Contents

200 DESCRIPTION

This section defines the construction standards for earthwork and grading specifications to be used when completing earthwork including but not limited to clearing, grubbing, excavating, and embankment backfill within the limits of control for the Town.

201 GENERAL PROVISIONS

1. All earthwork operations shall be executed in a manner which will minimize dust, noise, excessive accumulation of debris, danger to the public, and interference with other construction. Positive drainage and adequate erosion control shall be provided at all times during the earthwork operations.

2. Upon completion of earthwork operations, the Contractor shall leave the site and soil clean to allow for proper installation of irrigation, plantings, and related site improvements. Completed grades shall be smooth and uniformly sloped, properly compacted, and provide proper drainage away from site improvements. All banks or slopes shall be maintained in a stable condition by approved methods to prevent slips, washouts, or erosion.

3. It is the Contractor's responsibility to be cognizant of and to apply for the necessary Federal, State, or Local permits including but not limited to stormwater management, flood control, dust control, construction dewatering, and grading.

202 DESIGN CRITERIA

1. Prior to the commencement of grading, a Geotechnical Engineer shall be retained by the Contractor for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Geotechnical Engineer shall provide adequate testing and observation services so that they may determine that, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist their Geotechnical Engineer and keep him apprised of work schedules and changes so that personnel may be scheduled accordingly.

2. It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Town Engineer or Town representative, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, adverse weather, and so forth, result or will result in quality of work not in conformance with these specifications, the Town may reject the work.

203 CLEARING, STRIPPING AND GRUBBING

203.01 General

1. Areas to be excavated and filled shall first be cleared, stripped and grubbed. **Clearing** shall consist of complete removal above the ground surface of trees, stumps, brush, bushes, man-made structures and similar debris. **Stripping** shall consist of removal of all weeds, grasses, topsoil, organic soil or other vegetation not removed during clearing operations. **Grubbing** shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1-1/2-inches in diameter shall be removed to a depth of 3-feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials. Frozen materials shall be removed and stockpiled until thawed.

203.02 Construction Methods

1. Any asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility. Concrete fragments that do not contain steel reinforcement may be placed in fills, provided they are placed in accordance with Section 208 in these Standards and Specifications.

2. Unless specifically designated to be saved and marked as such, all trees, stumps, brush, windfalls, logs and other objectionable matter located within clearing limits shall be marked, cut off and disposed of.

3. Topsoil should be stockpiled for future use in revegetating exposed slopes or in back lots where they will not affect the overall structural integrity of slopes or other settlement sensitive structures.

4. Strippings and topsoil shall not be used in structural fills or structural fill areas. Strippings and topsoil may be placed in landscape berms, detention pond areas, open space areas, parks, greenbelts, and along back of lots (i.e. rear lot lines) as approved by the Town Engineer.

5. After clearing, stripping and grubbing operations are complete, soft surficial soils, unstable soils, loose or porous soils, collapsible soils, or highly expansive soils shall be removed to the depth recommended in the approved Geotechnical Report. The depth of removal shall be observed and approved by the Contractor's Geotechnical Engineer. The subgrade surface exposed after removal of the unsuitable material shall then be plowed, ripped, or scarified to a minimum depth of 6-inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

6. The refuse resulting from the clearing operation shall be hauled to a licensed waste site and shall be disposed of in such a manner as to meet all requirements of

Federal, State, County, and Municipal regulations regarding health, safety, and public welfare.

7. In no case shall the Contractor use burning as a method of clearing or disposal.

8. In no case shall any material be left on the project, placed onto abutting properties, or be buried in embankments or trenches on the project.

9. The Contractor shall avoid as far as practicable, injury to trees, shrubbery, vines, plants, grasses and other vegetation growing on areas outside of the grading area, on parking islands or adjacent lots. If damage does occur the contractor is solely responsible for repair or replacement, in original or better condition, as directed by the Town Engineer or Special District at no additional cost to the town.

204 DEMOLITION AND REMOVAL OF STRUCTURES AND OBSTRUCTIONS

204.01 General

1. The Contractor will remove and satisfactorily dispose of all foundations, signs, structures, fences, old pavements, abandoned pipelines, traffic signal material and any other obstruction not designated to remain, except for utilities and those items for which other provisions have been made for removal.

