

April 2014, rev 00

31 2000 – Earthwork

PART 1. - GENERAL

1.01 Regulatory Requirements

- A. Project sizes greater than one acre, the contractor is required to submit a “Notice of Intent for General Permit to Discharge Storm Water Associated with Construction Activities” (NOI)
- B. Storm Water Pollution Prevention Plan
- C. IEMA ten day notification for demolition provisions
- D. IEPA Uncontaminated Soil Certification LPC 663 if material is to be hauled offsite.

1.02 General Considerations

- A. Visit the site and examine all conditions that may affect the scope of work.
- B. Review NIU Environmental Health & Safety (EHS), Contractor Safety Handbook,
http://www.niu.edu/ehs/constructionsafety/Contractor%20Safety%20Handbook_2013.pdf.
- C. Contacting the Illinois Historic Preservation Agency if there is a potential for disruption of historic sites or materials as necessary.
- D. Consider contacting JULIE prior to any subsurface disturbances, as necessary.
- E. Comply with all local ordinances relative to erosion control. The contractor is responsible to obtain any permit required under the National Pollution Discharge Elimination System (NPDES) from the Illinois Environmental Protection Agency, Division of Water Pollution Control.
- F. Take necessary precautions to prevent blocking of sewers, filling of ditches and washing of earth onto existing pavement during heavy rains. After heavy rains promptly cleanup any debris and sedimentations that may have occurred, or might be damaging to sewers, ditches, and pavements.
- G. Topographic and property surveys giving lot size, ground elevations, obstructions on site, locations and depths of sewers, conduits, pipes, existing structures, curbs, pavements, and tracts have been obtained from reliable sources. The accuracy of this data is not guaranteed, and is furnished solely as an accommodation to the

Contractor. Use of this data shall be at the Contractor's discretion. No additional compensation will be granted due to the Contractor's lack of knowledge of site conditions. Prior to bid submission, conduct any additional surveys and soil test you may deem necessary to verify the accuracy of the information provided. Additional surveys and tests made by the Contractor shall be made at no cost to the Owner.

1.03 Work Includes

A. Base Bid:

1. General Contractor provide:

- a. Excavation for exterior ramp and stair foundations.
- b. Preparing and grading subgrades for walks, pavements, and landscaping.
- c. Cut and fill as necessary to provide finish grading at new paved and unpaved areas shown on the drawings.
- d. Removal of excess soils.
- e. Backfilling and compaction.
- f. Subsurface drainage backfill for walls and trenches.
- g. Sub-base course for walks and pavements.
- h. Qualified independent testing agency to provide testing specified herein.

1.04 Related Work

A. Division 31 1000 – Site Clearing

1.05 References

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

1. ASTM D698 - Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb. Rammer and 12" Drop.
2. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
3. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
4. ASTM D2487 - Standard Test Method for Classification of Soils for Engineering Purposes.
5. ASTM D2922 - Standard Test Methods for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

B. State of Illinois Dept of Transportation (IDOT) - Standard Specification for Road and Bridge Construction, latest edition.

C. FS Q-P-166E - Peat Moss; Peat Humus; and Peat Reedsedge.

1.06 Definitions

- A. Excavation: Consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.
- B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below sub-base, drainage fill, or topsoil materials.
- C. Sub-base course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade and surface of a pavement or walk.
- D. Base course: The layer placed between the sub-base and surface pavement in a paving system.
- E. Unauthorized excavation: Consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Architect. Unauthorized excavation, as well as remedial work directed by the Architect, shall be at the Contractor's expense.
- F. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.
- G. Utilities: Include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.07 Submittals

- A. Submit as requested:
 - 1. Test Reports: Submit test reports for all fill materials to be installed below the soil materials and the area of intended use. A separate submittal of test reports is required for each new source of material.
 - 2. Filter fabric: Provide product data and 12" x 12" sample.
 - 3. Test Report on Fill Material: Prior to filling operations, submit an engineering report of the material to be used for fill, which includes a Standard Proctor Compaction Test (ASTM D698) and an engineer's recommendation for proper method of compaction for the fill material to be followed by the contractor during the filling operation.
 - 4. Product Certification: Submit certificates of inspection as may be required by governing authorities to accompany shipments. For standard products submit manufacturer's certified analysis. For other materials submit analysis by a

recognized laboratory, made in accordance with methods established by the Association of Official Agricultural Chemists wherever applicable.

