tested, the other 2 will be held onsite until at least 3 random samples have been taken, at which time the other 2 will be discarded.

(a) Lot Size. For purposes of evaluating all acceptance test properties, a lot shall consist of the total quantity represented by each item listed under the lot size heading in the table above. Each lot will be divided into at least 3 sublots, 5 where possible.

(b) Sublot size. The quantity represented by each sample will constitute a sublot. The size of each sublot shall be as listed under the sublot size heading in the table above. If there is insufficient quantity in a lot to make up at least three sublots, then the lot quantity will be divided into three equal sublots.

If there is less than one half of a sublot remaining at the end, then it shall be combined with the previous sublot. If there is more than one half sublot remaining at the end, then it shall constitute the last sublot and shall be represented by test results.

(c) Rejection by Contractor. The Contractor may, prior to sampling, elect to remove any defective material and replace it with new material at no expense to the Owner. The Owner will sample, test, and evaluate any such new material for acceptance. The Owner will review any test results for density below 90%, and areas found to be deficient shall be isolated and 3 random tests taken. If the resultant Pay Factor falls at or below 0.75, the Contractor shall remove and replace the material for the full lane width for a length of no less than 50 Meters at no expense to the Owner.

(d) Acceptance Testing. The Owner will obtain samples of Hot Mix Asphalt Pavement in conformance with AASHTO T168 – Sampling Bituminous Paving Mixtures. The Owner will take the sample randomly within each sublot. Target values shall be as specified in the JMF. The Owner will use the following Table for calculating Pay Factors for gradation, PGAB content, air voids at N_d, VMA, Fines to Effective Binder and VFB.

Table 6: GRADATION, VOLUMETRIC AND ASPHALT CEMENT ACCEPTANCE LIMITS

Property	USL and LSL
Passing 4.75 mm and larger sieves	Target ± 7 percent
Passing 2.36 mm to 1.18 mm sieves	Target ± 4 percent
Passing 0.60 mm	Target ± 3 percent
Passing 0.30 mm to .075 mm sieve	Target ± 2 percent
PGAB Content	Target ± 0.4 percent
Air Voids	Target ± 1.5 percent
Fines to Effective Binder	0.6% to 1.4%
Voids in the Mineral Aggregate	JMF Target -/+ 1.5% but not more than 0.5% below the table 2 Min. Value
Voids Filled with Binder	Target +/- 5%

Prior to paving, the Contractor shall determine whether testing of the surface for density QA will be done with cores or the Nuclear Density Gauge. If the Owner tests with the Nuclear Method, then the following table shall apply:

Table 7a: Density Acceptance Limits

	TARGET	LSL	USL
% of Maximum Theoretical Density	94.5	92.0	97.0

The Owner will designate a control section of pavement approximately 150 m long at the start of the paving operations. Within the control section at least three locations will be tested at the same offset at approximately a 2 M spacing to calibrate the nuclear density gauge. After placement of pavement, the Contractor shall cool the pavement to be tested by using ice and promptly cut the necessary calibration cores. After cooling to 20° C, the Contractor shall remove the cores using a core removing tool to assure minimum damage to the core. The Owner will adjust the nuclear density gauge to reflect the average of the cores. The Owner reserves the right to designate a new control section at any time. When nuclear testing is performed at locations outside normal paving and traffic control areas, the Contractor shall furnish a flagger and other necessary safety devices to protect personnel and equipment.

For base of binder courses, or for surface course when the nuclear density gauge is not available and the Owner so directs, the Contractor shall cut cores within 24 hours of placement of the pavement, or by the end of the next working day.

If the Owner tests with the Core Method then the following Table shall apply:

Table 7b: Density Acceptance Limits

	TARGET	LSL	USL
% of Maximum Theoretical Density	95.0	92.5	97.5

The Owner will measure pavement density on the compacted wearing surface using core samples tested according to AASHTO T-166. The Owner will randomly determine core locations. The Contractor shall cut cores at no additional cost to the Owner within 24 hours of placement of the pavement, and immediately give them to the Owner. At the time of sampling, the Contractor and the Owner shall mutually determine if a core is damaged. If it is determined that the core(s) is damaged, the Contractor shall cut new core(s) adjacent to the initial sample. In the Owner's presence, the Contractor may saw-cut the bottom of the core onsite without disturbing the layer being tested to remove lower layers of Hot Mix Asphalt Pavement, gravel, or RAP. No recuts are allowed at a test location after the core has been tested.

The minimum acceptable density for shoulders shall be 90.0% unless waived by the Owner due to local conditions that make densification to this point detrimental to the finished pavement.

Method B

Method B utilizes Product Verification testing to determine the quality of the material incorporated into the project. The Hot Mix Asphalt Pavement (other than that placed outside the traveled way and shoulders) shall meet the material properties in Tables 1 through 3. Aggregates and Mix shall meet the Consensus and Volumetric properties in Table 8 and Section 401.03, Aggregates, utilizing the testing methods and sampling procedures in Table 5.

For the traveled way density will be tested with 3 random cores, and statistically evaluated for Pay Factors with a USL of 98.0% and an LSL of 92.0%. If the resultant Pay Factor is 0.75 or below, the Contractor shall remove and replace the material with mix meeting the specifications at no additional cost to the Owner.

Only the Owner shall be allowed to dispute whether the test results reflect the true quality of the mix.

Unless otherwise noted, the Owner will verify density by inspection to ensure that the proper compaction procedures are complied with. The Owner may test for density to ensure that the Contractor's method attains acceptable results. At any time, the Owner may take samples from the source of production to determine the properties shown in Table 8, Section 401.03, Aggregates, or will verify these properties with test results from another project done during the same time period.

Table 8: GRADATION, VOLUMETRIC AND PGAB CONTENT VERIFICATION LIMITS (METHOD B)

	USL and LSL		
	Mainline	Shoulder	Drives & Sidewalks
Percent Passing 4.75 mm and larger sieves	Target ± 7	Target ± 7	Target ± 7
Percent Passing 2.36 mm to 1.18 mm sieves	Target ± 5	Target ± 5	Target ± 5
Percent Passing 0.60 mm	Target ± 4	Target ± 4	Target ± 4
Percent Passing 0.30 mm to 0.75 mm sieve	Target ± 3	Target ± 3	Target ± 3
PGAB Content	Target ± 0.5	Target ± 0.5	Target ± 0.5
Air Voids	4.0% ± 2.0	4.0% ± 2.0	Not Applicable
Fines to Effective Binder	0.6% to 1.6%	0.6% to 1.6%	Not Applicable
Voids in the Mineral Aggregate	JMF Target ± 1.5%*	JMF Target ± 1.5%*	Not Applicable
Voids Filled with Binder	Target ± 5%	Target ± 5%	Not Applicable

* But not more than 0.5% below the Table 2 Min. Value

For PGAB Content, Gradation, and Volumetric properties on items covered under Method B, the Owner may take 3 or more random samples from the material delivered to the project. The Owner may elect to test one or more of these samples to evaluate the quality of the mix. If there is concern about the quality, the Owner will test 3 or more random samples to determine a Pay Factor for each property using Table 8 USLs and LSLs. The Owner may reject material with a 0.75 pay factor or less. If the PF is less than 1.00 but greater than 0.75, price adjustments may be made accordingly. If the PF is 1.00 or greater the Owner will pay the full contract price.

401.21 Method of Measurement and Payment. All material, equipment and labor required to produce, place and test the asphalt pavement shall be included in the Lump Sum contract except testing by the independent testing laboratory hired by the Owner. No quantity measurement will be made for any pavement placed under this contract.

401.22 Basis of Payment. Payment for all paving activity shall be included in the Project Lump Sum contract price.

This Work shall include all labor, equipment, materials, and incidentals necessary to meet all related Contract requirements, including design of the JMF, implementation of the QCP, obtaining core samples, filling core holes, applying emulsified asphalt to joints, and providing testing facilities and equipment. Cleaning objectionable material from the pavement and furnishing and applying bituminous material to joints and contact surfaces is incidental.

No separate payment will be made for any pavement work under this Contract.

401.222 Pay Factor (PF) (Method A Only). The Owner will use density, Performance Graded Asphalt Binder content, voids @ N_d, VMA, VFB, F/B^e, and the screen sizes listed below (Table 9) for the type of material represented in the JMF. The Owner will evaluate materials using the following price adjustment factors under Subsection 106.033 for QA purposes only and no additional payment will be based on these calculations.

Table 9: Table of Gradation Composite "f" Factors
(Method A)

Constituent		"f" Factor				
		25 mm	19 mm	12.5 mm	9.5 mm Surface	9.5 mm Other
Gradation	25 mm	4	-	-	-	-
	19 mm		4	-	-	-
	12.5 mm			4	-	-
	9.50 mm				4	4
	2.36 mm	6	6	6	6	6
	1.18 mm					
	0.60 mm	2	2	2	2	2
	0.30 mm	2	2	2	2	2
	0.075 mm	6	6	6	6	6

For each lot of material, the Owner will determine a price adjustment as follows:

Gradation. The Owner will determine a composite pay factor (PF) using applicable price adjustment factors "f" from Table 9 and acceptance limits from Table 6. The Owner will not make price adjustments for gradations, but will monitor them as a shutdown criteria.

VFB and Fines to Effective Binder. The Owner will determine a pay factor (PF) using acceptance limits from Table 6. The Owner will not make price adjustments for VFB or Fines to Effective Binder, but will monitor them as a shutdown criteria.

Density. For mixes having a density requirement, the Owner will determine a Pay Factor using acceptance limits from Table 7a or 7b.

PGAB Content, VMA and Air Voids. For mixes having a Volumetric requirement, the Owner will determine a Pay Factor using acceptance limits from Table 6.

If any single Pay Factor for PGAB Content, VMA, Air Voids or Density falls below 0.75, the Owner will reject the material.

401.223 Process for Dispute Resolution (Method A Only).

The Owner will take a split for each QA test random sample, including mix samples for PGAB content, volumetrics and gradation, and label and store them to allow at least 2 working days for the Contractor to notify the Owner in writing of any disputes. At the time of sampling, the Contractor may also take a split sample of the material.

(a) PGAB content. To contest PGAB content within a sublot the Contractor must run its split of the original sample. If the Contractor tests its split and the results are equal to or greater than the allowable tolerances in Table 10, and notifies the Owner in writing within 2 working days of receiving the QA test results, the Owner will retest for PGAB content by the ignition method. If the re-test result is within the allowable tolerance shown in Table 10, the original test result will be used. If the re-test is equal to or greater than the allowable tolerances from Table 10 the new value will be used to calculate PGAB Content, VMA, VFB and Fines to Effective Binder.

(b) Density. To contest a nuclear density reading within a sublot, 1) the Contractor's nuclear gauge must have been calibrated using the same cores as the QA test gauge, and 2) the QC test must have been taken at the same location, and 3) the difference must have been greater than the tolerance allowed inn Table 10. If the difference is greater, the Contractor may request a new reading be taken by the QA Technician within 10 meters at the same offset from centerline. If this result is within Table 10 tolerance, the Owner will use the initial QA test. If the resulting density reading differs more than allowed in Table 10, the Owner will use the second reading. If the difference is less than the tolerance allowed in Table 10, the Owner will use the original reading.

If the Contractor and the Owner believe that the mat being tested may be 5 mm less than the designated thickness or thinner, the Contractor may cut a core in the same location as the original test. If the core is found to be 5 mm or more thinner than the designated thickness, then the Owner will test the core. If the density results exceed the tolerances allowed in Table 10, then the Owner will substitute the core value for the nuclear value. Re-testing may only take place after the area is opened to traffic if approved by the Owner. On any pavement thickness found to be less than 30 mm, the Owner will determine density using the core.

Where the Owner tests for density by the core method, no disputes will be allowed unless based on evidence that the results are inaccurate, as reasonably determined by the Owner.

(c) Volumetric. If the Contractor believes that the Owner's test results vary significantly from the Contractor's results, the Contractor may dispute the Owner's results by testing their split of the original sample. If the Contractor's results vary from the Owner's results by more than the tolerance in Table 10, and the Owner is notified in writing within at least 2 working days of the Contractor receiving QA test results, the Owner will re-test the remaining split of the original sample. If the Owner's re-test is within the allowable tolerance shown in Table 10, the original test shall stand. If the re-test is outside the allowable tolerances from Table 10 but is within the Table 10 tolerance of the Contractor's test, the Owner will use the second value.

When the Contractor has initiated 3 disputes that have not been overturned, further disputes resulting in no change will be paid for by the Contractor at the rates established by the Owner.

Table 10. Dispute Resolution Variance Limits

PGAB Content	± 0.3%*
Density	± 1.0%
Voids @ N_d	± 0.8%
VMA	± 0.8%

* 0.4% will be used if the Contractor uses any method other than TP53.

END OF SECTION 02511-APPENDIX A

SECTION 02525 – CURB AND SIDEWALKS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concrete and Bituminous Sidewalks

B. Granite Curb

C. Bituminous Curb (N.I.C.)

D. Exterior Plaza Areas

1.2 RELATED SECTIONS

A. Section 02100 - Site Preparation

B. Section 02227 - Aggregate Materials

C. Section 02505 - Paving Base and Subbase Course

D. Section 02584 - Pavement Markings

E. Section 03300 - Cast-in-place Concrete

F. State Highway Department Standard Specifications

G. Construction Documents.

1.3 SECTION EXCLUDES STRUCTURAL SLABS AT ENTRANCES

A. Structural slabs are entryway areas consisting of a slab supported by a foundation contiguous with the building foundation.