2. Materials used in detour structures, supplied by the Contractor, will be the property of the Contractor. After the detour is abandoned, the Contractor will completely remove the detour structure and dispose of materials according to these Standards and Specifications.

3. Existing improvements, adjacent property, utilities, trees, and plants that are not to be removed shall be protected from injury or damage resulting from the Contractor's operations. If damage should occur, the Contractor shall make repair such that damaged materials are restored in original or better condition, as directed by the Town Engineer.

4. Immediately following demolition and removal of rubbish from the site, provided additional work is not required, the Contractor shall grade the area by filling, compacting, and leveling the site to existing adjacent grades, and implement erosion control devices in accordance with these Standards and Specifications and the approved construction documents.

204.02 Underground Obstructions and Protection of Utilities

1. The Contractor shall notify Colorado 811 and contact each utility owner and request utilities to be located at least 48-hours prior to any earthwork. The Contractor shall

verify all drawings of record and information obtained from the Town or other affected utility company.

2. In situations where conflicts may exist, the Contractor shall expose and verify the size, location, and elevation of underground utilities and other obstructions sufficiently in advance of construction to permit changes to be made to the construction drawings.

3. In the case of a conflict the Contractor shall notify the Town and the affected utility company. The proposed work will be modified by the Design Engineer subject to the Town Engineer's approval.

4. The Contractor shall protect sewer, water, gas, electric, phone, other pipelines, fiber optics, or conduits uncovered during the work.

5. If such lines are found to be abandoned and not in use after examination by the Town Engineer and the utility owner, the Contractor shall remove utilities interfering with the work at the Contractor's expense. If such lines are found to be in use, the Contractor shall carefully protect and carry on work around them.

6. Existing improvements, adjacent property, utilities, trees, and plants that are not to be removed shall be protected from injury or damage as a result of the contractor's operations. If damage should occur, the contractor shall make repair such that damaged materials are restored in original or better condition, as directed by the Public Works Director/Town Engineer, utility or property owner in question.

7. If the Contractor removes any underground obstructions, the following shall apply:

   a. Drainage culverts may be salvaged, stored, and reused in the original location if written approval is obtained from the Town Engineer. All other underground obstructions shall be replaced with new materials.

   b. The area in which the underground obstruction was located shall be restored to original or better condition as defined above.

204.03 Salvage

All salvageable material will be clearly marked by the Town and shall be removed, without unnecessary damage, in sections or pieces which may be readily transported and will be stored in locations approved by the Town Engineer. These materials may include but shall not be limited to, manhole frames and covers, inlet grates, fence material, handrails, culverts, guardrails, roadway and parking appurtenances (traffic signals and attached hardware), including mast arms and span wire.

204.04 Disposal

Contractor to furnish written permission from the disposal facility.

204.05 Remaining Portions of Structures

1. Where portions of structures are to be removed, the remaining parts will be prepared to fit new construction. The work will be done in accordance with plan details and materials left in place will be protected from damage. All damage to portions that are to remain in place will be repaired by the Contractor at their expense. Reinforcing steel projecting from the remaining structure will be cleaned and aligned to provide bond with the new extension. Dowels are to be securely grouted with approved grout.

204.06 Bridges, Culverts, and Other Drainage Structures

1 Bridges, culverts, and other drainage structures located under active roadways shall not be removed until a Traffic Control Plan has been approved by the Town Engineer in accordance with Section 1300, Traffic Control, of these Standards and Specifications.

2. Unless otherwise directed the substructures of existing structures shall be removed down to one foot below natural stream bottom or ground surface. Where such portions of existing structures lie wholly or in part within the limits of the one structure, they shall be removed as necessary to accommodate the construction of the proposed structure. Steel, precast concrete and wood bridges will be carefully dismantled without unnecessary damage. Steel members shall be match-marked with waterproof paint.

3. Where culverts are to be left in place or plugged, the ends shall be filled with flowable backfill in accordance with Section 300, Concrete, of these Standards and Specifications. Culvert ends are to be sufficiently filled to prevent future settlement of embankments.

204.07 Pipe

1. Unless otherwise specified all pipe shall be carefully removed and cleaned, and every precaution will be taken to avoid breaking or damaging the pipe.

2. When removing manholes, catch basins, and inlets, any live sewer connected with these items shall be properly reconnected, and a satisfactory bypass service will be maintained during such operations.

