Addendum #01 for RFB #947800-02

Project Name: DAS CC Wallace Building Demolition
DAS RFB #: 947800-02
DAS Project #: 9478.00
Date: 01/26/2026

Bids Due: February 17th, 2026 at 2:00PM

This Addendum consists of:

General Items:

1. **Cover Page (1 page)**
2. **DIVISION 02 – DEMOLITION**
   - 02 4100 Building Demolition (4 pages)
   - 02 4113 Selective Site Demolition (6 pages)
3. **DIVISION 31 – EARTHWORK**
   - 31 2213 Earthwork and Rough Grading (6 pages)
   - 31 2316.13 Trench Excavation and Backfill (6 pages)
   - 31 2500 Erosion and Sediment Control (8 pages)
4. **DIVISION 32 – EXTERIOR IMPROVEMENTS**
   - 32 1116.16 Aggregate Subbase Courses (2 pages)
   - 32 1313 Concrete Paving (24 pages)
   - 32 1313.10 Concrete Paving for Sidewalks and Shared Use Paths (6 pages)
   - 32 9112.13 Topsoil Placement and Grading (4 pages)
   - 32 9219 Seeding and Soil Supplements (6 pages)
   - 32 9223 Sodding (4 pages)

SECTION 02 41 00
BUILDING DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Building demolition.

1.2 RELATED REQUIREMENTS

A. Section 02 41 13 – Selective Site Demolition: Removal of utilities, site features, and plants.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 REFERENCE STANDARDS

A. 29 CFR 1926 – U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.5 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fill Material: As specified in Section 31 22 13 – Earthwork and Rough Grading.

PART 3 EXECUTION

3.1 SCOPE

A. Remove the entire building, floor slabs, foundation walls and footings, and subgrade utilities, as designated on the Drawings.

B. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as specified in Section 31 22 13.

3.2 It is the intent that the demolition called for be complete and adequate for the intended purpose and all necessary work, in addition to the specifically listed, shall be included, whether or not indicated on the plans or detailed in these specifications.

3.3 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   5. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

D. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

E. If hazardous materials are discovered during removal operations, Constructor shall properly and safely remove hazardous materials from the project site. Hazardous materials include, but are not limited to: cleaning supplies, lead, PCB's, and mercury. Hazardous materials identified on site have been listed on plan sheet C302.

F. If asbestos containing materials or materials believed to contain asbestos are found, stop work and notify the Owner. All asbestos removal will be completed by the Owner.

G. The Contractor is responsible for the removal and disposal of all elevator hydraulic fluid per Iowa DNR requirements.

H. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers in place.

I. Contractor to refer to the Owner’s Requirements for hot work requirements.

3.4 EXISTING UTILITIES

A. Also refer to Section 02 41 13 – Selective Site Demolition.

B. Refrigerant: Remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction before starting.

C. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

D. Protect existing utilities to remain from damage.

E. Do not disrupt utilities to remain.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.5 SALVAGE

A. List of items to be salvaged by the Owner is listed on plan sheet C501. Items to be salvaged by the Owner will be salvaged prior to the project commencing except for the North elevator equipment. Owner will salvage elevator equipment once contractor notifies the Owner that the elevator is no longer needed to remain operational. No items to be salvaged by the Contractor.

3.6 DEMOLITION

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Design Professional before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Remove existing work as indicated and as required to accomplish new work.

C. Remove all foundations for building, stairs, fire escapes, equipment, etc. in their entirety.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, and Electrical): Remove existing systems and equipment as indicated.
   1. Remove abandoned pipe, ducts, conduits, and equipment; remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Patch as specified for patching new work.

3.7 DEMOLITION BY MECHANICAL MEANS

A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.

B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
   1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.

C. Below-Grade Construction: Demolish foundation walls and other below-grade construction.
   1. Remove below-grade construction, including basements, foundation walls, and footings, completely.
   2. Caisson's to have location surveyed and provided to Owner. Abandon caisson's in place.

D. Existing Utilities: Demolish and remove existing utilities and below-grade utility structures.
   1. Piping: Disconnect piping at unions, flanges, valves, or fittings.