1.4 REFERENCES

A. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete

B. ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural construction.

C. ANSI/ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

D. ASTM C33 - Concrete Aggregates.

E. ASTM C94 - Ready Mix Concrete.

F. ASTM C150 - Portland Cement

G. ASTM C260 - Air-Entraining Admixtures for Concrete.

H. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

I. ASTM C494 - Chemical Admixtures for Concrete.

J. FA TT-C-800 - Curing Compound, Concrete, for New and Existing Surfaces.

1.5 PERFORMANCE REQUIREMENTS

A. Contractor shall maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects. Use flexible spring steel forms or laminated boards to form radius bends as required. Coat forms with nonstaining type coating that will not discolor or deface surface of concrete.

B. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM 185. Furnish in flat sheets, not rolls, unless otherwise acceptable to Owner.

C. Concrete Materials: Comply with requirements of applicable Division 3 sections for concrete materials, admixtures, bonding materials, curing materials, and others as required.

D. Joint Fillers: Resilient premolded bituminous impregnated fiberboard units complying with ASTM D 1751 FS HH-F-341, Type II, Class A; or AASHTO M 153, Type I.

E. Joint Sealers: Non-priming, pourable, self-leveling polyurethane. Acceptable sealants are Sonneborn "Sonolastic Paving Joint Sealant", Sonneborn "Sonomeric CT 1 Sealant", Sonneborn "Sonomeric CT 2 Sealant", Mameco "Vulken 45", or Woodmont Products "Chem-Caulk".

F. Granite Curb: Sloped granite curb shall be Type "5", meeting the requirements of the State of New Hampshire Type "E" sloped granite curb, except where Type "1" vertical curb, meeting the requirements of MDOT Specification 609, is required and specifically shown on the contract drawings. Type 1 granite headstones and transitions shall be used at all catch basin inlets along the access drive gutter lines. Granite at all ADA ramps shall be Type 1 with a ¼" reveal. Type 5 curb is not permitted for tip downs or to directly abut Type 1 curb in any area. An NHDOT Type 1 to Type V transition stone shall be used in these areas. The Contractor shall submit samples of granite for owner approval of color and quality prior to ordering and delivery.

G. Bituminous Curb shall be used where required on the Contract Drawings and shall be installed in accordance with Section 609 of the MDOT specifications. Fiberglass resin shall be used in all curb and coatings pursuant to MDOT specifications shall be provided.

H. Aggregates subbase gravels and base gravels (if appropriate) for sidewalks shall meet the requirements of Section 02227 of these specifications.

I. Asphaltic concrete pavement for sidewalks shall meet the requirements of Section 02511 of these specifications.

J. Catalog cuts and information on the curb supplier shall be submitted to the Engineer for approval prior to ordering the material.

2.2 MIX DESIGN AND TESTING

A. Concrete mix design and testing shall comply with requirements of applicable Section 03300.

B. Design mix to produce normal weight concrete consisting of Portland cement, aggregate, water-reducing admixture, air-entraining admixture, and water to produce the following properties:

1. Compressive Strength: 4,000 psi, minimum at 28 days, unless otherwise indicated on the Drawings.

2. Slump Range: 3"-5" for normal concrete at time of placement.

3. Air Entrainment: 4% to 6%

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare subgrade to receive sidewalk subbase gravel in accordance with Section 02223.

B. Place and compact subbase and base gravel in accordance with Section 02200, 02223, 02227 of these specifications.

C. Proof-roll prepared base material surface to check for unstable areas. The paving work shall begin after the unsuitable areas have been corrected and are ready to receive paving. Compaction testing for the base material shall be completed prior to the placement of the paving.

D. Surface Preparation: Remove loose material from compacted base material surface immediately before placing concrete.

3.2 INSTALLATION (CONCRETE SIDEWALKS)

A. Form Construction

1. Set forms to required grades and lines, rigidly braced and secured.

2. Install sufficient quantity of forms to allow continuance of work and so that forms remain in place a minimum of 24 hours after concrete placement.

3. Check completed formwork for grade and alignment to following tolerances:

Top of forms not more than 1/8" in 10'-0".
Vertical face on longitudinal axis, not more than 1/4" in 10'-0".

4. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

B. Reinforcement: Locate, place and support reinforcement per Division 3 specifications.

C. Concrete Placement

1. Comply with requirements of Section 03300.

2. Do not place concrete until base material and forms have been checked for line and grade. Moisten base material if required to provide uniform dampened condition at time concrete is placed. Concrete shall not be placed around manholes or other structure until they are at the required finish elevation and alignment.

3. Place concrete using methods which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Consolidate with care to prevent dislocation of reinforcing, dowels and joint devices.

4. Deposit and spread concrete in continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hours, place construction joint.

D. Joint Construction

1. Contraction Joints: If joints are specified, the curb or gutter shall be constructed in uniform sections of the length specified on the plans. The joints between sections shall be formed either by steel templates 1/8 inch in thickness, or a length equal to the width of the gutter or curb, and with a depth which will penetrate at least 2 inches below the surface of the curb and gutter; or with 3/4 inch thick preformed expansion joint filler cut to the exact cross section of the curb or gutter; or by sawing to a depth of at least 2 inches while the concrete is between 4 to 24 hours old. If steel templates are used, they shall be left in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place.

2. Longitudinal Construction Joints: Concrete curb, concrete gutter, combination concrete curb and gutter, where specified on the plans, shall be tied to concrete pavement with 1/2 inch round, reinforcement bars of the length and spacing shown on the plans.

3. Transverse Expansion Joints: Transverse expansion joint in curb, curb and gutter, gutter or sidewalk shall have the filler cut to the exact cross section of the curb, curb and gutter, gutter or sidewalk. The joints shall be similar to the type of expansion joint used in the adjacent pavement.

E. Joint Fillers: Extend joint fillers full-width and depth of joint, and not less than 1/2" or more than 1" below finished surface where joint sealer is indicated. If not joint sealer, place top of joint filler flush with finished concrete surface. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler section together.

F. Joint Sealants: Exterior pavement joint sealants shall be installed per manufacturer's recommendations.

3.3 COLD WEATHER PLACING

A. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions or low temperatures, in compliance with ACI 306 and as specified herein. All expenses associated with the protective measures, temporary heating, etc. shall be at the expense of the Contractor.

When air temperature has fallen to or is expected to fall below 40° F (4° C) uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50° F (10° C) and not more than 80° F (27° C) at point of placement.

Do not use frozen materials or materials containing ice or snow. Do not place concrete or frozen subgrade or subgrade containing frozen materials.

Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical agents, unless otherwise accepted in mix design.

3.4 CONCRETE FINISHING

A. After striking off and consolidating concrete, smooth surface by screeding and floating. Adjust floating to compact surface and produce uniform texture. After floating, test surface for trueness with 10'-0" straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide continuous smooth finish.

B. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2" radius. Eliminate tool marks on concrete surface. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:

1. Inclined Slab Surfaces: Provide coarse, nonslip finish by scoring surface with stiff-bristled broom perpendicular to line of traffic.

2. Paving: Provide coarse, nonslip finish by scoring surface with stiff-bristled broom perpendicular to line of traffic.

C. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed.

D. Protect and cure finished concrete paving using acceptable moist-curing methods, more particularly described in the "water-curing" section of ACI 308-81.

3.5 CLEANING AND ADJUSTING

A. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just prior to final inspection.

B. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials.

3.6 GRANITE CURB

A. Granite curbing will be installed and backfilled in accordance with provisions of Paragraph 3.06. If Type 5 sloped curb configuration is used, the curb shall be set on a slope as shown on the plans. All granite curb used to form a radius and any granite curb of any type with stone length of less than 36" shall be set in a dry mortar bedding.

B. Protection of granite curb shall be in accordance with Paragraph 3.06 C above.

3.7 BITUMINOUS CURB

A. Bituminous curb shall be installed on the bituminous pavement base course prior to placement of final bituminous pavement wearing course. The curb shall be backfilled with approved materials. This material shall be placed in layers not exceeding 8 inches in depth, loose measure and thoroughly tamped.

B. Protection of bituminous curb with coatings shall be in accordance with MDOT Standard Highway specifications.

3.8 HOT BITUMINOUS CONCRETE

A. Bituminous concrete pavement for sidewalks shall be placed in two lifts to provide the total thickness specified on the drawings.

B. Compaction shall be by a paver roller having a minimum total weight of 2,000 lb. with a minimum of 65 lbs. per inch of drive roll or by satisfactory vibratory equipment.

C. Placement and quality control shall comply with Section 02511 of these specifications.

SECTION 02584 – PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS:

A. Section 02200 Earthwork
B. Section 02505 Paving Base Course
C. Section 02511 Asphaltic Concrete Paving
D. Construction Drawings

1.2 PROJECT CONDITIONS

Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize flagmen, barricades, warning signs and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

The paint shall be a non-bleeding, quick-drying, alkyd petroleum base paint suitable for traffic-bearing surfaces and shall meet FS TTP-85E and mixed in accordance with manufacturer's instructions before application.

PART 3 - EXECUTION

3.1 SITE MEETING

A. A site meeting including the Engineer, General Contractor, Pavement Marking Subcontractor, and the Owner shall be conducted prior to conducting the work. Marking locations, colors, and dates of application shall be confirmed at this meeting.

3.2 PREPARATION

A. Sweep and clean surface to eliminate loose material and dust.

B. Where existing pavement markings are indicated on the drawings to be removed or would interfere with the adhesion of new paint, a motorized device shall be used to remove the markings. The equipment employed shall not damage the existing paving or create a surface hazardous to vehicle or pedestrian traffic. In all areas within public rights-of-way, the method of marking removal shall be approved by governing authority.

3.3 APPLICATION

A. Apply two (2) applications of paint at manufacturer's recommended rate without the addition of thinner, with a maximum of 125 square feet per gallon. Apply with mechanical equipment to produce uniform straight edges. At sidewalk curbs and crosswalks, use a straightedge to ensure a uniform, clean, and straight stripe. A minimum of 48 hours shall elapse between the applications.

B. The following items are to be painted with the colors noted below:

Pedestrian Crosswalks: White
Guardposts: Forest green or black per Engineer's direction.
Lane Striping where separating traffic in opposite directions: Yellow
Lane Striping where separating traffic in same direction: White
Handicap Symbols: White symbol with 4' square non-skid blue background or per Local Code and conforming to ADA requirements.
Parking Stall Striping: Yellow or white (distinguished compact/non-compact spaces).
Stop Bars: Provide painted stop bars where shown on the plan
Directional Arrows: White

SECTION 02605

WATER, SEWER, STORM AND CATCH BASIN STRUCTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Monolithic concrete manholes with masonry transition to lid frame, covers, anchorage and accessories.

B. Modular precast concrete manhole sections with tongue-and-groove joints with masonry transition to lid frame, covers, anchorage and accessories.

C. Masonry manholes sections with masonry transition to lid frame, covers, anchorage and accessories.

D. Catch basin structures.

E. Precast septic tank, holding tank, grease traps, and accessories when required on the contract drawings.

F. Outlet control structures when required on the contract drawing.

G. Flared concrete inlets when required on the contract drawing.

H. Water meter pit when required on the contract drawing.

I. Electrical transformer pads.

J. Electrical handholes and manholes.

K. Precast bases for lighting.

1.2 RELATED REQUIREMENTS

A. Section 02222 - Excavation, Backfilling, and Compacting for Utilities

B. Section 02606 – Water Quality Unit

C. Section 02720 - Storm Sewer Systems

D. Section 02730 - Sanitary Sewer System

E. Section 03300 - Cast-In-Place Concrete

F. Local Governing Authority and Code Requirements

G. Construction Drawings

The public utility for sewers is the City of Portland. All materials, installation, and workmanship will comply with the requirements specified in this section, and the requirements of the City of Portland and the City of Portland Department of Public Works. Where a more stringent standard exists, the more stringent standard shall apply.

1.3 REFERENCES

A. ANSI/ASTM C55 - Concrete Building Brick.

B. ASTM A48 - Gray Iron Castings

C. ASTM C478 - Precast Reinforced Concrete Manhole Sections.

D. ASTM C923 - Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes.

E. ASTM D1248 - Precast Polyethylene Manholes.

F. International Masonry Industry All-Weather Council (IMIAC): Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.4 SUBMITTALS

A. Shop Drawings: For all precast structures indicate manhole locations, rim elevation, piping, sizes and elevations of proposed penetrations. Submit a prefabrication drawing for each appurtenance showing this data.

B. Product Data: Provide manhole covers, component construction, features, configuration and dimensions.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE ITEMS

A. Precast Manhole and Catch Basin Sections: Manhole and catch basin super-structures shall be precast reinforced concrete of the dimensions indicated on the Plans conforming to ASTM Specification C478. Sections shall be installed with a flexible plastic gasket equal to or better than "Ram-Nek" as manufactured by K. T. Snyder Co., Houston, Texas, or sections may be fabricated to accept Tylox "O" rubber gaskets as manufactured by Hamilton Kent Manufacturing Co., Kent, Ohio. The casting and the outside of the brick work required to bring the rim to grade shall be plastered with at least 3/8" mortar, thoroughly troweled to leave a smooth waterproof exterior surface.

Manhole steps shall be forged aluminum safety type, alloy 6061, temper T6, or reinforced polypropylene plastic. Steps shall be cast or anchored into walls of precast sections to form a ladder with a distance of 12 inches between steps.

The Contractor shall furnish the name of the manufacturer to the Engineer prior to commencing work.

B. Precast Manhole and Catch Basin Bases: Manhole and catch basin bases shall be precast reinforced concrete of the dimensions indicated on the Plans conforming to ASTM Specification C478. Bases shall be placed on a well-compacted layer of crushed stone.