204.08 Pavements, Sidewalks, Curbs, Etc.

All concrete or asphalt that is to remain shall have a straight, true line with a vertical face. Concrete or asphalt may be cut with a cutting wheel, jackhammer, or saw. If the Contractor cannot maintain a straight, true break line by other means, sawing shall be used. The

sawing shall be done carefully and all damages to the concrete or asphalt to remain in place shall be repaired at the Contractor's expense.

205 SCARIFYING THE AREA TO BE FILLED

1. All vegetation and frozen material shall be removed from the surface upon which the fill is to be placed and the surface shall then be plowed, ripped, or scarified to a depth of at least 6-inches, and smoothed until the surface is free from ruts, hummocks or other uneven features which would tend to prevent uniform compaction by the equipment to be used.

2. Where fills are made on hillsides or slopes, the slope of the original ground upon which the fill is to be placed shall be plowed or scarified per the approved Soils Report, or where the slope ratio of the original ground is steeper than 5 horizontal to 1 vertical feet, the bank shall be stepped or benched. Ground slopes that are flatter than 5 to 1 shall be benched when considered necessary as directed by the Geotechnical Engineer or the Town Engineer.

206 MAINTAINENCE OF SUBGRADE AND DRAINAGE

1. It shall be the responsibility of the Contractor to pump or bail out water from excavations, whether rain or groundwater. Excavations must be kept free of water at all times. All required permits should be obtained and kept current.

2. It shall be the responsibility of the Contractor to take measures and furnish equipment and labor necessary to control the flow, drainage, and accumulation of water as required to permit completion of the work under this Section and to avoid damage to the work.

3. During construction the subgrade shall be maintained in such a condition that it will be well drained at all times. Side ditches or gutters emptying from cuts to embankments shall be constructed as to avoid damage to embankments by erosion. All excavations must be maintained to meet OSHA worker safety requirements. The Town of Frederick is not responsible for the safety of the jobsite.

4. If it is necessary during the course of the work to interrupt existing surface drainage, sewers, or underdrainage, temporary drainage facilities shall be constructed by the Contractor at their expense.

5. Water shall be prevented from entering into previously constructed pipe.

6. Except for storm drains, the pipe under construction shall not be used for dewatering.

207 EXCAVATION

207.01 General

1. "Borrow Excavation" shall consist of excavation made from borrow areas within the project limits and outside the normal grading limits for the completion of embankments. Borrow areas, or areas within the project limits from which the borrow may be obtained, will be designated on the Plans. Borrow excavation shall be made only at those designated locations and within the horizontal and vertical limits as stated or directed. On completion of borrow operations, the borrow area shall be adequately drained and finished to a neat and uniform grade acceptable to the Town Engineer.

2. "Imported Borrow Excavation" shall consist of excavation made from borrow areas outside the project limits and outside the normal grading limits for the completion of the project fills. The Contractor shall provide all erosion control, permits and re-seeding for the Imported Borrow area as required. Borrow areas, or areas outside the project pits from which the imported borrow may be obtain, will be designated. Any source chosen by the Contractor will be subject to the approval of the Town Engineer.

207.02 Trenches

1. Trenches shall be excavated by open-cut methods, except where boring or tunneling is indicated, shown on drawings, or approved by the Town Engineer.

2. Trench width shall be maintained to within 3-inches of that specified on plans.

3. Care shall be used when operating mechanical equipment in locations where it may cause damage to trees, buildings, culverts, or other existing property, utilities, or structures above or below ground.

4. Mechanical equipment shall be designed and operated in such a manner that the bottom elevation of the trench can be controlled with uniform trench widths and vertical sidewalls which extend from the bottom of the trench to an elevation 1-foot the top of the installed pipe.

5. Trench alignment shall be sufficiently accurate to permit pipe to be aligned properly with an 8-inchminimum clearance between the pipe and the sidewalls of the trench. The trench sidewall shall not be undercut in order to obtain clearance.

6. Contractor shall over-excavate a minimum of 6-inches below the bottom of the pipe wherever the trench bottom is rock, shale, or other unsuitable material. Over-excavation shall be backfilled and compacted with acceptable granular material. Granular material shall conform to these Standards and Specifications.