5. Topsoil Analysis Report: Submit soil analysis report for proposed new topsoil.
 - a. Before delivery of topsoil, furnish to the Architect a written statement giving location of properties from which topsoil is to be obtained, names and addresses of Owners, depth to be stripped, and crops grown during past two years.
 - b. Before delivery of topsoil, furnish to the Architect a soil analysis made by an acceptable soil testing laboratory, stating percentages of silt, clay, sand, and organic matter; soil pH; mineral content; and plant nutrient content of topsoil. In soil analysis report, indicate suitability of topsoil for indicated use. If not suitable, state recommended quantities for nitrogen, phosphorus, and potash; and any limestone, aluminum sulfate, or other soil amendments to be added to make topsoil suitable.
6. Testing Agency qualifications.

1.08 Quality Assurance

- A. Perform excavation work in compliance with applicable requirements of Federal and State codes and standards.
- B. IDOT Standard Specifications.
- C. Testing Agency: Contractor shall employ a qualified independent geotechnical engineering testing agency with not less than three years documented experience in performing the tests specified herein and acceptable to the Architect. Tests include the following:
 1. Classify proposed on-site and borrow soils to verify that soils comply with specified requirements
 2. Laboratory preparation of standard proctor for fill materials.
 3. Verify existing bearing capacities.
 4. Test for compaction of installed fill material.

1.09 Project Conditions

- A. Existing Utilities
 1. Locate existing underground utilities in the area of work. When utilities are to remain in place, provide adequate means of protection during earthwork operations.

2. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Architect and the Owner in writing for resolution.
- B. Bring to the attention of the Architect in writing, any unnoted structural conditions or existing conditions.
- C. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, except when permitted in writing by Architect, and then only after acceptable temporary utility services have been provided.
- D. Site soils are moisture sensitive and subject to significant deterioration if prematurely exposed or overworked with construction equipment.
- E. Certain soils or weather conditions may preclude or require the limitation of the use of certain types of heavy earthmoving equipment.
- F. Correction of soil deterioration caused by contractor means/methods and/or scheduling will be considered incidental to the work and will not be subject to contract cost or time adjustment by Change Order.
- G. Protection of Persons or Property: Barricade open excavations with suitable fencing to prevent entry.
- H. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
- I. Dispose of excess and unsuitable excavated material off-site on the adjacent property as designated on the plans.
- J. Protect downstream properties from materials deposited by storm water run-off.

PART 2. - PRODUCTS

2.01 Back fill and Fill Materials at Building Site

- A. Sand: Fine aggregate materials meeting the requirements of IDOT Grade FA-6 of Section 703 of the Standard Specifications.
- B. Borrow Material: Silty clay, a native material from the project site that is free of grass, roots, and vegetation. It shall not contain topsoil or muck.
- C. Pavement Base Material: Crushed stone Coarse Aggregate Gradation IDOT CA.
- D. Structural Fill: Sub-base or base soil material with 70% maximum silt tested according to ASTM D-422 and free of all organic material or rocks.

- E. Mass backfill material: Bank run sand and gravel or uniformly graded crushed stone.
- F. Drainage fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D448, coarse aggregate grading size 57, with 100% passing a 1-1/2" sieve and not more than 5% passing a No. 8 sieve.
- G. Filter fabric: Manufacturer's standard nonwoven pervious geotextile fabric of polypropylene, nylon or polyester fibers, or a combination. Tensile strength: 100 lb. Apparent opening size: #100 US Standard Sieve. Permeability: 150 gpm per sq. ft.
- H. Flowable Fill: Water, Portland cement and fine aggregate mixed according to IDOT special provisions for controlled low-strength material, 28 day compressive strength is 100 min, 500 maximum verified by laboratory tests by Contractor.