Jointing system for pipe entering or leaving manholes shall be a flexible manhole sleeve cast in the base. A stainless steel pipe clamp shall be used to fix the pipe into the sleeve. All materials shall meet or exceed rubber quality standards of ASTM C-443 and C-361.

For manhole bases, a minimum of 4 inches shall be allowed between pipe invert and inside bottom of base for construction of brick inverts.

Where precast bases are used for drop manholes, a 6-inch concrete slab is to be placed under the base section large enough to receive the concrete encased drop pipes. Provide suitable ties between manhole sections and drop pipe encasements.

Prior to ordering precast manhole bases, all angles between incoming pipes are to be field checked to incorporate possible line changes required in the field layout.

C. Water Quality Unit: Refer to Section 02606 of the Division 2 Specifications.

D. Outlet Control Structure: Provide precast concrete unit, covers, weirs, orifices and appurtenances as shown on the drawings.

E. Precast Tanks, Vaults and Appurtenances: Precast tanks, vaults, and appurtenances shall be constructed of precast reinforced concrete with inside dimensions conforming to those indicated on the contract drawings and conforming to ASTM C478. The tank may be a monolithic section or constructed with tongue and grooves with approved watertight sealants such as butyl sealant. All penetrations through the tank shall use either cast in place wall sleeves with Link Seals or a flexible boot secured in the casting such as Kon N Seal. Any clamps or metallic connections shall be stainless steel.

The tanks, vaults, and appurtenances shall include shop drawings and submittals with supporting computations which demonstrate the tank can support an H20 loading, an equivalent external fluid pressure of 105-lb./cubic ft. (with the tank empty), and an internal fluid pressure of 65-lb./cubic ft. The pressures shall be assumed to apply from the base of the structure to the finish grade surface.

Tanks which require attachment to an anti-flotation slab shall use stainless steel angles and anchors sized to resist the uplift force.

The tanks shall be coated with a waterproof seal on the interior and exterior. Sections shall be fabricated to receive a watertight seal.

F. Precast Light Pole Bases: The precast light pole bases shall have the anchor bolts, conduit, and ground wire cast in the base. The anchor bolts and template shall be supplied by the Division 16 contractor after lighting submittals are approved.

2.2 CASTINGS

A. The Contractor shall furnish all cast iron frames, grates, and covers conforming to the details shown on the Drawings, or as hereinbefore specified.

B. Castings shall be at least Class 25 conforming to the ASTM Standard Specifications for Gray Iron Castings, Designation A-48-64 except for the 12" NDS risers and 12" inlets.

C. Before being shipped from the foundry, castings shall be given two coats of coal-tar-pitch varnish, applied in a satisfactory manner so as to make a smooth coating, tough, tenacious and not brittle or brittle with any tendency to scale off.

D. Sanitary sewer covers shall have the name "Sewer" cast therein. Storm drain covers shall have the name "Storm" cast therein.

E. The manhole castings for roadway or traffic areas shall be the equal of the Portland standard non-perforated manhole frame and cover M 24 x 8-S weighing approximately 425 pounds as manufactured by the Etheridge Foundry Company, or Catalog No. LK610 as manufactured by the E.L. LeBaron Foundry Company.

F. Catch basins castings shall have frames conforming to S 24" x 8 square by Etheridge with a 24" square type "M" bicycle safe grate or catalog LK 124 (LeBaron), unless otherwise noted on the drawings. Provide 24" Circular Frame and Casting for the center of the "windrose" shown on Drawing C-9.0, C-9.1 or C-9.2.

2.3 MORTAR

A. Mortar used to adjust rims and covers for manholes shall consist of the following materials and proportions by volume: 1 part of Portland cement; 1/4 part lime hydrate; and 3 parts sand.

B. For precast reinforced concrete manholes, mortar for invert construction shall consist of the following materials and proportions by volume: 1 part Portland cement and 2 parts sand. Quantity of water in mixture shall be sufficient to produce a stiff, workable mortar, but in no case shall exceed 5-1/2 gallons of water per sack of cement.

2.4 BRICK

Brick for manholes and catch basins shall meet Standard Specifications for Sewer Brick, AASHTO Designation M-91-42, Grade SA, Size No. 1 wire cut. Any brick rejected by the Engineer as unsuitable shall be immediately removed from the work.

2.5 VENTS

Vents, when required by the Contract Drawings, shall be constructed of galvanized piping of the diameter indicated on the plans with a minimum size of 4" with threaded joints. The top of the vent shall have a minimum of 12 square inches of screened opening to permit air passage, and a cap to prevent extraneous material from entering the vent. The cap shall not interfere with the air passage. Vents shall be connected to appurtenances using a cast in wall pipe.

2.6 SITE CONCRETE

Site concrete shall meet the requirements set forth below:

A. Aggregate: The aggregate shall conform to the Standard Specifications for Concrete Aggregates, ASTM Designation C-33, as revised.

(a) Sand shall be a medium sand with a fineness modules of 2.60 - 2.90.

(b) Coarse aggregate shall not exceed 1-1/2 inches for mass concrete.

B. Cement: All cement shall be a Portland Cement conforming to the requirements of Standard Specifications of the American Society for Testing Materials, Designation C-150, as revised, Type II. An air entraining agent, approved by the Engineer, shall be used.

C. Proportioning Concrete:

Maximum Size Coarse Aggregate (Inches)	Air Content Percent by Volume
1-1/2, 2, or 2-1/2	5 +/- 1
3/4 or 1	6 +/- 1

The strength of the concrete shall be fixed in terms of water-cement ratio in accordance with trial batches of the materials to be used. All concrete placed under this Specification shall be mixed in the ratio not to exceed six (6) U.S. gallons of water per sack of cement, including surface water carried by the aggregate in each case. The Contractor shall determine the approximate amount of surface water contained in the aggregate, and make proper allowance. Concrete shall have a minimum 28-day strength of 3750 psi. The Contractor shall submit the proposed mix proportions to the Engineer for approval ten (10) days prior to placing concrete. Copies of recent test results for the proposed mix design shall also be submitted.

2.7 REINFORCEMENT

The Contractor shall submit detailed shop drawings for concrete reinforcement in accordance with ACI 318 and ACI 315. The steel shall be deformed Grade 60 bars which conform to ASTM 615, ASTM 616, or ASTM 617. Supports, spaces, and chairs shall permit the steel to be supported in accordance with ACI 318.

2.8 INSULATION

Insulation, when required by the Drawings, shall be Styrofoam SM or TG as manufactured by the Dow Chemical Company or equal. Profiles are generally the location where insulation required for the pipelines and appurtenances are shown.

Material submitted shall have a K factor of .20 @ 75 degrees by ASTM C518-70, 2-lb. density by ASTM C303-56, compressive strength of 30-lb. by ASTM D1621-64 and a water absorption of less than .05% by ASTM C272-53 and meet Federal Specification HH1524B Type II, Class B.

The Contractor shall coat the insulation material in accordance with the manufacturer's instructions.

2.9 TREATMENT OF INTERIOR SURFACES

All interior surface of cast in place concrete structures shall have a liquid hardener applied. The application shall consist of two coats of VANDEX or approved equal installed in accordance with manufacturer's instructions including requirements for surface preparation. Catalog cuts of the hardener shall be submitted to the Engineer for approval. All interiors of contrite items shall be treated with a waterproof coating (18 mil. Film thickness).

2.10 TREATMENT OF EXPOSED SURFACES

All exposed exterior concrete surfaces shall have a "rub finish". Structures and appurtenances shall have an applied coating of Tnemec Series 104 H5 Epoxy applied in 2 coats or approved equal to achieve a minimum dry film thickness of 18 mils.

PART 3 - EXECUTION

3.1 MANHOLES

A. General: All appurtenant structures shall be set level on compacted material as specified in Section 2 of these Specifications and as shown on the Plans.

B. Manhole Channels: Channels shall be constructed in all sanitary sewer and storm drain manholes in accordance with the details shown on the Plans by a mason whose qualifications meet the approval of the Engineer or a preformed manhole channel: "FIBERLINER" or equal. The sides shall be raised by brick masonry construction from the spring line perpendicular to the height of the crown of the pipe. Where changes in directions are made at manholes, the invert shall be shaped with as great a radius as possible, and to the complete satisfaction of the Engineer. Brick shall be carefully laid to present a smooth surface as indicated on the Plans and to the satisfaction of the Engineer.

C. Pipe Connections:

1. Stubs in Manholes: Stubs placed as specified and indicated on the Drawings shall be short pieces cut from the bell ends of appropriate pipe and shall have compatible watertight stoppers. Stubs shall be set accurately to the required line and elevation and encased in the structure masonry as indicated on the Drawings:

2. Wall Sleeves and Castings: Wall sleeves and castings as specified and indicated on the Drawings shall be accurately cast to the required location and elevations as indicated on the Drawings.

D. Steps: Manhole and appurtenant steps shall be cast in the wall and installed in a straight vertical alignment.

3.2 ALTERATIONS TO EXISTING MANHOLES AND CATCH BASINS

Existing manholes and catch basins to be altered shall be reconstructed as indicated on the Plans or as directed by the Engineer. Adjusting to grade or connecting to an existing pipe stub is not considered an alteration.

Alterations covered include, but are not limited to, adjustments to manhole invert channel caused by new pipe connections or removal of existing pipe connections, and removal and plugging of existing catch basin lead and replacing with a new lead connection conforming to the appropriate section of the Specifications contained herein.

3.3 ADJUSTING EXISTING MANHOLES AND CATCH BASINS

Existing manholes and catch basins to be adjusted to grade shall be reconstructed to the required grade. The existing frames, grates, and covers shall be re-used unless otherwise directed.

The existing structure shall be dismantled to a sufficient depth to allow reconstruction conforming to the standard details.

Adjustment will take place just prior to placing of surface pavement for adjustments of the frame and cover. Adjustments which require dismantling and reconstruction of the super structure shall be accomplished at the time of subgrade preparation. Pavement which is removed for this adjustment shall be cut square, tack coated, and capped with 2" of bituminous concrete. No separate payment will be made for furnishing the bituminous cap.

Each structure that is adjusted shall be cleaned of accumulated silt, debris, or foreign matter prior to final acceptance of the work.

3.4 ABANDONING EXISTING CATCH BASINS AND MANHOLES

Existing catch basins and manholes designated to be abandoned shall be removed to a depth of one (1) foot below the subgrade line, unless otherwise indicated on the Plans below the proposed building or directed by the Engineer. The existing pipes shall be plugged with concrete and brick masonry and the catch basins and manholes shall be filled with heavy gravel satisfactorily compacted in 9 inch lifts. Prior to backfilling, the sump shall be pumped and cleaned of all water and foreign material. When an existing catch basin or manhole is below the proposed building, it shall be removed.

3.5 MANHOLE ADAPTERS

When altering an existing manhole or where a pre manufactured manhole adapter cannot be installed in precast manhole sections, the Contractor shall use a Fernco, or equal, concrete manhole adapter. The adapter shall be designed to provide a positive, watertight seal between the manhole and pipe and shall be mortared in place with Five Star grout or approved equal non-shrink grout.

3.6 PRECAST TANKS, VAULTS, AND APPURTENANCES

These precast items shall be set in a dry excavation, proofrolled, and prepared with one of the following bedding materials:

- Compacted ¾" crushed stone (8" min.),
- Compacted MDOT 703.06 Type D gravel.

If the subgrade is weak and/or unstable, a layer of Mirafi 600X shall be installed between the prepared subgrade and the bedding.

The anti-flotation slabs shall be carefully laid out and aligned, and set on the bedding with reinforcement and forms set on a dry excavation site. Concrete shall be poured and protected from inclement weather during the cure period.

Tanks shall be set on the anti-flotation slab. Where necessary for plumbness and level, the tank shall be shimmed with a strong slurry grout installed to fill the void space.

Multiple section tanks shall be set in place using approved sealants. Double rows shall be required when joint mastics are used. An approved adhesive primer shall be installed prior to installing the mastics and setting the concrete.

The tank shall be anchored to the anti-flotation slab with approved stainless steel masonry anchors. All anchors shall be inspected by the contractor to assure the anchor is secure and will provide the required resistance.

After anchorage, the tank excavation shall remain dewatered and backfilled. The backfill shall be brought up uniformly around the tank and compacted in place. Pipe connections shall occur after the tank has been backfilled to the level of the bottom of the pipe bedding.

Any voids created by removal of sheeting, bracing or shielding shall be filled and recompacted.

PART 4 - TESTING

4.1 GENERAL

All sanitary manholes, wetwells, septic tanks, holding tanks, and other appurtenant structures shall be tested as to water tightness. If the initial test fails a retest shall be required. The Contractor has the option of either of the following methods:

A. Water Test: The inlet and outlet of the structure shall be plugged by watertight plugs furnished by the Contractor, and the manhole shall be filled with water. The water shall remain for sufficient time for the absorption into the concrete pipe to have been substantially completed. The amount of water loss from the manhole shall then be determined. The rate shall not exceed five (5) gallons per hour. Obvious leaks shall be repaired by the Contractor by excavating outside the structure, if required, at no cost to the Owner.

B. Vacuum: The manholes shall be vacuum tested by a method and apparatus subject to the prior approval of the Engineer. Vacuum testing shall be performed in the following manner:

The manhole shall be fully assembled, including all pipe connections into the structure. The manhole shall be in its final location and shall not have been backfilled prior to the performance of the test.

All lift holes shall be plugged with a non-shrinking mortar, as approved by the Engineer.

The seal between the manhole sections shall be in accordance with ASTM C923.