7. Preparation of Trench Bottom:

a. Trench bottoms shall be graded uniformly to provide clearance for each section of pipe.

b. Loose material, water, and foreign objects shall be removed from the trench.

c. The contractor shall provide a firm subgrade which is suitable for application of bedding material.

d. Wherever unstable material is encountered in the bottom of the trench, said material shall be over-excavated to a depth suitable for construction of a stable subgrade. The depth suitable for construction of a stable subgrade shall be determined by the Public Works Director/Town Engineer. The over-excavation shall be backfilled with stabilization material and compacted as required by the Public Works Director/Town Engineer. Stabilization material shall conform to these Standards and Specifications.

8. Stockpiling Excavated Materials:

a. Suitable material for backfilling shall be stockpiled in an orderly manner at a minimum of 4-feet from the edge of the trench.

b. Excess excavated materials not suitable or not required for backfilling shall be removed from the site and disposed.

c. Excavated material shall not be stockpiled against existing structures or appurtenances.

d. Excavated materials containing any hazardous materials shall be disposed of at an approved site in accordance with an abatement plan to be prepared by the developer/engineer or other qualified professional in accordance with all federal, state, and local ordinances.

9. Trenches shall be excavated to a width necessary to provide an 8-inch minimum working space between the pipe and the trench walls for proper pipe installation, joining, and bedding.

10. The maximum trench width at an elevation 12-inches above the top of the installed pipe shall be the pipe diameters of the pipe plus 24-inches, or 30-inches whichever is greater. If the width of the trench, 12-inches above the top of the pipe, exceeds the maximum allowable trench width, a higher strength pipe or special pipe bedding shall be provided as required by soil-loading conditions and as approved by the Public Works Director/Town Engineer.

208 FILL AREAS

208.01 General

Fill shall consist of the construction and placement of miscellaneous backfills, to the lines, grades, dimensions and typical section shown on the plans and/or as designated by the Town Engineer. Placement of fills and subgrades necessary for roadways, utilities, and other structures are discussed in their representative sections.

208.02 Material

1. Fill shall be constructed from suitable material, as per recommendations from the approved soils and geological reports, and taken from the designated excavation in conformity with the lines, grades and cross-sections shown on the plans. Stumps, trees, rubbish, vegetation, frozen lumps, or other unsuitable materials shall not be placed in embankments.

2. Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by applicable local, state or federal laws. The Town is not responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause the Town to suspect the presence of hazardous materials, the Town may require the Owner to terminate grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Town indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3. Representative samples of soil materials to be used for fill shall be tested in a laboratory by a Soils Engineer hired and paid for by the Contractor to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

208.03 Construction Methods

During grading, soil or ground water conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Town and the Geotechnical Engineer hired by the Contractor shall be notified immediately to evaluate the significance of the unanticipated condition.

208.04 Preparation

1. Topsoil shall be stripped from areas which are to be disturbed by construction and stockpiled.

2. Topsoil shall be segregated from non-organic trench excavation material and debris.

208.05 Pipe Bedding

1. Placement and Compaction:

a. Bedding material shall be distributed and graded to provide uniform and continuous support beneath the pipe at all points between bell holes or pipe joints. Pipe shall not be supported by the bells.

b. To prevent lateral displacement, granular bedding material shall be deposited and compacted uniformly and simultaneously on each side of the pipe.

c. Granular bedding material shall be compacted in accordance with these Standards and Specifications.

d. Ground water barriers shall be constructed in such a manner to prevent passage of water through bedding material for the full depth of the granular bedding material and the full width of the trench.

e. Ground water barriers, if shown on the approved construction plans, shall be approximately 4-feet long and spaced not more than 400- feet apart.

f. Material for ground water barriers shall be as specified by the ditch company which controls the irrigation ditch to be crossed. If there is no ditch company, the Public Works Director/Town Engineer shall determine the material to be used.

208.06 Backfilling and Compaction

1. Trenches shall be backfilled promptly after the pipe has been installed and inspected. Backfill around manholes and valve boxes shall be compacted with hand-operated equipment.

2. Backfill material shall be deposited in uniform horizontal layers which may not exceed 6-inches (compacted depth) in all areas. Other thickness may be used with the prior written approval of the Public Works Director/Town Engineer.

3. Methods and equipment which are appropriate for the backfill of material shall be employed. Backfill equipment or backfilling methods which transmit damaging shocks to the pipe shall not be used.