2.02 Topsoil

- A. Topsoil at Site: Verify suitability and quantity of topsoil stockpiled at site. If sufficient quantities of suitable topsoil are not available at site, provide additional topsoil as required to complete landscape work.
- B. Acceptable topsoil: Includes selectively excavated material that is representative of soils in the vicinity that produce heavy growths of crop, grass or other vegetation and is reasonably free of underlying subsoil, clay lumps, objectionable weeds, litter, brush, matted roots, toxic substances, or any material that might be harmful to plant growth or be a hindrance to grading, plant or maintenance operation. Topsoil shall not contain more than 5% by volume of stones, stumps, and other objects larger than 2" in any dimension for lawn areas. Topsoil shall be acceptable to Architect prior to beginning finish grading work.

PART 3. - EXECUTION

3.01 Inspection

- A. Examine the areas and conditions under which excavating, filling and grading are to be performed and notify the Architect in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been resolved.
- B. Protect structures, utilities, sidewalks, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- C. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

- D. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding project site and surrounding area.
 - E. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- 3.02 Excavation
- A. The areas indicated for grading shall be cut to the elevations and contours shown. Useable topsoil shall be stripped and stockpiled for reuse. The final grade in unpaved areas shall have a minimum of 4" of topsoil. All areas, once stripped either for fill or for subgrade, shall be proof-rolled with loaded trucks to detect localized weak subgrades.
 - B. Classified excavation: Excavation is classified and includes excavation to required subgrade elevations. Excavation will be classified as earth excavation or rock excavation as follows:
 - 1. Earth excavation includes excavation of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; together with soil and other materials encountered that are not classified as rock or unauthorized excavation.
 - 2. Rock excavation includes removal and disposal of rock material and obstructions encountered that cannot be removed by heavy-duty rock excavating equipment without systematic drilling, blasting, or ripping.
 - a. Rock material includes boulders 1/2 cubic yard or more in volume and rock in beds, ledges, un-stratified masses, and conglomerate deposits.
 - b. Rock excavation, when encountered, will be paid by unit prices included in the Contract Documents or by Change Order. Do not excavate rock until it has been classified and authorized by Architect.
 - C. Stability of excavations: Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.
 - D. Excavation for structures:
 - 1. Excavate to indicated elevations and dimensions within a tolerance of + .10'. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.
 - 2. Excavations for footings and foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3. Excavation for underground tanks, basins, and mechanical or electrical appurtenances: Excavate to elevations and dimensions indicated within a tolerance of + .10'. Do not disturb bottom of excavations intended for bearing surface.
 4. Underpin adjacent structures which may be damaged by excavation work, including utilities.
 5. After completion of the excavation and prior to placement of concrete for footings, excavations may be inspected and approved by the Owner's Testing Lab or representative to insure that suitable bearing has been obtained if deemed necessary by the Owner. Twenty-four-hour notice shall be given to the Architect and Owner.
 6. Fill excess cuts under footings and foundations with concrete, and fill any excess cuts under slabs with compacted sand.
- E. Excavation for walks and pavements: Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.
- F. Excavation for utility trenches:
1. Excavate trenches to indicated slopes, lines, depths, and invert elevations.
 2. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12" higher than top of pipe or conduit, unless otherwise indicated.
 3. Trench bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove stones and sharp objects to avoid point loading.
- G. Approval of subgrade: Notify Architect when excavations have reached required subgrade. When Architect determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Architect.
- H. Unauthorized excavation: Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the Architect. Fill unauthorized excavations under other construction as directed by the Architect.
- I. Unsuitable Soil Materials Removal: When dry compacted suitable bearing soil for footings is not encountered at depth indicated on drawings, immediately notify Architect; do not proceed until an acceptable solution has been determined.