The Contractor shall plug the pipe openings, taking care to securely brace the plugs and the pipe.

With the vacuum tester set in place:

- Inflate the compression band to effect a seal between the vacuum base and the structure.
- Connect the vacuum pump to the outlet port with the valve open.
- Draw a vacuum to 10" of Hg. and close the valve.
- The test shall pass if the vacuum remains at 10" Hg. or drops to 9" Hg. in a time greater than one minute. If the manhole fails the initial test, the Contractor shall locate the leak and make proper repairs. Leaks may be filled with a wet slurry of accepted quick setting material.

Any appurtenant structure which shows obvious infiltration, whether tested or not, shall be sealed to eliminate said infiltration.

SECTION 02606 – WATER QUALITY UNIT

PART 1 - GENERAL

1.1 SCOPE

A. The work of this section includes furnishing a water quality unit which will achieve an average total suspended solids removal rate of 60 percent based upon particles and winter sand found on streets in the Portland, Maine area together with precipitation patterns represented as an average year from weather station data collected at the Portland International Jetport, The unit shall be a proprietary unit with all rights to construct and install the unit at the project site assigned to the Division 2 contractor and benefiting Mercy Health System of Maine. The work includes providing all performance and tests data to demonstrate compliance with the performance requirements of the specification as well as all materials and equipment needed to provide a complete water quality unit.

The work shall also include the operation and maintenance of the water quality unit until final acceptance of the project. In addition, the work shall include providing three firms and quotations for a five year maintenance contract for the unit to the Owner. The unit shall be supplied by a proprietary vendor who will review and research the hydrologic information which serves as the basis of design for this system from the record permit applications on file at the City of Portland Planning Department, or the civil engineering consultant.

1.2 RELATED SECTIONS

Storm sewers, catch basins etc, excavating/backfill for structures

1.3 GENERAL REQUIREMENTS

A. The water quality unit shall be completely below grade and accessible from manhole covers set at finish grade. The water quality performance shall be based upon methods which use a vortex principle to separate total suspended solids from the storm water. The system shall not have any mechanical parts which require a power source, lubrication, or routine maintenance except for cleaning the sediment from the unit.

B. The water quality unit shall be supplied by a vendor who can provide performance affidavits and guarantee the unit will meet the performance requirements when installed at the location required for this project. Any unit failing to meet the performance guarantee shall be replaced at no cost to the Owner during the first 7 years of operation. Thereafter, the materials of the unit shall be replaced for a period of up to 20 years with labor to install the replacement unit provided by the Owner.

C. Performance data and references shall be made available to the Engineer demonstrating that the water quality unit meets the design criteria and performance requirements stated in these specifications. This submittal data shall be considered for information only and shall not obviate the performance affidavits and guarantees supplied with the unit.

1.4 SUBMITTALS

A. Submittals shall be provided in accordance with the General Conditions and shall include the following:

1. Arrangement for this site and dimensional drawings (English units) of the water quality treatment system.

2. Plan and profile drawings of the stormwater treatment system as part of the stormwater drainage system. The profile drawing shall indicate the top of water level both upstream and downstream of the stormwater treatment system at the design flow conditions.

3. Handling, Storage and Installation Instructions.

4. Performance affidavits and guarantees.

5. List of contacts and three quotations for five year maintenance.

6. Operation and Maintenance Instructions.

1.5 QUALITY ASSURANCE

A. Certification and Performance Affidavits:

The manufacturer shall submit performance affidavits and guarantees in a form acceptable to the Owner. The manufacturer shall provide supporting documentation that demonstrates the stormwater treatment system is in strict compliance with the Contract Specification's treatment and design requirements.

B. Warranty

The manufacturer shall guarantee to the Division 2 contractor naming Mercy Health System of Maine as a third party beneficiary that the water quality unit is free from defects in materials and fabrication workmanship for a period of twelve months following final acceptance of the water quality unit and final cleaning of the unit. Equipment supplied by the manufacturer shall be installed and suitable for the application at this project site as specified herein and stipulated in the contract documents. Any defects found within the warranty period will be, at the election of the Owner and in accordance with the general requirements of the contract, modified,

repaired or replaced with a unit supplied by the vendor or a replacement unit provided with the performance affidavits and guarantees stipulated by these specifications.

The Division 2 contractor shall warrant all materials and installations of the water quality unit not warranted by the vendor to meet all requirements of the contract documents.

The manufacturer or vendor shall also guarantee that the unit will perform in accordance with the design criteria specified herein or inferred herein. Failure of the unit to perform shall entitle the Owner to the remedies identified earlier in this section.

C. Patent Indemnity

The vendor shall warrant that the system sold does not infringe upon or violate any patent, copyright, trade secret or any other proprietary right of any third party. In the event of a claim by any third party against the Owner, the manufacturer shall defend such claim, in the Owner's name, at the manufacturer's expense, and shall indemnify the Owner against any loss, cost, expense, legal or professional consulting fees, or liability arising out of such claim whether or not such claim is successful.

D. The water quality unit shall be supplied through a vendor capable of complying with these specifications. Vendors must be accepted by the Maine Department of Environmental Protection as having units capable of achieving MeDEP standards for water quality units in excess of 60% TSS. Compliance with MeDEP standards does not obviate the Vendor's requirement to comply with the specifications defined in Section 1 of this section.

PART 2 – EQUIPMENT PERFORMANCE AND DESIGN CRITERIA

2.1 WATER QUALITY UNIT

A. The water quality unit shall meet the design standards stipulated in the scope of this section and the hydrologic design data for this site as available in the reference material.

B. The water quality unit shall be a below grade vessel with internal components which can be inspected and cleaned from access manholes set flush with grade,

C. The water quality unit shall have a device to screen or trap floatable (materials with a specific gravity of less than 1.0) to retain such material in the water quality unit and not permit passage from the unit discharge.

D. Access covers shall be provided for the sediment and floatable contaminant storage areas to facilitate maintenance.

PART 3 – EQUIPMENT

3.1 WATER QUALITY UNIT

A. The water quality unit shall be designed for H-20 loading, anti-flotation assuming full hydrostatic uplift, and the earth loadings specified in the project geotechnical report.

The materials of the unit shall be constructed of materials typically used in wastewater treatment systems including aluminum, Type 304 stainless steel, reinforced concrete meeting these specifications and ASTM C-478.

The water quality unit shall be watertight and tested in accordance with section 02605 of these specifications.

All piping connections shall use a watertight manhole boot as specified in section 02605 of these specifications.

PART 5 - EQUIPMENT INSTALLATION

5.1 GENERAL

A. The system shall be installed in strict accordance with the site plans, the vendors' general arrangement drawings and Handling, Storage and Installation Instructions, and all OSHA and safety codes in effect at the work site.

B. The unit shall be installed plumb and level as shown on the submittals. Filter fabric shall be installed between any prepared sub grade and base material for the unit where conditions warrant.

C. All concrete surfaces shall have an approved sealant customarily used for precast concrete items used in a wastewater environment and as specified in Section 02605 of these specifications.

SECTION 02660 – WATER DISTRIBUTION SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

Furnish labor, materials, services, equipment, and other necessary items required for accompanying the construction of the water systems. This shall include, but not be limited to the following: pipe and fittings for site water line including domestic water line and fire water line, valves and fire hydrants, set lines, elevations, and grades for water distribution systems work and control system for duration of work including careful maintenance of benchmarks, property corners, monuments, or other reference points.

1.2 RELATED SECTIONS

A. Section 02222 - Excavation, Backfilling and Compacting for Utilities.

B. Section 02227 - Aggregate Materials.

C. Local Governing Authority and Code Requirements.

D. All Necessary Construction Permits.

E. The public utility for water is the Portland Water District. All materials, installation, and workmanship will comply with the requirements specified in this section, the requirements of the Public Utilities Commission and the Portland Water District. Where a more stringent standard exists, the more stringent standard shall apply.

F. Section 02605 – Water, Sewer, Storm, and Catch Basin Structure.

1.3 REFERENCE

A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb (4.54 kg) Rammer and an 18-in. (457 mm) Drop.

B. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54 Kg) Rammer and 18-in. (457 mm) Drop

C. ANSI/ASTM D2466 - Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.

D. ANSI/AWS A5.8 - Brazing Filler Metal.

E. ANSI/AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe Fittings for Water.

F. ANSI/AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquid.

G. ANSI/AWWA C111 - Rubber-Gasket Joints for Ductile Iron and Grey-Iron Pressure Pipe and Fittings.

H. ANSI/AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.

I. ANSI/AWWA C500 - Gate Valves, 3 through 48 in NPS, for Water and Sewage Systems.

J. ANSI/AWWA C502 - Dry Barrel Fire Hydrants.

K. ANSI/AWWA C504 - Rubber Seated Butterfly Valves.

L. ANSI/AWWA C508 - Swing-Check Valves for Waterworks Service, 2 in through 24 in NPS.

M. ANSI/AWWA C509 - Resilient Seated Gate Valves 3 in through 12 in NPS, for Water and Sewage Systems.

N. ANSI/AWWA C600 - Installation of Ductile-Iron Water Mains and Appurtenances.

O. ANSI/AWWA C606 - Grooved and Shouldered Type Joints.

P. ANSI/AWWA C900 - Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch, for Water.

Q. ASTM B88 - Seamless Copper Water Tube.

R. ASTM D1785 - Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.

S. ASTM D2241 - Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR).

T. ASTM D2855 - Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings.

U. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

V. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

W. ASTM D3139 - Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

X. ASTM D3035 - Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.

Y. AWWA C901 - Polyethylene (PE) Pressure Pipe, Tubing, and Fittings, ½ inch through 3 inch, for water.

Z. UL 246 - Hydrants for Fire - Protection Service.

1.4 SUBMITTALS

A. Product Data: Provide data on pipe materials, pipe fittings, hydrants, valves and accessories including ASTM designations, AWWA certifications and UL labels as required.

B. Manufacturer's Certificate: Certify that products meet or exceed state or local requirements.

1.5 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of piping mains, valves, connections, and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

A. Perform work in accordance with utility company and/or municipality requirements.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

PART 2 - PRODUCTS

2.1 PIPE GENERAL SPECIFICATIONS

2.1.1 PVC Water Pipe

A. For all water main installations that are less than 4" I.D., the District will require use of 2" I.D. PVC plastic water pipe meeting the following. The District will also require the use of C-900 PVC pressure pipe for all water mains that will be on the public side of the supply meter and that will become the responsibility of the District.

B. Pipe Specifications (2"):

1. Diameter:

   a. The I.D. shall be a minimum of 2".
   b. The O.D. shall be a maximum of 2.38".
   c. The minimum wall thickness shall be 0.113".

2. Pressure Rating:

   a. The minimum working pressure rating shall be 200 PSI (SDR-21).
   b. The pipe shall conform to standard ASTM 2241.

3. Pipe Length:

   a. The pipe shall be provided in 20' lengths.
      * Shorter lengths may be allowed and/or field cut following manufacturer's recommended procedures.

4. Gaskets:

   a. The gasket or O-Ring material shall be rubber meeting ASTM F 477 and of the "permanent use" type.

C. Fittings:

1. Standard AWWA C900 fittings are not available in the 2" I.D. and therefore "steel pipe" class fittings, or Certa-Lok Yelomine couplings and fittings meeting ASTM D 3139 shall be used.

2. The normal nomenclature for "steel fittings" is Schedule 40 or Schedule 80, with the respective pressure ratings of 280 PSI and 400 PSI. Both of these fitting classes are acceptable for use.

D. Service Connections:

1. All service connections shall be made with tapping saddles* per Portland Water District specifications or by use of tees meeting the above-noted fitting specification.

E. Installation:

1. Follow manufacturer's instructions.

2. An eight gauge bare copper wire shall be fastened to the buried PVC pipe to facilitate electronic pipe locating. The wire shall be fastened at two locations per length and not at any joint.

F. The District requires 200 PSI (SDR-14) PVC pipe for other sizes such as 4", 6", 8" and 12". Pipe shall conform to AWWA C-900.

G. Approved Manufacturer/Type

1. J-M Manufacturing – Blue Brute

2. Certainteed – Yelomine

3. Victaulic – Aquamine

4. IPEX – Blue Brute

2.1.2 Ductile Iron Pipe

A. Ductile iron pipe shall meet requirements of AWWA Standard C-151 (latest revision) and be cement lined and seal coated to meet AWWA Standard C-104 (latest revision).

B. Joints shall meet requirements of AWWA C-111 (latest revision).

C. Interior seal coated, bituminous paint oil cut, emulsion not acceptable, thickness minimum of 2 mils dry film thickness.

D. Exterior bituminous coated with minimum of 2 mils dry film thickness.

E. Class 52 wall thickness, 4-inch diameter through 12-inch diameter inclusive.

F. Ductile Iron Pipe with diameters 16 inches and larger shall be approved by PWD.

G. State nominal laying length and mark shorter lengths near bell.

H. Mechanical joint pipe to be furnished with gland, gaskets and Cor-Ten bolts and nuts.

I. Approved Manufacturers:

1. American Cast Iron Pipe

2. Griffin Pipe

3. U.S. Pipe

4. Clow Pipe

5. McWain Pipe (Not Atlantic States)

2.2 Ductile Iron Fittings

A. Material shall be ASTM A536 latest, grade 70-50-05, in accordance with AWWA C110 (latest revision) for fittings larger than 24" and C153 (latest revision) for fittings 3" thru 24".

B. Fittings shall be cement lined AWWA C104 (latest revision) or fusion bonded epoxy coated with a 5 mil nominal thickness per AWWA C550 and C116.