4. Compaction shall not be performed by jetting or water settling.

5. If compaction cannot be obtained with job excavated material, trench backfill material shall be imported.

6. Topsoil shall be replaced to the depth of stripping over all areas which are to receive vegetation.

7. Excess excavated materials and materials not suitable for backfill shall be removed from the site.

208.07 Field Quality Control

1. Field tests will be conducted to determine compliance of compaction methods with specified density in accordance with ASTM D 2922 (Tests for Density of Soil and Soil-Aggregate in Place by Nuclear Methods).

2. Compaction tests shall be performed at a depth of 1.5-feet above the top of the pipe and in 1-foot vertical increments up to the finish grade.

3. Compaction tests shall be performed at least once every 100-linear feet as measured along the length of the pipe.
4. If the Public Works Director/Town Engineer determines that reliable and uniform results are produced by the contractor's construction techniques, the frequency of testing may be changed to one every 200-feet.

5. Compaction shall be to the following minimum densities (reference ASTM D 698 or AASHTO T 99 unless otherwise indicated):

    a. Barrier Material - 95% of Maximum Standard Density.

    b. Pipe Bedding:

        i. Compacted Granular Material - 80% of Maximum Relative Density (ASTM D 2049).

        ii. Carefully Compacted Select Soil - 95% of Maximum Standard Density

        iii. Barrier Material - 95% of Maximum Standard Density

    c. Trench Backfill:

        i. Paved roadways, sidewalks, and other areas - 95% of Maximum Standard Density

        ii. Gravel Roadways - 95% of Maximum Standard Density

        iii. Fields and All Other Areas - 90% of Maximum Standard Density

        iv. Under Footings, Foundations, Structures, 100% of Maximum Standard Density or in Conformance with the Approved Soils Report and Recommendations

    d. Moisture Content:

        i. All compacted backfill shall be within plus or minus 2% of the optimum moisture content of the soil as determined by ASTM D 698.

ii. Water shall be added to the material or the material shall be harrowed, disced, bladed, or otherwise worked to insure a uniform moisture content, as specified.

208.08 Compaction Equipment

Compaction of soil or soil-rock fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of applying sufficient compactive effort to the soil or soil-rock fill to attain the specified relative compaction at the specified moisture content.

208.09 Depth and Mixing of Fill Layers

The selected fill material shall be placed in layers that shall not exceed eight inches loose and when compacted shall not exceed six inches. Each layer shall be spaced evenly and shall be thoroughly mixed during the spreading to insure uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 208.14 of these specifications.

208.10 Fill Moisture Content

Moisture content shall be maintained within the specified percentage deviation from optimum shown in Table 200-01. Optimum moisture content is defined as the moisture content corresponding to the maximum density of a laboratory-compacted sample performed according to ASTM D698. The contractor may be required to add moisture to the backfill material in the excavation if, in the opinion of the Town Engineer, it is not possible to obtain uniform moisture content by adding water to the fill surface. Additionally, the contractor shall not place backfill material which exceeds the maximum moisture content specification unless the material is left to aerate or is uniformly blended with drier material to achieve the specified moisture specification. The moisture content specifications for the groups of soils that may be placed in structural areas are shown on Table 200-01.

208.11 Fill Density

After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction within the range specified for the various soil types specified in Table 200-1. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D698.

208.12 Compaction of Fill Layers

Compaction shall be by sheepsfoot rollers, segmented steel wheeled rollers, pneumatic tired rollers, smooth drum steel rollers, vibratory rollers, or other types of suitable compaction equipment. It is suggested that smooth drum vibratory or pneumatic tire rollers be used for granular soils and sheepsfoot or segmented rollers be used for cohesive soils. Compaction shall be accomplished while the material is at the specified moisture content. Compaction of each layer shall be continuous over its entire area and the compaction equipment shall make sufficient passes to insure that the required density has been obtained.

208.13 Compaction of Slopes

1. Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Properly compacted soil fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3-feet and then cut to the design grade. This procedure is considered preferable to track walking of slopes, as described in the following paragraph.
2. As an alternative to over-building of slopes, slope faces may be back rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or approved similar equipment, such that a dozer track covers all slope surfaces at least twice.