- J. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is below 35° F.
 - K. Install sub-drainage systems as shown on drawings.
- 3.03 Storage of Soil Materials
- A. Stockpiling of usable topsoil on University property is acceptable but shall be under the direction of the Grounds Superintendent.
 - B. Clay soils and unusable soils shall be removed from University property unless directed otherwise by the Grounds Superintendent.
 - C. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
- 3.04 Backfill
- A. Place acceptable soil material in layers to specified subgrade elevations, for each area classification listed below.
 - 1. Use acceptable excavated or other on-site earth material as backfill material adjacent to foundations. The final 2'-0" of backfill shall be a compacted cohesive soil material.
 - 2. In excavations, outside the building, use foundation backfill material.
 - 3. Under grassed areas, use satisfactory excavated or fill material from the site and final 4" layer of topsoil.
 - 4. Under walks use trench backfill or fill material.
 - 5. Under paved areas use fill material.
 - B. Backfill excavations promptly, but not before completing the following:
 - 1. Acceptance of construction below finish grade including, where applicable, damp-proofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Testing, inspecting, and approval of underground utilities.
 - 4. Concrete formwork removal.
 - 5. Removal of trash and debris from excavation.
 - 6. Removal of temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on vertical supported walls.
 - C. Placement and Compaction:

1. Place backfill and fill material in layers not exceeding 8" in loose depth for material compacted by heavy compaction equipment, and not exceeding 4" in loose depth for material compacted by hand-operated tampers.
2. Place backfill and fill materials evenly adjacent to structures, to specified elevations; prevent wedging action of backfill against structures by carrying material uniformly around structure to approximately same elevation in each lift.

D. Moisture Control:

1. Before compaction, moisten or aerate each layer to provide optimum moisture content; compact each layer to specified percentage of maximum dry density or relative dry density for each area classification.
2. Do not place backfill material on muddy, frozen, frosted, or iced surfaces.

E. Utility trench backfill:

1. Place and compact bedding course on rock and other unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
2. Concrete backfill trenches that carry below or pass under footings and that are excavated within 18" of footings. Place concrete to level of bottom of footings.
3. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1", to a height of 12" over the utility pipe or conduit. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
4. Coordinate backfilling with utilities testing. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed. Place and compact final backfill material of satisfactory soil material to final subgrade.

F. Subsurface drainage backfill:

1. Subsurface drain: Place a layer of filter fabric around perimeter of drainage trench or at footing, as indicated.
2. Drainage backfill: Place and compact drainage backfill of filtering material over subsurface drain, in width indicated, to within 12" of final subgrade. Overlay drainage backfill with one layer of filter fabric, overlapping edges at least 6".
3. Impervious fill: Place and compact impervious fill material over drainage backfill to final subgrade.

3.05 Fill

- A. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.
 - 1. Scarify or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surface.
 - 2. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture condition or aerate soil and re-compact to required density.
 - B. Place fill material in layers to required elevations for each location listed below.
 - 1. Under grass, use satisfactory excavated or borrow soil material with 6" of topsoil at the surface.
 - 2. Under walks and pavements, use mass backfill material to within 6" of paving material. Use 6" of pavement base material immediately beneath walks and pavements.
 - 3. Under steps and ramps, use mass backfill material.
 - 4. Under building slabs, use sand.
 - 5. For backfilling use borrow material or mass backfill material.
 - 6. Under footings and foundations, use structural fill.
 - C. Flowable fill: In tight locations below foundations use flowable fill as shown on the drawings.
- 3.06 Moisture Control
- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2% of optimum moisture content. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density.

3.07 Compaction

- A. Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure. Carry material uniformly on both sides of the wall to approximately the same elevation in each lift.

- C. Control soil compaction during construction, providing minimum percentage of dry density specified for each area classification. Dry density is determined by a Standard Proctor Test, ASTM D698.
- D. Prior to any filling or after cutting to proper subgrade elevations, the entire area outside the building area shall be disced to a depth of 8" and re-compacted using a sheepsfoot roller or other appropriate equipment.
 - 1. Lawn or unpaved areas: Compact top 8" of subgrade and each 12" layer of backfill or fill material at average 95% maximum dry density.
 - 2. Paved areas: Compact top 8" of subgrade and each 8" layer of backfill or fill material at average 95% maximum dry density.
 - 3. Walkways: Compact top 6" of subgrade and each layer of backfill or fill material at average 95% maximum dry density.
 - 4. Building structure areas: Compact top 8" of subgrade and each 8" layer of fill material at average 98% maximum dry density.
 - 5. Building slabs: Compact top 8" of subgrade and each 8" layer of backfill or fill material at average 98% maximum dry density.