C. Interior seal coated AWWA C104 with minimum of 4 mils dry film thickness.

D. Exterior bituminous coated, 4 mils minimum dry film thickness or fusion bonded epoxy coated with a 5 mil nominal thickness per AWWA C550 and C116.

E. Sleeves shall not be cement lined, but shall be bituminous coated inside to 4 mils dry film thickness. All sleeves shall be long body type.

F. Mechanical joint with accessories furnished: D.I. glands, gaskets, Cor-Ten T-bolts and nuts.

G. Pressure Ratings:

1. Class 350 pressure rating in accordance with AWWA C153 – 3"-24" sizes.
2. Class 250 pressure rating in accordance with AWWA C110 – 30"-48" sizes.

H. The "compact design fittings must provide adequate space for the MJ joint and accessories to be installed without special tools (i.e. Lowell wrench can be used).

I. Approved Manufacturers:

1. All manufacturers.

2.3 Pipe Joint Restrainer

A. Pipe Restraints:

1. Use in conjunction with mechanical joint fittings.

2. The joint restraint ring and its wedging components shall be made of ductile iron conforming to ASTM A536-80.

3. Dimensions of the restrainer must allow use with standard M.J. bell conforming to AWWA C111 and AWWA C153.

4. Restrainer must restrain up to 350 psi of working pressure in 3" to 16" sizes and 250 psi of working pressure in 18" to 48" sizes with a 2:1 safety factor.

5. Torque limiting twist off nuts shall be used to ensure proper actuation of the restraining wedges (used on 1, 2, 3 below).

B. Approved Manufacturers:

1. Sigma Super Lug

2. Ford Uni-Flange Series 1400

3. Ebba Mega Lug

4. Romac Grip Ring

5. Star Grip Series 300

6. Romac Romagrip

7. MJ FIELD LOK Gasket

C. Retainer Glands: Glands shall be heavy duty ductile iron body as manufactured be Romac or Ebba Iron and shall have a minimum working pressure rating as follows:

1. 4" - 350 psi (pounds per square inch)
   6" - 350 psi
   8" - 250 psi
   12" - 200 psi

Set screws shall be:

1. cupped style ends;

2. composed of Cor-Ten Steel or Ductile Iron

The number of set screws shall be equal to or greater than the number of inches of nominal diameter of the gland (i.e. 4" - 4 set screws; 6" - 6 set screws, etc.).

Gland shall meet AWWA specifications.

2.4 Bolts and Nuts: General description of properties required.

A. Stainless Steel: Type 316 - contains the addition of molybdenum to the nickel-chromium steels.

Specific Chemical Composition:

1.	Carbon	-	0.08% max.
2.	Manganese	-	2.00% max.
3.	Silicone	-	1.00% max.
4.	Phosphorus	-	0.04% max.
5.	Sulphur	-	0.03% max.
6.	Chromium	-	16-18.00%
7.	Nickel	-	10-14.00%
8.	Molybdenum	-	2-3.00%
9.	SAE No.	-	30316
10.	ASM No.	-	5361A, 5524A, 5573, 5648B, 5690D

B. Cor-Ten Steel: Trade name for cold formed T-head bolts containing alloying elements such as copper, nickel, and chrome.

Specific Chemical Composition:

1.	Carbon	-	0.2% max.
2.	Manganese	-	1.25% max.
3.	Sulphur	-	0.05% max.
4.	Nickel	-	0.25% min.
5.	Copper	-	0.20% min.
6.	Combined	-	1.25% min. (Ni,Cu,Cr)

2.5 Resilient Seated Gate Valve

A. Valve shall meet the latest revision of the AWWA C-509 Standard.

B. Valve shall have a smooth unobstructed water way which shall be a minimum diameter of the valve.

C. Valve ends to be specified and shall be furnished with Cor-ten (or equal) bolts and nuts.

D. Valve shall be rated for zero leak rate at 200 psi differential working pressure and have a 400 psi hydrostatic test for structural integrity.

E. Sealing – Valve shall have 2 "O" rings situated such that the "O" rings above the thrust collar can be replaced with the valve under pressure and in the open position.

F. Stem – Valve stem shall:

1. open right with a stem nut made of grade D,E manganese bronze;

2. be non-rising;

3. be designed with a thrust collar integrally cast to the stem;

4. be designed with two (2) thrust washers, placed one above and one below the stem thrust collar;

5. be constructed of grade D,E manganese bronze;

6. be such that the thrust washers are made of a synthetic polymer with physical properties required.

G. Valve Body – The body, including the stuffing box and the bonnet, shall be constructed of cast iron or ductile iron, meeting the latest revision of AWWA C-153.

H. Valve Wedge:

1. shall be constructed of ductile iron (less guiding mechanism);

2. shall be fully encapsulated and permanently bonded with a resilient elastomer;

3. shall be constructed such to allow the flushing of any interior exposed surface during operations.

I. Coatings:

1. the internal and external valve body, including the stuffing box, bonnet, and interior of the wedge shall be fusion bonded epoxy coated with 8 mils D.F.T.

2. interior shall meet latest version of AWWA C-550.

3. shall be holiday free, interior and exterior, per testing method described in AWWA C-550, Sec. 5.1

J. Operating Nut:

Shall be two (2) inch square ductile iron:

1. with a countersunk hold down nut (made of 316 stainless steel or silicone bronze). This applies to stems that are tapered; or

2. with a stainless steel pin inserted thru the stem. This applies to stems of full diameter.

K. Bolts:

1. The seal plate and bonnet bolts shall be stainless steel (Type 316 or Type 304).

L. General Provisions:

1. Vendor shall identify any and all exceptions to the specifications.

2. Vendor shall provide standard brochures for item quoted.

3. Vendor may be required to supply a valve for inspection and determination of coating process.

M. Approved Resilient Seated Gate Valves:

1. U.S.P. Metroseal

2. AFC Series 2500

3. Mueller A-2360

4. Clow Series F6100

2.6 Valve Boxes

Reference Standard Details

A. The valve box bottom section shall be slide-type with bell-type base.
Manufacturer: North American Manufacture

B. The valve box top section shall be slide-type, 36 inches long (minimum). No top flange and no "bead" or bottom flange.
Manufacturer: North American Manufacture

C. The valve box cover shall be a 2" drop-type cover to fit the 7-1/4" opening of the top section.
Manufacturer: Bibby St.-Croix (no substitute)

D. The valve box intermediate (mid) section shall be slide-type with a minimum 3" belled bottom. Base section No. 645 may be used as an alternate.
Manufacturer: North American Manufacture

E. Material shall be cast iron or ductile iron free from defects.

F. Interior and exterior of all components shall be bituminous control with a minimum of 4 mils dry film thickness.

2.7 Service Box and Rod

A. Service Box Specification:

1. Shall be 1.0" (in.) I.D. Schedule 40 or steel pipe with top having N.P.I. threads for 1.0" screw-on cover or coupling.

2. Shall be Erie style with 6' (ft.) slide-type riser.

3. Any extension of a service box requires a threaded merchant coupling with no set screw.

B. Service Box Cover Specifications:

Approved Manufacturers: Bibby, Laroche, Clow Canada.

1. Shall be Quincy type (heavy duty) cover that screws on service box.

2. Shall be tapped with a 1" rope thread with a solid brass plug with pentagon operating head.

C. Service Box Foot Piece Specifications

Approved Manufacturer: Laroche

1. The standard foot piece shall be heavy duty (Ford style or equal) cast iron design.

2. The large, heavy-duty foot piece shall have an arch that will fit over 2" ball-valve curb-stops.

D. Service Rod Specifications

Approved Manufacturer: North American Manufacture

1. Shall be 24" in length air valves and have a self-aligning design.

2. Shall be 36" in length – all services.

3. Shall be of circular dimension and constructed of:

   a. Stainless steel (304) with an epoxy coating (minimum 4 mil D.F.T.).

4. Shall have a yoke design that is an integral part of the rod.

5. The curb-stop attachment point shall be a brass cotter pin.

6. The rod "wrench-flat" shall have a minimum thickness of 1/4" tapered to 1/16" and width of 5/8" or 1/2".

7. Diameter:

   a. ½", ¾" and 1" services use ½" diameter.
   b. 1 ½" and 2" services use 5/8" diameter.

2.8 Tapping Sleeves

A. For sizes 12" and smaller tapping sleeve shall be ductile iron:

1. Tapping sleeve shall be mechanical joint with recessed outlet flange for tapping valve.

2. Tapping sleeve shall conform to AWWA C-207, Class D, with rated maximum working pressure of 200 psi.

3. The side rubber gaskets shall be rectangular in cross-section and fit into grooved channels in the casting. These gaskets shall extend the entire length of the sleeve and shall not require cutting or trimming to match MJ and gaskets.

4. Tapping sleeve shall be AB-CD pattern to permit use of plain rubber and duck-tipped gaskets for various O.D. piping sizes.

5. Mechanical joint with accessories furnished; glands, gaskets, and Cor-Ten T-bolts and nuts or equal.

6. All flange outlet bolts shall be stainless steel (Type 304).

7. Interior and exterior to be bituminous coated with a minimum of 4 mils dry film thickness or fusion bonded epoxy coated.

8. The sleeve shall be provided with a ¾" F.I.P.T. test port and brass lug.

B. For sizes 16" and larger tapping sleeve shall be fabricated steel:

1. Body and Flange – A-36

2. Coating – Fusion-bonded epoxy coating with minimum D.F.T. of 5 mils, inside and out.

3. Bolts, Nuts – Stainless Steel (Type 304).

4. Gaskets - SBR.

5. Flange – AWWA Class D plate flange with ANSI 150# drilling, proper recessing for tapping valves.

6. Sleeves shall be provided with ¾" F.I.P.T. test port and plug.

C. Approved Manufacturers (4" – 12")

1. AFC

2. Mueller Co.

3. U.S. Pipe.

4. Tyler / Union

5. Powerseal Model 3490 and 3490MJ.

D. Approved Manufacturers (16" and larger)

1. Romac FTS 420

2. Ford FTSC

3. Smith Blair 622

4. JCM 412

5. Powerseal Model 3490 and 3490 MJ (up to 24")

2.9 Corporation Stop

A. 3/4" - 2" shall be a ball valve design with a brass ball that is Teflon coated or brass ball with Teflon seats.

B. The valve shall be supported by 2 seats for water tight shut-off in either direction.

C. The valve shall have a full port opening.

D. The body of the corporation-stop shall be of heavy duty design.

E. The valve working pressure shall be 300 psi.

2.10 Specifications for Services:

1. Material

   a. Copper Tubing: ASTM B88, Type K, Seamless, Annealed, 2 Inch Diameter Maximum.

2. Fittings

   a. Brass Compression Manufactured by Ford, Mueller or McDonald.

2.11. Curb Stops

A. For sizes 3/4" - 2", the valve shall be a brass ball that is Teflon coated or brass ball with Teflon seats.

B. The ball shall be supported by seats which are water tight in either direction.

C. The valve shall have a full-port opening.

D. The valve shall open with ¼ turn (90^{O}) with a check or stop.

E. The valve shall not have a drain.

F. The valve stem shall have 2 "O" rings and a bronze ring lock which holds the stem solidly in the valve body.

G. The valve body shall be a heavy duty design.

H. The valve working pressure shall be 300 psi.

2.12 Fire Hydrant

A. The hydrant shall open right.

B. The operating nut shall:

   1. be D.I. or bronze
   2. be pentagon in shape with dimensions: Top 1-13/16" tapering to 1-7/8" on bottom.

C. Nozzles shall be:

   1. 2 each – 2-1/2" National Standard Thread
   2. 1 each – 4-1/2" National Standard Threadbottom

D. Port covers shall be supplied without chains and shall have the same size pentagon operator as specified in 3.0(b) above.

E. Traffic model hydrant with breakaway feature.

F. Barrel length(s) shall be:

1. 6 ft. cover, 6-1/2 ft. bury; or

2. 5-1/2 ft. cover, 6 ft. bury, or

3. 5 ft. cover, 5'-6" bury

G. Hydrant shoe or base shall have the following:

1. 6" MJ inlet;

2. 5-1/4" valve opening with non-draining bronze seat that is permanently plugged;

3. valve seat and sub-seat arrangement shall be bronze to bronze

H. Bolts:

1. all buried mechanical joint bolts and nuts (T-head, etc.) shall be Cor-Ten or equal;

2. all buried flange joint bolts shall be stainless steel (Type 304) or silicone bronze.

I. Protective Coatings shall consist of the following:

1. all paintings and coatings shall be a minimum of 3 mils total dry film thickness, unless noted

2. the internal area of the hydrant base, which is normally exposed to water and which includes the internal body of hydrant shoes, including lower valve plate, shall be epoxy coated

3. all internal and external cast iron or ductile iron components shall be coated with an approved bituminous coating, 3 mils minimum

4. Coatings for upper barrel – exterior:

   a. Surface preparation blast clean SSPC-SP-6
   b. Primer Sherwin Williams Red Oxide E61RC21, 1.5 mils, dry
   c. Finish coat Sherwin Williams – Regal Yellow, F78Y30, 1.5 mils, dry or sufficient paint to hide the second coat
   d. Total dry film thickness – 3 mils minimum

5. Coatings for bonnet, operating nut, port cap:

   a. Surface preparation: Blast clean, SSPC-SP-6
   b. Exterior primer
   c. Exterior aluminum
   d. Total dry film thickness: 3 mils minimum.