208.14 Oversized Material

1. Rocks larger than 12-inches but less than 4-feet in dimension may be incorporated into the compacted soil fill provided there is sufficient space and the presence of such rock is not likely to adversely impact further development. Rock placement shall be a minimum of 3-feet below the deepest utility or as determined by Town Engineer.

2. Rocks or rock fragments up to 4-feet in dimension may be individually placed. The placing of rock materials greater than 4-feet in dimension shall be evaluated during grading, as specific cases arise and shall be approved by the Town Engineer prior to placement.

3. For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

4. The Town Engineer and the Towns' inspector shall be notified of any oversized material that will be incorporated into compacted fill or otherwise buried underground.

208.15 Density Requirements

The Contractor shall provide moisture conditioning and compaction as required to achieve at a minimum, the recommended density as specified in the soils and geological reports. No separate pay compensation shall be allowed for moisture conditioning and compaction. In addition, all phases of the base construction shall be subject to proof rolling. Areas found to be weak and those areas which have failed shall be ripped, scarified, wetted if necessary and re-compacted to the requirements for density and moisture at the Contractor's expense.

209 FIELD TESTING OF DENSITY AND MOISTURE CONTENT

1. A qualified Geotechnical Engineer or technician under the direct supervision of a Geotechnical Engineer shall make field density and moisture tests of each layer of fill. Sufficient tests will be made to provide a basis for expressing an opinion as to whether the fill material is compacted as specified. The Town Engineer or Town representative will determine the frequency of testing in the field, depending on the conditions encountered. Where sheepsfoot rollers are used, the soils may be disturbed to a depth of several inches. Density tests shall be performed in the compacted materials below any disturbed surface and shall be performed in general accordance with ASTM D1556 and ASTM D2216 with 4 or 6-inch sand cone, or ASTM D2922 and D3917 with nuclear density devices and methods.
2. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked and retested until the specified density has been achieved.

210 FINISHED SLOPES AND ELEVATIONS

The fill operations shall be continued in 6-inch compacted layers as specified above until the fill has been brought to the finished slopes and elevations shown on the accepted plans.

211 SEASONAL LIMITS

1. No fill material shall be placed upon frozen subgrade, nor placed, spread or rolled while it is frozen or thawing or during unfavorable weather conditions. When work is interrupted by heavy rain, snow, or frost penetration, fill operations shall not be resumed until the Town Engineer indicates that the moisture content and density of the previously placed fill are as specified.

2. Embankment which has been subjected to freezing shall be refinished to grade, and compacted after the frost is out of the ground and the embankment is in suitable condition for work. Use of a loose cover lift is acceptable to provide frost protection, provided this loose material is not incorporated into the fill until it has been properly moisture conditioned and compacted to project specifications.

212 PROTECTION OF WORK

1. During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

2. After completion of grading as observed and tested by the Geotechnical Engineer, no further excavation or filling shall be conducted without notifying the Town.

213 SUMMARY OF COMPACTION AND MOISTURE REQUIREMENTS

Table 200-01 - Compaction and Moisture Requirements			
Structural Areas (Beneath Structures, Footings, Pavement, etc.)			
Soil Type	**USCS Classification**	**Minimum Compaction (%)**	**Deviation From Optimum Moisture Content (%)**
Cohesive Soils	CL, CH, SC, GC	95	+1 to +4
	ML, MH	95	-1 to +2
Cohesionless Soils	SP, SM, SW, GP, GW, GM	95	-2 to +2
Common Fill (Landscape Areas)			
All Soils (Topsoil & Strippings)	CL, CH, SC, GC, ML, MH, SP, SM, SW, GP, GW, GM	90	-4 to +4

Notes:
1. The compaction and moisture requirements are based on Standard Proctor Density (ASTM D698).
2. Landscape fill areas do not include back of lots. Landscape areas encompass landscape berms, open space areas, detention areas, etc.
3. For fills greater than 16-feet in depth or height, minimum compaction requirements may need to be increased and will be determined by the Town Engineer.

214 REFERENCES

Standards Referenced in Section 200:	
Standard	**Title**
ASTM D424	Soil Classifications
ASTM D698	Standard Proctor
ASTM D1556	Density and Unit Weight by Sand Cone Method
ASTM D2216	Moisture Content of Soil and Rock by Mass
ASTM D2922	In-Place Density with Nuclear Density Gauge