3.8 SITE RESTORATION

A. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Division 31.

B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.9 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

D. The Contractor is responsible for the removal and disposal of all elevator hydraulic fluid per Iowa DNR requirements.

END OF SECTION

SECTION 02 41 13
SELECTIVE SITE DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal of all minor site structures, pavements, surfacing, and base contours of all types, curb and gutter, sidewalks, steps, retaining walls, foundation walls, catch basins, manholes, utility pipes, trees, stumps, roots or other objects or structures, and other existing improvements which conflict with the work and are not designated to remain in place. No listing of items to be removed will be made.

B. All items identified for removal shall be legally disposed of by the Contractor away from the site of work.

C. It is the intent that the demolition called for be complete and adequate for the intended purpose and all necessary work, in addition to the specifically listed, shall be included, whether or not indicated on the plans or detailed in these specifications.

1.2 PERMITS

A. Contractor shall comply with all applicable local, state, and federal requirements regarding materials, methods of work, and disposal of excess and waste materials.

B. Contractor shall obtain and pay for all required inspections, sampling, analytical costs, permits, and fees. Provide notices required by governmental authorities. The following site and utility demolition permits and approvals are anticipated for the project. This list is for informational purposes only and is not intended to list all permits and approvals that may be required.

1. City of Des Moines Right-of-Way (ROW) Obstruction Permits will be required for all work within the City of Des Moines ROW and any lane or street closures.
2. City of Des Moines Plumbing Disconnect Permits and inspections will be required for storm sewer and sanitary sewer disconnections.
3. City of Des Moines Excavation Permits will be required for work within the City of Des Moines ROW.
4. City of Des Moines Sidewalk and Approach Permits will be required for work effecting sidewalks and driveway approaches within the City of Des Moines ROW. City of Des Moines will waive all fees associated with these permits at the contractors' request.
5. City of Des Moines Grading Permit (One Acre of Larger). Fee is estimated to be $160 for an estimated 3.75 acres of disturbance. Actual affected area to be determined during permit submittal.
6. Des Moines Water Works will require water service disconnection approvals and retirement charges for all service connections. Des Moines Water Works has estimated retirement charges for this project to be $6,700.00. The contractor shall provide allowance to project for the above listed amount to cover DMWW retirement charges only. Contractor shall confirm all additional charges and fees and shall be responsible for actual fees required by the project.

1.3 SUBMITTALS

A. The Contractor shall submit utility service termination certificates, copies of demolition notices, and permits to the Owner's Representative prior to removal.

B. The Contractor shall submit demolition procedures and operational sequence for review and acceptance by the Owner's Representative.

C. Schedule indicating proposed sequence of operations for selective demolition work to Owner's Representative for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.

D. Record drawings of utility disconnection locations.

1.4 JOB CONDITIONS

A. Phasing of Work
1. All site demolition shall be phased as shown in the Construction Drawings.

B. Protection
1. Erect barriers, fences, guard rails, enclosures, chutes, and shoring to protect personnel, structures, and utilities remaining intact.
2. Protect on-site trees and plants noted on Plans and all off-site trees and plants from damage.
3. Protect existing objects designated to remain, and in the event of damage, immediately make repairs or replacements necessary to the approval of the Owner's Representative at no additional cost to the Owner.

C. Maintaining Traffic
1. Minimize interference with streets, driveways, sidewalks, and adjacent facilities.
2. Close streets and sidewalks as per the phasing plans.
3. Do not close or obstruct streets or sidewalks without permission from authorities having jurisdiction.
4. If closure is permitted, provide signage indicating closure and signage to direct traffic to alternate route as per Plans.

D. Dust Control
1. Moisten surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the site.
2. All concrete sawcutting will be required to be wet sawed.
3. Surrounding buildings will be occupied during construction. Dust shall not be allowed to enter buildings.

E. Interruptions to Building Occupants
1. Surrounding buildings will be occupied during construction. All noise and vibration generating activities and utility outages shall be coordinated with the Owner.