J. Flow Indicator Collars

1. PWD personnel shall install flow indicator collars on all new hydrants.

K. Field Test of Installed Hydrant

1. Hydrant flow shall completely stop with no more than 200 ft. lb. of torque applied to the operating nut.

2. Failure to shut completely at no more than 200 ft. lb. of torque will be cause for rejection of that hydrant.

L. Approved Hydrants

1. Clow Eddy – with lower stern machined from bar stock

2. American Darling Models: B62B-1, B62B-5

2.13 Joint Restraint

Place thrust blocking consisting of 2,500 psi concrete to provide sufficient bearing area to transmit unbalanced thrust from bends, tees, caps, or plugs to undisturbed soil without loading undisturbed soil in excess of 2,500 lbs./sq. ft. when water main pressure is 100 psi.

MINIMUM THRUST BLOCKING BEARING AREAS

Pipe Diameter	Tees	90 Deg. Bend Sq. Ft.	45 Deg. Bend Sq. Ft.	22 Deg. Bend Sq. Ft.
4"	1.0	1.0	1.0	1.0
6"	1.5	2.0	1.0	1.0
8"	2.5	3.5	1.8	1.0
10"	4.0	5.5	2.8	1.5
12"	6.0	8.0	4.0	2.0
14"	8.0	11.0	5.5	3.0
16"	10.0	14.2	7.0	4.0

2.14 Rigid Insulation: Installation, when required by the Drawings, shall be Styrofoam SM or TG as manufactured by the Dow Chemical Company or equal.

Materials submitted shall have a K factor of .20 @ 75 degrees by ASTM C518-70, 2-lb. density by ASTM C303-56, compressive strength of 30-lb. by ASTM D1621-64 and a water absorption of less than .05 meet Federal Specifications HH1524B Type II, Class B.

2.15 Temporary Water Service: Provide temporary water service as necessary during the site work and building construction. Use materials as approved by the Portland Water District.

2.16 Meter Pit: Provide meter pit with fire line meter and valves as shown on the drawings.

PART 3 - EXECUTION

3.1 WATER DISTRIBUTION SYSTEM

A. Building Service Lines: Install water service lines to point of connection within approximately five feet outside of buildings to which such service is to be connected and make connections thereto. If building services have not been installed provide temporary caps. Connections of service lines to distribution mains shall be constructed in accordance with the following requirements.

1. 2 Inch and Larger: Connect by rigid connections and provide gate valve below frost line.

B. Regrading: Raise or lower existing valve and curb stop boxes and fire hydrants to finish grade in areas being graded.

C. Pipe Laying, General

1. Install to same tolerances as specified for storm drain (Section 02720).

2. Do not lay pipe on unstable material, in wet trench, or, when trench or weather conditions are unsuitable.

3. Support pipe laid in fill area at each joint, by brick or concrete piers carried down to solid undisturbed earth.

4. Do not lay pipe in same trench with other pipes or utilities.

5. Hold pipe securely in place while joint is being made.

6. At least one foot shall separate water lines vertically from other pipes or underground structures.

7. Where water pipes cross sanitary sewers or are laid parallel and adjacent to them, bottom of water pipe shall be separated by not less than one foot above top of sewer and ten feet horizontally.

8. Do not work over, walk on, pipes in trenches until covered by layers of earth well tamped in place to a depth of 12 inches over pipe.

9. Full length of each section of pipe shall rest solidly upon pipe bed with recesses excavated to accommodate bells or joints. Do not lay pipes on wood blocking.

10. Install water lines to avoid storm and sanitary sewer lines.

11. Clean interior or pipe thoroughly of all foreign matter before installation. Keep pipes clean during laying operations by means of plugs or other methods. When work is not in progress, securely close open ends of pipe and fittings to prevent water, earth, or other substances from entering.

12. Tees, plugs, caps, bends and hydrants on pipe installed underground shall be anchored. Pipe clamps and tie rods, or concrete thrust blocks may be used. Type of pipe and soil conditions determine methods. Anchor water mains as specified in NFPA No. 24.

13. Close pipe openings with caps or plugs during installation. Tightly cover and protect equipment against dirt, water and chemical, or mechanical injury. At completion of all work thoroughly clean exposed materials and equipment.

D. Laying Ductile Iron Pipe

1. Installing Pipe: Lay pipe in accordance with AWWA C600.

2. Joints:

   a. Mechanical: AWWA C111. Provide sufficient quantities of bolts, nuts, glands and gaskets for each socket opening on pipe and fittings.

   b. Push-On: Apply thin film of lubricant to gasket and place in proper position in contour of bell. Insert beveled end of joining pipe and make contact with gasket. Force beveled end of pipe to bottom of bell without displacing gasket. Do not caulk. Only lubricant furnished by manufacturer of pipe shall be used.

   c. Flanges: AWWA C115. Install only in concrete pits. Must be watertight and set not less than six inches from walls to floor.

E. Setting of Valves:

1. Install gate valves as indicated on the Drawings and support on concrete pads with valve stem vertical and plumb. Install valve boxes in a manner that will not transmit loads, stress, or shock to valve body.

2. Center valve box over operating nut of valve vertical and plumb. Securely fit valve box together leaving cover flush with finished surface.

3. Clean valves and curb stops interior before installation.

F. Setting of Fire Hydrants

1. Install fire hydrant assemblies as indicated on Drawings in vertical and plumb position with steamer nozzle pointed toward building unless otherwise directed by local authorities. Support hydrant assembly on concrete pad and firmly braced on side opposite inlet pipe against undisturbed soil or concrete blocking. Place minimum of 6 cu. ft. of crushed stone or gravel around hydrant base and barrel after thrust blocking has cured at least 24 hours. Exercise care when backfilling and compacting so proper vertical position will not be altered.

2. Clean interior of hydrants of all foreign matter before installation.

3. Set center of each hydrant not less than two (2) feet nor more than six (6) feet back of edge of road or face of curb. Set barrel flange not more than two (2) inches above finished grade and eighteen (18) inches between center of steamer nozzle and finished grade.

G. Pipe Sleeves: Install where water lines pass through retaining and foundation walls. Properly secure in place, with approximately 1/4-inch space between pipe and enclosing sleeve, before concrete is poured. Caulk annular opening between pipe and sleeves, and seal with asphaltic compound consisting of bituminous materials mixed with mineral matter. Install piping so that no joint occurs within a sleeve. Split sleeves may be installed where existing lines pass through new construction.

H. Meter: The Contractor will obtain the meter from the Portland Water District and install the domestic water meter for the installation and will pay all usage charges connected with water supply until the installation is accepted by the Owner.

3.2 DISINFECTION

A. Disinfect distribution system with chlorine before acceptance for domestic operation in accordance with the following procedures:

1. The only acceptable method of disinfection shall be the continuous Feed Method of chlorine.

2. The rates of introduction of the chlorine and water shall be so proportioned so that the chlorine concentration in the water is maintained at a minimum of 50 mg/l available chlorine.

3. During the application of the chlorine, valves shall be operated in such a manner that the treatment dosage shall not flow back into the line supplying the water. The operation of the valves shall be done under Water District supervision.

4. The chlorinated water shall be retained in the main for at least 24 hours. At the end of the 24 hour period, the treated water shall contain no less than 25 mg/l available chlorine.

5. At the end of the retention period, the chlorinated water shall be flushed from the main until the chlorine in the water leaving the main is no higher than the normal residual in the system, or less than 1 mg/1.

6. All bacteriological tests shall be collected in sample bottles and shall be tested at a State certified laboratory. All costs for disinfection of the main as well as bacteriological costs shall be borne by the Contractor.

3.3 TESTING OF WATER DISTRIBUTION SYSTEM

A. Test water distribution system pipe sizes installed below grade and outside building in accordance with following procedures:

1. Before pressure testing the water main, air shall be completely expelled from the pipe. If permanent air valves are not located at all high points, corporation stops shall be installed at all high points so that the air can be expelled as the pipe is being filled. After completion of the test, the corporation stops shall either be removed or left in place at the discretion of the Water District.

2. If fire hydrants are installed on the new water main, the test shall be conducted against a closed hydrant valve.

3. The test pressure shall be 1.5 times the static pressure at the lowest point of elevation of the line and shall not be less than 150 p.s.i.

4. The test shall not exceed the pipe or thrust restraint design pressures, nor exceed twice the rated pressure of the valves or hydrants and shall not exceed the rated pressure of the valves, if resilient - sealed butterfly valves are used.

5. Water, only, shall be used to bring the main to the required test pressure. The type of pump shall be approved by the Portland Water District.

6. The test shall be of at least two hours in duration. A leakage test shall be conducted immediately after the pressure test.

7. After the pressure test period, water shall be pumped into the main to bring the pressure back up to the initial test pressure. No pipe installation shall be accepted if the leakage is greater than that listed in Table 1 attached to this Section.

   If any pipe installation shows a leakage greater than that specified in Table 1, the contractor at his own expense shall locate and repair the leak until it is within the specified allowance.

   The pressure and leakage tests shall be conducted under Portland Water District's supervision.

SECTION 02720 – STORM SEWER SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Site storm sewerage drainage piping, fittings, and accessories, and bedding.

B. Connection or providing stubs of building storm water drainage system.

C. Catch basins, paved area drainage, site surface drainage, and stormwater detention facilities.

D. Installation of perimeter underdrains around the building foundation with connectors to the storm drainage systems.

1.2 RELATED SECTIONS

A. Section 02222 - Excavation, Backfilling and Compacting for Utilities.

B. Section 02270 - Slope Protection and Erosion Control

C. Section 02605 - Sewer and Catch Basin Structures.

D. Section 02730 - Sanitary Sewer Systems.

E. 02606 – Water Quality Unit.

F. Section 03300 - Cast-in-Place Concrete: Concrete type for catch basin, cleanout or head wall base pad construction.

G. Local governing authority and code requirements.

H. All necessary construction permits.

I. Construction drawings.

1.3 REFERENCES

A. AASHTO M294 and M252 - Corrugated Polyethylene pipe smooth interior.

B. AASHTO M36 - Metallic (Zinc or Aluminum) Coated Corrugated Steel Culverts and Underdrains.

C. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb (4.54 kg) Rammer and an 18-in. (457 mm) Drop.

D. ANSI/ASTM A74 - Cast Iron Soil Pipe and Fittings.

E. ANSI/ASTM C14 - Concrete Sewer, Storm Drain, and Culvert Pipe.

F. ANSI/ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

G. ANSI/ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.

H. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

I. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations Soils and Soil-Aggregate Mixtures Using 10-lb (4.54 Kg) Rammer and 18-in. (457 mm) Drop

J. ANSI/ASTM D3034 - Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

K. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

L. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

1.4 DEFINITIONS

Bedding: Fill placed under, beside and directly beside pipe to midpoint of pipe, prior to subsequent backfill operations.

Special Backfill: Fill placed above bedding beside and over pipe prior to other backfill operations.

1.5 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of pipes and mains, connections, catch basins, cleanouts and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 COORDINATION

A. Coordinate the work with termination of storm connections outside building and trenching.

B. Coordinate the installation of the footing drains with the General Contractor and the foundation subcontractor.

C. The exact location of roof drain leaders shall be determined from the Architectural Plans or as shown on the drawings. The number and location of the roof drains may be different than shown in the site drawings. Verify roof drain lead locations with the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS AND ACCESSORIES

Provide any one of the following materials subject to any restrictions noted in this subsection or on plans. The contractor shall provide catalog cuts to the Owner and indicate the proposed materials to be used prior to ordering materials. The approval of the Owner must be obtained prior to ordering materials.

A. Reinforced Concrete Pipe: Comply with requirements of ASTM C 76, Class IV unless another class type is indicated on Drawings, installed with flexible plastic (Bitumen) gaskets at all joints. Gaskets shall comply with AASHTO M-198 75I, Type B, and shall be installed in strict accordance with pipe manufacturer's recommendations.

B. Polyvinyl Chloride (PVC) Pipe: Pipe and fittings shall comply with ASTM D 3034, rated SDR 35. Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM D 3034 classification. Pipe joints shall be integrally molded bell ends in accordance with ASTM D 3034, Table 2, with factory supplied elastomeric gaskets and lubricant. PVC shall not be used for any drainage pipe which will be permanently exposed to sunlight.

C. Corrugated Polyethylene Pipe (CPP), Smooth Interior: Shall conform with AASHTO Designations M294 and M252. Pipe must be installed in accordance with manufacturer's installation guidelines for culvert and other heavy duty drainage applications. Acceptable manufacturers: Advanced Drainage Systems, Inc. (ADS) N-12 and HANCOR, INC. (HiQ smooth interior). CPP pipe shall not be used for any drainage pipe which will be permanently exposed to sunlight. Piping below the water table, subject to surcharge, or which could affect a pond level, shall be watertight. All other piping shall be silt tight.

D. Polyvinyl Chloride (PVC) Large Diameter Closed Profile Gravity Sewer Pipe, UNL-B-9: Pipe and fittings shall be installed in accordance with pipe manufacturer's installation guidelines. Acceptable manufacturer: CARLON (Vylon HC). PVC pipe shall not be used for any drainage pipe which will be permanently exposed to sunlight.

E. Storm drain inlets, outlets, and culverts to include:

- Rip rapped aprons.
- Concrete flared inlets/outlets for pipes 24" or larger in diameter.
- Bar racks for pipes 24" diameter or larger.
- HDPE flares for pipe smaller than 24" in diameter. High density polyethylene flares with added carbon black for exposure to sunlight.

F. Manholes and Catch Basins Outlet Control Structures, Stilling, and Water Quality Unit (Refer to Section 02605 and 02606).

2.2 UNDERDRAIN SYSTEM

A. Polyvinyl Chloride (PVC) Pipe: The perforated underdrain pipe with ring-tite joints and fittings shall comply with the requirements of ASTM F 758. Holes shall be 120 degrees double row, 1/4 inch diameter at 3 1/4 inch spacing. Underdrain pipe with a filter fabric sleeve shall not be acceptable. Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM F 75B classification.