3.08 Grading

- A. Subsoil Preparation:
 - 1. Eliminate uneven and depressed areas. Remove any debris, roots, branches, stones, and gravel in excess of 1/2" in size. Remove subsoil contaminated with petroleum products.
 - 2. Scarify subgrade to a depth of 12" where topsoil is scheduled. Scarify all areas where equipment has compacted subsoil.
- B. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated. Provide a smooth transition between existing adjacent grades and new grades. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.
- C. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes, within not more than 0.10' above or below the required finish elevations. Topsoil to be in minimum depth of 4". Topsoil finish grade shall be in accordance with type of surface treatment.
- D. Grading Surface of Fill: Grade smooth and even, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1".

E. Topsoil:

1. Provide acceptable topsoil level to grade and place in areas where seeding or sodding is scheduled.
2. Install topsoil during favorable weather conditions. Topsoil and installation area must be relatively dry.
3. Place topsoil over all backfill trenches, excavations and disturbed areas that are not scheduled for paving.
4. Place topsoil to a minimum depth of 4".

F. Site grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or unpaved areas: + .10'.
2. Walks: + .10'.
3. Pavements: + 1/2".
4. Grading inside building lines: Finish subgrade to a tolerance of 1/2" when tested with a 10' straightedge.

G. Finish Grading:

1. Mechanically cultivate and fine grade topsoil eliminating rough, uneven, or depressed areas. Maintain levels, profiles and contours of subgrade.
 - a. Finished grade shall provide positive drainage away from buildings at all times and shall prevent pooling or puddling of water at any/all locations.
 - b. Finished grade tolerance shall be + 1".
 - c. Finished grade to be level, firm and sufficient to prevent areas from settling when irrigation is applied.
 - d. Cultivate inaccessible areas by hand. Rake until surface is smooth.
2. Remove stones, roots, grass, weeds, debris and foreign materials while grading. Do not bury foreign materials.

3.09 Sub-base and Base Courses

- A. Proof roll building site and parking lots prior to fill operations with a loaded dump truck. The Owner's soils engineer will examine for soft areas that will need to be removed. The cost of correcting unstable soil conditions shall be adjusted by change order.
- B. Under pavements and walks, place sub-base course material on prepared subgrades. Place base course material over sub-bases to pavements.
- C. Compact sub-base and base courses at optimum moisture content to required grades, lines, cross sections and thickness to not less than 100% of standard dry density. Shape sub-base and base to required crown elevations and cross-slope

grades. When thickness of compacted sub-base or base course is 6" or less, place materials in a single layer. When thickness of compacted sub-base or base course exceeds 6", place materials in equal layers, with no layer more than 6" thick or less than 3" thick when compacted.

3.10 Drainage Fill

- A. Under slabs-on-grade, place drainage fill course on prepared subgrade. Compact drainage fill to required cross sections and thickness. When compacted thickness of drainage fill is 6" or less, place materials in a single layer. When compacted thickness of drainage fill exceeds 6" thick place materials in equal layers, with no layer more than 6" thick nor less than 3" thick when compacted.

3.11 Field Quality Control

- A. Testing agency services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
- B. Footing subgrade: At footing subgrades, perform at least one test of each soil stratum to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of each subgrade with related tested strata when acceptable to the Architect.
- C. Paved and slab areas: At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 200 sf or less of paved area, but in no case fewer than three tests.
- D. Trench backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 150' or less of trench, but no fewer than two tests.
- E. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, re-compact and retest until required density is obtained.

3.12 Protection

- A. Protecting grade areas: Protect newly graded areas from traffic, freezing and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.
- C. Settling: Where settling occurs during the project correction period, remove finished surfacing, backfill with additional approved material, compact, and

reconstruct surfacing. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.13 Disposal of Surplus and Waste Materials

- A. Disposal: Remove surplus soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

End of Division 31 2000

This section of the NIU Design Requirements establishes minimum requirements only.

It should not be used as a complete specification.