1.5 PROJECT RECORD DOCUMENTS

A. Accurately record locations of capped utilities and subsurface obstructions on the Contractor's record drawing set.

B. The Contractor shall provide an as-built topographical survey of the project site upon completion of construction. Survey shall verify that all site grades conform to the tolerances specified in the contract documents.

PART 2 MATERIALS

2.1 TRAFFIC CONTROL SIGNAGE

A. Signs shall be constructed of marine grade plywood or metal and conform to the latest edition of Manual of Uniform Traffic Control Devices (MUTCD).

PART 3 EXECUTION

3.1 PREPARATION

A. Notification: Provide the Owner's Representative a minimum of seven (7) calendar days' notice prior to commencing the work of this section. Schedule sidewalk and roadway closures a minimum of 48 hours in advance with the City of Des Moines.

B. Site Inspection: Prior to work under this section, the Contractor shall carefully inspect the entire site and verify all objects designated to be removed or to be preserved.

C. Protection of Utilities: The Contractor shall locate existing utility lines and services traversing the site and determine the requirements for their protection. The Contractor shall preserve in operating condition all active utilities traversing the site and designated to remain.

D. Disconnection of Utilities: Before starting site operations, the Contractor shall disconnect or arrange for the disconnection of all utility services designated to be removed, performing all such work in accordance with the requirements of the utility company or agency involved.

E. Cover and protect facilities to remain from soiling or damage when demolition work is performed.

F. Provide appropriate temporary signage including signage for exit or building egress.

3.2 PAVEMENTS

A. In removing pavement, curb and gutter, sidewalks, and other similar improvements, and where a portion of such improvements are to be left in place, they shall be removed to an existing joint or to a joint sawed to full depth with a true line and a vertical face. Sufficient removal shall be made to provide for proper grade and connections in the new work regardless of any limits which may be indicated on the Plans.

B. All removals and replacements in the City Right-of-Way shall meet City of Des Moines Standards and requirements.

3.3 SEWERS

A. All existing sewers, drainage pipe roof drains, and floor drains which have been or are to be abandoned shall be permanently sealed at the ends with bulkheads constructed of concrete, having a minimum thickness of 3 feet or by other engineer pre-approved methods. No direct payment will be made for blocking abandoned pipe and conduit.

3.4 BLASTING

A. Blasting is not permitted.

3.5 DISPOSAL

A. All debris shall be disposed of off-site.

B. If off-site disposal of debris is required in the Plans or Specifications, the Contractor shall remove demolition debris and grindings as soon as practicable.

C. Do not store or burn materials on site.

D. All asphalt materials shall be disposed off site.

E. Contractor may retain and remove from the premises items considered of salvageable value.

F. Remove all other materials from demolition operations, including debris and rubbish, from the building site. Transport and legally dispose of materials off site.

G. Remove and promptly dispose of contaminated, vermin-infested, or dangerous materials encountered. If hazardous materials, as defined by the EPA, are encountered, stop work and immediately notify the Owner's Representative.

H. Burning of materials will not be permitted on the project site.

3.6 CONSTRUCTION LIMITS

A. The Contractor's operations shall be restricted to those areas inside the construction limits as indicated on the Plans. If limits are not indicated the Contractor shall be restricted to the Owner's property or easement and public rights-of-way. Work within public rights-of-way shall be completed under the permission of the governing agency. Restoration and site repair within the construction limits will be included in the base bid. Damage, site restoration, etc., necessary outside the construction limits, shall be repaired by the Contractor at no additional expense to the Owner.

3.7 UTILITY ADJUSTMENT

A. Contractor is responsible for the adjustment of all vents, manholes, castings, valves, and fire hydrants to match the new surface. Adjustments shall be coordinated with the utility companies and the cost for all adjustments shall be incidental to construction. Any damage to said structures and appurtenances, that occurs during construction, shall be repaired by the Contractor at no additional cost to the Owner.

3.8 EXISTING SIGNAGE

A. Carefully remove traffic signs as designated on the Plans or in conflict with the work and within the project limits. Protect from damage. Temporarily store and reinstall in the same fashion as their original installation.