B. Filter fabric: Filter fabric shall be used around all underdrains as specified in Section 02222.

2.3 INLETS AND CATCH BASINS

A. Lid and frame per details shown on plans.

B. Catch basin and inlet structures shall be in accordance with Section 02605.

C. The location of catch basins shall be accurately located by a registered land surveyor. Catch basins shall be located as follows:

1. Edge of frame 6" off face of curb where shown near sloped granite or bituminous concrete curblines.

2. The center of aisle of parking modules when shown on plans.

3. In other cases, verify with Engineer.

PART 3 - EXECUTION

3.1 EXAMINATION

Verify that trench cut and excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on civil engineering drawings.

3.2 INSTALLATION - STORM DRAINS

A. The pipe shall be accurately laid to the line and grades to the satisfaction of the Engineer. The line and grade may be adjusted by the Engineer from that shown on the Drawings to meet field conditions and no extra compensation shall be claimed therefore.

The Owner or his representative reserves the right to check the elevations and alignment on any pipe for conformance with proposed line and grade. Installed grades shall be within the tolerance of plus or minus 0.02 feet from theoretical computed grades. Alignment shall be within a tolerance of plus or minus 0.04 feet. Pipe grade shall be defined as the invert elevation of the pipe. Pipe not meeting the grade tolerance or of poor alignment shall be adjusted by the Contractor.

B. No pipe laying will be allowed to begin at any point other than a manhole or other appurtenance without the expressed consent of the Engineer. The interior of each length of pipe will be swabbed and wiped clean before laying the next length. No length of pipe shall be laid until the previous length has had sufficient fine material placed and tamped about it to secure it firmly in place to prevent any disturbance. Bell ends shall be laid uphill. Whenever the work is stopped temporarily, or for any reason whatsoever, the end of the pipe shall be carefully protected against dirt, water, or other extraneous material. Bedding shall be as shown on the Plans.

C. The pipe shall be cut as necessary for appurtenances. In general, the pipe material shall be cut by using a saw or milling process, approved by the pipe manufacturer and not by using any impact device, such as a hammer and chisel, to break the pipe. The pipe shall be cut, not broken. The cut end of the pipe shall be square to the axis of the pipe and any rough edges ground smooth.

D. Clean interior of all pipe thoroughly before installation. When work is not in progress, open ends of pipe shall be closed securely, in a manner approved by the Engineer, to prevent entrance of trench water, dirt, or other substances.

E. All joints shall be made in a dry trench in accordance with the manufacturer's recommendations.

F. A minimum of two (2) pipe lengths or pipe stubs shall be used between any two (2) appurtenances.

G. When connections are made between new work and existing piping, make connection using suitable fittings for conditions encountered. Make each connection with existing pipe at time and under conditions which least interfere with operation of existing pipeline service. Provide facilities for dewatering and for disposal of water removed from dewatering lines and excavations without damage to adjacent properties.

3.3 INSTALLATION-UNDERDRAIN SYSTEM

A. Pipe Laying: Underdrain system pipe laying shall comply with the requirements of pipe laying described above under "Installation - Storm Drains."

B. The underdrain pipe shall be installed with holes facing up unless otherwise noted on the plans.

C. Filter fabric shall be used around all underdrains. The filter fabric shall completely encapsulate the piping and a bedding and backfill of 3/4 inch crushed stone. The use of fabric sleeves for underdrains without stone shall not be permitted.

D. The work of this section includes the installation of the building underdrains and outfall.

SECTION 02730 – SANITARY SEWER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

Furnish labor, materials, services, equipment, and other necessary items required for accompanying the construction of the sanitary systems. This shall include, but not be limited to, the following:

Sanitary sewer drainage piping, Fitting and Accessories, Cleanouts, and Bedding.

Set lines, elevations, and grades for sanitary sewer system work and control system for duration of work, including careful maintenance of benchmarks, property corners, monuments, or other reference points.

Provide sanitary sewer systems for wastewater only. Do not connect foundation drains, roof leaders, or other "illicit forms".

1.2 RELATED SECTIONS

A. Section 02222 - Excavation, Backfilling, and Compacting for Utilities.

B. Section 02605 - Sewer and Catch Basin Structures.

C. Construction Drawings.

D. Local governing authority and code requirements.

E. All necessary construction permits.

The public utility for the sewer is the City of Portland Public Works Department. The existing sanitary sewer trunk line within the site is the responsibility of the Portland Water District. All materials, installation, and workmanship will comply with the requirements specified in this section, the requirements of the City of Portland Public Works Department and the requirements of the Portland Water District. Where a more stringent standard exists, the more stringent standard shall apply.

1.3 REFERENCE

A. ANSI/ASTM A74 - Cast Iron Soil Pipe and Fittings.

B. ANSI/ASTM C14 - Concrete Sewer, Storm Drain, and Culvert Pipe.

C. ANSI/ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

D. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb. (2.49 kg) Rammer and 12 inch (304.8 mm) Drop.

E. ANSI/ASTM D3034 - Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

F. ASTM A746 - Ductile Iron Gravity Sewer Pipe.

G. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

H. ASTM D1785 - Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

I. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

J. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

1.4 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.5 SUBMITTALS

A. Product Data: Provide catalog materials indicating pipe, pipe accessories, and fittings.

B. Manufacturer's Installation Instructions: Indicate special procedures required to install products specified.

C. Manufacturer's Certificate: Certify that products meet or exceed ASTM designations.

1.6 COORDINATION

A. Coordinate the work with termination of the sanitary sewer connection outside building, connection to municipal sewer utility service, and trenching.

PART 2 - PRODUCTS

2.1 SEWER PIPE MATERIALS

A. Polyvinyl Chloride Sanitary Sewer:

1. Pipe and fittings shall comply with ASTM D 3034, rated SDR 35. Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM D 3034 classification.

2. Pipe joints shall be integrally molded bell ends per ASTM D 3034, Table 2, with factory supplied elastomeric gaskets and lubricant.

3. Corrugated Polyvinyl Chloride sewer pipe and fittings shall comply with ASTM F 949. Pipe must be marked with manufacturers name, pipe size, cell classification and ASTM F 949. Pipe must be marked with manufacturer's name, pipe size, cell classification and ASTM F 949 Classification. Pipe must be installed per the manufacturer's installation requirements. Acceptable manufacturer: CONTECH, INC. "A-2000" PVC sewer pipe or Owner-approved equivalent.

B. Ductile Iron Sanitary Sewer: Pipe and fittings shall comply with requirements of ductile iron pipe described under "Section 02660, Water Distribution Systems."

C. Polyvinyl Chloride Pressure Sewer:

1. Pipe and fittings shall comply with ASTM D 2241, rated SDR 18 or ASTM D1784 and shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM D 2241 or D1784 classification.

2. Joints shall be integral gasketed joints formed on a continuous pipe length, utilizing elastomeric seal such as "Ring Tite" as manufactured by Johns Manville Company.

D. Manholes (Refer to Section 02605).

2.2 CLEANOUTS

A. Lid and Frame: Heavy duty cast iron construction, manufactured by Mueller.

B. Shaft Construction: Cast iron shaft of internal diameter as specified on plans with 2,500 psi concrete collar for cleanouts located in paved areas.

C. Base Pad: Cast-in-place concrete, 2,500 psi leveled top surface to receive cast iron shaft sections, sleeved to receive sanitary sewer pipe sections.

2.3 PIPE AND VALVING ASSOCIATED WITH STRUCTURES

A. All pipe and valving shall be cast/ductile iron with 125 lb ANSI standard flanges.

B. All pipe to be cement lined.

C. Air and vacuum valve shall be Crispir Model A141.

D. Paint any piping inside special appurtenances with epoxy paint in accordance with 10 state standards and/or TR-16 manual "Guides for the Design of Wastewater Treatment Works."

PART 3 - EXECUTION

3.1 INSTALLATION - GRAVITY AND PRESSURE SEWERS

A. Pipe Laying: Gravity and pressure sewer pipe laying shall comply with the requirements of pipe laying described under "Storm Sewer System" Section 02720.

B. All service leads shall have a temporary cap placed to permit testing as outlined in Part 4 of this specification.

C. All service leads shall have cleanouts installed in accordance with Part 1 of the State Plumbing Code.

PART 4 - FIELD QUALITY CONTROL

4.1 TESTING OF SANITARY SEWER SYSTEM (GRAVITY MAIN)

A. Testing of a section of sewer between manholes shall be performed using the below stated equipment according to stated procedures and under the supervision of the Owner's representative.

1. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.

2. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.

3. All air used shall pass through a single control panel.

4. Three (3) individual hoses shall be used for the following connections:

a. From control panel to pneumatic plugs for inflation.

b. From control panel to sealed line for introducing the low pressure air.

c. From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

Procedures: All pneumatic plugs shall be seal tested before being used in the actual test installation. One (1) length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psig. The sealed pipe shall be pressurized to 5 psig. The plugs shall hold against the pressure without bracing and without movement of the plugs out of the pipe.

After a manhole to manhole reach of pipe has been backfilled and cleaned, and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 25 psig. Low pressure reaches 4 psig greater than the average back pressure of any ground water that may be over the pipe. At least two minutes shall be allowed for the air pressure to stabilize.

After the stabilization period (3.5 psig minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of line being tested shall be termed "acceptable" if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time shown for the given diameters in the following table:

Diameter (inches)	Minimum Allowable Pipe Minutes to Decrease from 3.5 - 2.5 psig Pressure In
4	2.0
6	3.0
8	4.0
10	5.0
12	6.0
15	7.5
18	9.0
21	10.5

B. In areas where ground water is known to exist, the Contractor shall install a one-half (1/2) inch diameter capped pipe nipple, approximately ten (10) inches long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the Line Acceptance Test, the ground water shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the nipple.

The hose shall be held vertically, and a measurement of the height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11-1/2 feet, then the added pressure will be 5 psig, and the 2.5 psig to 7.5 psig. The allowable drop of one pound and the timing remain the same.)

C. If installation fails to meet the above requirements for the air test, the Contractor shall correct the pipeline until an acceptable test is achieved.

D. The Contractor shall provide as required the proper plugs, weirs, and other equipment required to perform all tests. Testing of each section of sewer installed shall include the portions of service connections that are to be installed under the Contract.

E. Where ground water is confirmed to be high, the Engineer at his option may elect to accept infiltration measurements in lieu of air testing.

F. These tests shall be conducted at all times in the presence of the Engineer. Should a line which has previously been tested indicate any water infiltration, or otherwise appear suspect to the Engineer, the Contractor shall conduct confirmation air tests on the line at no additional costs.

4.2 DEFLECTION TESTING

A. Deflection tests shall be performed on all flexible pipe. The test shall be conducted after the final backfill has been in place at least 30 days.

B. No pipe shall exceed a deflection of 5 percent.

C. If the deflection test is to be run using a right ball or mandrel, it shall have a diameter equal to 95 percent of the inside diameter of the pipe. The test shall be performed without mechanical pulling devices.

SECTION 02831 – SITEWORK CHAIN LINK FENCING AND GATES

PART 1 – GENERAL

1.01 SUMMARY

A. Provide vinyl or galvanize coated chain link fences and gate units controlled by single source including erection accessories, fittings, and fastenings. Refer to Drawings for when either type is required.

B. Provide high wire mesh fence including erection accessories, fittings and fastenings of the height indicated on the Drawings.

1.02 RELATED SECTIONS

A. Construction Drawings.

B. Manufacturer's technical data and installation requirements.

1.03 REFERENCES

A. ANSI/ASTM A123 –Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products

B. ANSI/ASTM F567 – Installation of Chain-Link Fence

C. ASTM A116 – Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric

D. ASTM A120 – Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized) Welded and seamless, for Ordinary Uses

E. ASTM A121 – Zinc-Coated (Galvanized) Steel Barbed Wire

F. ASTM A153 – Zinc Coating (Hot-Dip) on Iron and Steel Hardware

G. ASTM A392 – Zinc-Coated Steel Chain-Link Fence Fabric

H. ASTM A428 – Weight of Coating on Aluminum-Coated Iron or Steel Articles

I. ASTM A491 – Aluminum-Coated Steel Chain Link Fence Fabric

J. ASTM C569 – Steel, Carbon (0.15) Maximum Percent), Hot-Rolled Sheet and Strip Commercial Quality

K. ASTM C585 – Aluminum Coated Steel Barbed Wire

L. ASTM C94 – Ready Mixed Concrete

M. ASTM F573 – Residential Zinc-Coated Steel Chain Link Fence Fabric

N. ASTM F668 – Poly (Vinyl Chloride) (PVC) Coated Steel Chain Link Fence Fabric

O. Chain Link Fence Manufacturers Institute (CLFMI) – Product Manual

P. FS FF-F-191 – Fencing Wire and Post Metal (and Gates, Chain Link Fence Fabric, and Accessories)

1.04 SUBMITTALS

A. Contractor shall submit catalog cut sheets of all fencing products proposed for use.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following:

1. Allied Tube and Conduit Corporation

2. Anchor Fence, Inc.

3. United States Steel

4. Acme Fence Company

2.02 MATERIALS

The following materials shall be provided. Unless shown otherwise on the Contract Drawings, use galvanized finishes. If shown on the drawing as vinyl coated, supply all components with vinyl coating.

A. Fabric

1. No. 9 ga. (0.148" ± 0.005") finished size galvanized steel wires, 2" mesh, with both top and bottom salvages twisted and knuckled finish with a black vinyl coating.

2. Furnish one-piece fabric widths for fencing.

B. End, Corner, and Pull Posts: Galvanized steel, with exposed portions finished with a black vinyl coating, minimum sizes and weights as follows:

1. Up to 4'-0" Fabric Height: 2.375" OD pipe, 3.65 lbs./lin. ft., or 3.5" x 3.5" roll-formed sections, 4.85 lbs./lin. ft.

2. Over 4'-0" Fabric Height: 2.875" OD pipe, 5.79 lbs./lin. ft., or 3.5" x 3.5" roll-formed sections, 4.85 lbs./lin. ft.

C. Line Posts: Galvanized steel, with exposed portions finished with a black vinyl coating, minimum sizes and weights as follows:

1. Up to 4'-0" Fabric Height: 1.90" OD steel pipe, 2.70 lbs./lin. ft., or 1.875" x 1.625" C-sections, 2.28 lbs./lin. ft.

2. 4'-0" to 8'-0" Fabric Height: 2.375" OD steel pipe, 3.65 lbs./lin. ft., or 2.25" x 1.875" H-sections 2.64 lbs./lin. ft.

3. Over 8'-0" Fabric Height: 2.875" OD steel pipe, 5.79 lbs./lin. ft. or 2.25" x 1.875" H-sections, 3.26 lbs./lin. ft.

D. Gate Posts: Galvanized steel, with exposed portions finished with a black vinyl coating, posts for supporting single gate leaf, or one leaf of double gate installation, for nominal gate widths as follows:

1. Up to 4'-0": 3.5" x 3.5" roll-formed section, 2.85 lbs./lin. ft., or 2.875" OD pipe, 5.79 lbs./lin. ft.

2. Over 4'-0" to 13'-0": 4.000" OD pipe, 9.11 lbs./lin. ft.

E. Top Rail: Rails: 1.66" OD pipe, 2.27 lbs./ft. or 1.625" x 1.25" roll-formed sections, 1.35 lbs./Ft.; galvanized steel, with exposed portions finished with a black vinyl coating, manufacturer's longest lengths.

F. Couplings: Expansion type, approximately 6" long, for each joint.

G. Attaching Devices: Provide means for attaching top rail securely to each gate corner, pull and end post.

H. Sleeves: Galvanized steel with exposed portions finished with a black vinyl coating pipe not less than 6" long and with inside diameter not less than ½" greater than outside diameter of pipe. Provide steel plate closure welded to bottom of sleeve of width and length not less than 1" greater than outside diameter of sleeve.

I. Tension Wire: 7 gauge galvanized steel, coated coil spring wire, located at bottom of fabric.

J. Wire Ties: 11 gauge galvanized steel.

K. Post Brace Assembly: Manufacturer's standard adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375" diameter rod and adjustable tightener.

L. Post Tops: Galvanized steel, with exposed portions finished with a black vinyl coating, weathertight closure cap for each tubular post. Furnish caps with openings to permit passage of top rail.

M. Stretcher Bars: Galvanized steel, with exposed portions finished with a black vinyl coating, one piece lengths equal to full height of fabric, with minimum cross-section of 3/16" x ¾". Provide one stretch bar for each gate and end post, and two for each corner and pull post.

N. Stretch Bar Bands: Manufacturer's standard.

O. Gate Cross-bracing: 3/8" diameter galvanized steel adjustable length truss rods.

P. Portland Cement: ASTM C150.

Q. Aggregates: ASTM C33.

R. Water: Clean.

S. Non-shrink non-Metallic Grout: Premixed, factory-packaged, noncorrosive, nonstaining, nongaseous, exterior grout complying with CE CRD-C621.

T. Swinging Gate Hardware

1. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180 degree gate opening. Provide 1-1/2" pair of hinges for each leaf up to 6'-0" nominal height. Add hinges for each 2' nominal height increase.

2. Latch: Forked type of plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.

U. Double Gates Hardware: Provide gate stops for double gates, consisting of mushroom type of flush plate with anchors set in concrete, to engage center drop rod or plunger bar. Include locking device and padlock eye as integral part of latch, using one padlock for locking both gate leaves.

V. Sliding Gate Hardware: Provide manufacturer's standard heavy-duty track, ball-bearing hanger sheaves, overhead framing and support, guides, stays, bracing, and accessories as required.

W. Solid Slats: All solid slates for chain link fencing shall be aluminum and match the color of the chain link mesh vinyl coating. Provide only where required by Contract Drawings.

X. Wire Mesh Fence: Provide galvanized field fencing with 9 ga. Top and bottom wire, 11 ga. Filler wires and stay wires at 12" o.c.

PART 3 – EXECUTION

3.01 GATE FABRICATION

A. Fabricate swing gate perimeter frames of 1.90" or 2.375" OD pipe, galvanized steel as specified on the drawings. Provide horizontal and vertical members to ensure proper gate operation and for attachment of fabric, hardware, and accessories. Space frame members maximum of 8'-0" apart.

B. Assemble gate frames by welding or special fittings and rivets, for rigid connections. Install same fabric as for fence with stretcher bars at vertical edges. Install diagonal cross-bracing on gates as required to ensure rigid frame without sag or twist. Bars may be used at top and bottom edges. Attach stretchers to gate frame at 15" o.c. maximum.

C. Attach hardware to provide security against removal or breakage.

3.02 FINISH

A. Fabric Finish: Galvanized, ASTM A382, Class I, with not less than 1.2 oz. zinc/sq. ft. of surface.

B. Framing: Galvanized steel, ASTM A120 or A123, with not less than 1.8 oz. zinc/sq. ft. of surface.

C. Hardware and Accessories: Galvanized, ASTM A153 with zinc weights in accordance with Table I.

3.03 CONCRETE MIXING

Mix materials to obtain concrete with minimum 28-day compressive strength of 2,500 psi; 1" maximum size aggregate, maximum 3" slump, and 2-4% entrained air.

3.04 INSTALLATION

A. Comply with recommended procedures and instructions of fencing manufacturer. Provide secure, aligned installation with line posts spaced at 10'-0" o.c. maximum.

B. Grade Set Posts: Drill or hand excavate using post hole digger in firm undisturbed or compacted soil.

C. Excavate hole for each post to minimum diameter recommended by fence manufacturer but not less than four times largest cross-section of post. Excavate hole depths approximately 3" lower than post bottom with bottom of posts set not less than 72" below finish grade surface.

D. Center and align posts in holes 3" above bottom of excavation.

E. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations. Extend concrete footing 2" above grade and trowel to crown to shed water.

F. Sleeve Set Posts: Anchor posts by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with nonshrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.

G. Top Rails: Run rail continuously, bending to form radius for curved runs. Provide expansion couplings as recommended by manufacturer.

H. Center Rails: Provide center rails where indicated. Install in one piece between posts and flush with post on fabric side, using special offset fittings where necessary.

I. Brace Assemblies: Install braces so posts are plumb when diagonal rod is under proper tension.

J. Tension Wire: Install tension wires through post cap loops before stretching fabric and tie to each post cap with not less than 6 ga. galvanized wire. Fasten fabric to tension wire using 11 ga. galvanized steel hog rings spaced 24" o.c.

K. Fabric: Leave approximately 3/4" between finish grade and bottom salvage. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

L. Stretcher Bars: Secure at end, corner, pull, and gate posts by threading through or clamping to fabric at 4" o.c., and secure to posts with metal bands spaced at 15" o.c.

M. Tie Wires

1. Use U-shaped wire, conforming with diameter of pipe to which attached, clasping pipe and fabric firmly when ends twisted at least two full turns. Bend ends of wire to minimize hazard to persons or clothing.

2. Tie fabric to line posts with wire ties spaced 12" o.c. Tie fabric to rails and braces with wire ties spaced 24" o.c. Tie fabric to tension wires with hog rings spaced 24" o.c.

3. Manufacturer's standard procedure will be accepted if of equal strength and durability.

N. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

O. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubrication.

SECTION 02846 – SIGNAGE

PART 1 - GENERAL

1.1 SECTION INCLUDES

Provide traffic control signs complying with U.S. Department of Transportation, Federal Highway Administration's "Manual on Uniform on Traffic Control Devices" (MUTCD), local codes, and as specified. See Drawings for type, location, and quantity of signs required.

1.2 RELATED REQUIREMENTS

A. Construction Drawings.

B. Manufacturer's Mounting Instructions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. Signs to meet FHWA requirements NCHRP 350 certification, engineer grade reflective.

B. Provide submittal information for all signs, colors, dimension, lettering, proposed mounting heights, mounting hardware, and posts to the Owner for review and approval prior to installation.

C. Posts galvanized steel meeting the Standards of MDOT.

2.2 SIGNS

To be backed with tan or light brown Dubond at Owner's option or shown on the plans.

To be painted with reflective baked-enamel finish with following colors:

A. "STOP" Signs: (R1-1) 24"x24", Octagon, reflectorized copy and border.

B. "SPEED LIMIT" Signs: (R2-1) 18"x24", black legend on white background.

C. "HANDICAPPED SYMBOL" Signs: (R7-Series) 18"x24", white legend on blue background.

D. "NO PARKING, FIRE LANE" Signs: (R7-Series) 12"x18", red letters on white background.

E. "KEEP RIGHT" signs: (R4-7a) 18"x24", black letters and symbol on white background.

F. "DO NOT ENTER" Signs: (R5-1) Highway Dept. standard red and white sign except 24"x24" size.

G. "PEDESTRIAN CROSSING WHEN FLASHING" signs (W Series) black letters on yellow background.

H. Miscellaneous Signs: Size and letters per Manual on Uniform Traffic Control Device recommendations. Overall dimensions shown on the contract drawings.

2.3 POSTS

Posts shall be galvanized steel "U" channel post and galvanized steel mounting hardware meeting the requirements of the MDOT specifications.

PART 3 - EXECUTION

Prior to installation, the Owner and the Owner's representative shall review the location for each sign. The Owner reserves the right to alter the sign locations.

All signs in pedestrian areas shall be mounted with the bottom of the sign set the minimum height at above finish grade permitted by MUTCD. Signs in non-pedestrian areas shall be mounted with the bottom of the sign set the minimum height above finish grade. Set posts vertical and plumb as shown in the plans. Mount signs in accordance with manufacturer's instructions. Check mounting height, replace any posts which are not installed plumb.

Install weed control collar when signs are installed in turf areas.

SECTION 02800 - SITE IMPROVEMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Bollards
2. Bicycle racks
3. Benches
4. Site identification sign
5. Granite edging
6. Tree grates
7. Bridges
8. Aluminum edging and stone mulch
9. Trash receptacles
10. Tree pit drains and aeration sheets

1.3 SUBMITTALS

A. Product Data: For each item specified.

B. Samples: Manufacturer's color charts showing the full range of colors available for units indicated.

C. Shop Drawings:
1. Fully engineered design prepared by qualified and licensed professional engineer for precast concrete segmental unit retaining wall.
2. Pond aeration fountain, level control, and well pump, prepared by qualified installer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect units during storage and construction against soiling or contamination from earth and other materials.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Products: Provide the following:
   1. Bollards: Precast concrete; 36" height, 5000 psi, reinforced, with light sand-blast finish.
   2. Bicycle racks: "Ribbon Rack", RB-09, Schedule 40 TP 304 stainless steel (ASTM A312); available from AAA Ribbon Rack Co., Division of Brandir International, Inc., New York, NY (1-800-849-3488), or approved equal. Finish to be satin # 4. Mounting to be standard in-ground.
   3. Benches:
      a. In building areas: Esplanade Series, Model ES-3, surface mount, color from standard manufacturer's range. FairWeather Site Furnishings, Port Orchard, Washington. 1-800-323-7198.
      b. Along pond path and in North Open Space: Landscape Series, Model L-2 with Ipe, permanent embed mount. FairWeather Site Furnishings, Port Orchard, Washington. 1-800-323-7198.
   4. Site identification: Main site identification sign to be metal panel on concrete base. See Division 10 SPECIALTIES.
   5. Granite edging: 4" x 12" section. See 02513 CURBING.
   6. Tree grates: R-8706 180 degree Square. Neenah Foundry Co., Neenah, WI. 1-414-725-7000.
   7. Bridges: 6-foot wide, prefabricated wood with cast-in-place concrete footings at ends (length approximately 30 feet) and handrails. Echo Bridge, Inc.; Pine City, NY. 1-888-327-4343.
   8. Aluminum edging and stone mulch:
      a. Edge material to be aluminum, 6063 alloy, T-6 hardness. Size 3/16" X 4" with 4" offset interlocking snap connection system. Minimum wall thickness to be 0.110". Sections to be 16' min., with loops for stakes at 2' o.c. Stakes to be aluminum, 6061 alloy, T-6 hardness. Color and surface to be mill finish. Provide as manufactured by Permaloc Corporation, or equal
      b. Stone mulch to be rounded river stone, 2"-3" diameter max. to ¾" diameter min., washed and free from all foreign and organic material. Accent boulders to be 2'-3' diameter and approved by Landscape Architect.
   9. Trash receptacles: Esplanade Series Accessories Model TR-8 with spun steel top, surface mount, color from standard manufacturer's range. FairWeather Site Furnishings, Port Orchard, Washington. 1-800-323-7198.
   10. Tree pit drains and aeration sheets:
      a. Tree pit drains: "Spee-D-Basin" NDS #100, with 6-inch plastic riser and plastic grate NDS #40 (black). National Diversified Sales, Newbury Park, CA. 1-800-235-3533.

b. Aeration sheets: "Awkwadrain 112" and plastic end connector. American Wick Drain, Matthews, NC. 1-800-242-9425.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install all items per manufacturers recommendations and as shown on the drawings.

END OF SECTION 02800