B. Damaged signs shall be replaced by the Contractor, or otherwise will be replaced by the Owner at the Contractor's expense.

3.9 BACKFILL

A. Any voids resulting from the removal of any object shall be backfilled and compacted in accordance with Specification Section 31 22 13 - Earthwork and Rough Grading.

END OF SECTION

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SECTION 31 22 13
EARTHWORK AND ROUGH GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Provide labor, materials, equipment, and supervision necessary to complete the following:
   1. Remove topsoil and stockpile on site for later use.
   2. Grade subsoil and reform to grades, contours, and levels.
   3. Rough grade for roadways, walks, curbs, gutters, parking areas, and landscaped areas.
   4. Scarifying and recompaction.
   5. Import and compaction of fill materials and disposal of excess material required to bring the final grade into conformance with the lines and grades indicated on the Drawings.

1.2 EXISTING CONDITIONS

A. Known underground, surface and aerial utility lines, and buried objects are indicated on the Drawings.

1.3 PROTECTION

A. Existing Utilities:
   1. Iowa One Call shall be notified for utility locates 48 hours prior to any digging. All locates shall be “Joint Locates.”

B. Protect trees, shrubs and lawn, and other features remaining as part of final landscaping.

C. Protect benchmarks and existing structures, fences, roads, sidewalks, paving, and curbs against damage from equipment and vehicular traffic.

D. Protect aerial, surface, or underground utility lines or appurtenances which are to remain.

E. Repair damage.

1.4 REFERENCES

A. Definitions:
   1. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.
   2. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
   3. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.
   4. Subbase 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.
   5. Base Course: The layer placed between the subbase and surface pavement in a paving system.

6. Drainage Fill: Course of washed granular material supporting slab-on-grade placed to cut off upward capillary flow of pore water.
7. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Owner's Representative. Unauthorized excavation, as well as remedial work directed by the Owner's Representative, shall be at the Contractor's expense.
8. 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.
9. Utilities include on-site underground pipe, conduits, ducts, and cables, as well as underground services within building lines.

1.5 SITE COMPACTION TESTING

A. Testing of compacted fill materials and soil evaluations may be performed by a Testing Agency retained by the Owner.

B. The Contractor shall notify the Testing Agency no less than 48 hours prior to when each section of work is ready for on-site testing. Do not proceed with additional portions of work until results have been verified.

C. If, during progress of work, tests indicated that compacted materials do not meet specified requirements, remove defective work, replace and retest at no cost to Owner.

D. Ensure compacted fills are tested before proceeding with placement of surface materials.

1.6 SUBMITTALS

A. Submit to testing agency minimum ten-pound (4.5kg) samples of each type of fill material to be used. Provide samples to appointed testing laboratory, packed tightly in containers to prevent contamination. If recent test results are available for fill materials to be used, disregard samples submission and submit such test results to the testing laboratory. Such test results are to clearly indicate types of materials and composition, hardness, compactibility, and suitability for proposed usage.

1.7 JOB CONDITIONS

A. Construction Limits:
   1. All construction activities will be contained within construction boundaries indicated on the Drawings. Specified excavation requirements, precautions, and protective systems shall be observed at all times.

B. Soil and Dust Control:
   1. Use all means necessary to prevent dust from leaving the project site and to control dust on public or private streets used as haul loads.
   2. Prevent soils from leaving the site by cleaning tires prior to vehicles leaving the site. Continuously clean dirt and mud from public or private streets used as haul roads. Maintain all erosion control measures as referred to in the Storm Water Pollution Prevention Plan (SWPPP) on the Drawings and in Specification Sections.

C. Protection:
   1. Protect materials of this section before, during, and after installation and protect all objects designated to remain. This includes erosion control.
   2. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

D. Adjustment of Utilities:
   1. Adjust all new and existing valve boxes, hydrants, castings, pull boxes, etc. to match finished grade elevations indicated on the Drawings. All rim elevations within paved areas shall be adjusted to match finished paving.
   2. All adjustment rings for manholes or intakes shall be concrete.
   3. Owner shall be notified a minimum of 24-hours prior to the establishment of the rough grade to allow the opportunity for hand holes, valve covers, manholes, and other surface fixtures to be located and reviewed.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. All fill materials shall be subject to approval of the Testing Agency.

B. Fill Material within 4' of Finished Grade: Excavated or borrowed material free from roots, broken concrete, broken asphalt, rocks larger than 3" in size, and building debris that meets compaction requirements.

C. Fill Material below 4' of Finished Grade: All fill material shall be soil or soil rock mixture which is free from organic matter and other deleterious substance. It shall contain no rocks or lumps over 6" (150mm) in greatest dimension and not more than 15% of the rocks or lumps shall be larger than 2-1/2" (63mm) in greatest dimension and shall meet compaction requirements.

D. Additional Fill Material: AASHTO Designation M145, soil classification group.

E. Fill under Landscaped Areas: Free from alkali, salt, and petroleum products. Use subsoil excavated from site only if conforming to specified requirements.

PART 3 EXECUTION

3.1 SAFETY

A. The Contractor is required to understand and implement all OSHA requirements for earthwork activities.

3.2 GENERAL

A. Familiarization:
   1. Prior to all work of this section, become thoroughly familiar with the site, the site conditions, and all portions of the work falling within this section.
   2. Establish and identify required lines, levels, contours, and datum.
   3. Maintain benchmarks, monuments, and other reference points. Re-establish if disturbed or destroyed, at no cost to Owner.

4. Before start of grading, establish the location and extent of utilities in the work areas. Notify utilities to remove and relocate lines which are in the way of construction.

B. Backfilling Prior to Approvals:
1. Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this section prior to all required inspections, tests, and approvals.
2. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work at no additional cost to the Owner.

C. Before excavation has begun, strip and stockpile all existing topsoil.

3.3 TOPSOIL EXCAVATION

A. Remove topsoil of horticultural value from areas to be excavated, regraded and paved, and stockpile on site in designated areas indicated on the Drawings.

B. Do not permit topsoil to be mixed with subsoil.

C. Do not strip topsoil when wet.

D. Do not stockpile topsoil to depths exceeding 10'-0". Do not drive heavy equipment over stockpiled topsoil.

3.4 EXCAVATION

A. Depressions Resulting from Removal of Obstruction:
1. Where depressions result from, or have resulted from, the removal of surface or subsurface obstructions, open the depression to equipment working width and remove all debris and soft material as directed by the Owner's Representative.

B. Other Areas:
1. Excavate to grades shown on the Drawings.
2. Where excavation grades are not shown on the Drawings, excavate as required to accommodate the installation.

C. Overexcavation:
1. Backfill and compact all overexcavated areas as specified for fill (Article 3.5) at no additional cost to the Owner.

3.5 FILLING

A. Fill areas to contours and elevations with unfrozen materials.

B. Compaction:
1. Granular Fill: Place and compact materials in continuous layers not exceeding 8" (200mm) in compacted depth, per ASTM 0698 at frequency of one test per 500 square yards.
a. Granular fill is not allowed within 18” of finished grade in landscape areas.
b. Under pavement and undercut structures, compact backfill to 98% of maximum Standard Proctor Density.

2. Subsoil Fill: Place and compact material in continuous layers not exceeding 8" (200mm) in compacted depth, compacted to 95% of maximum Standard Proctor Density unless otherwise shown on the Drawings, per ASTM D698 at frequency of one test per 500 square yards.
   a. Under landscaped and lawn areas from below uncompacted backfill to 30” below finished surface elevation, compact suitable excavated material to 90% of maximum Standard Proctor Density.
   b. Under landscaped and lawn areas, provide 6” of uncompacted suitable excavated material under topsoil or planting soil.
   c. Refer to Planting Soil and Topsoil specifications.

C. Maintain optimum moisture content of fill materials to attain required compaction density. The geotechnical report offers a range of desirable moisture content for compaction. In general, low-plasticity cohesive soils shall be within -2% and +3% of optimum moisture content. Granular materials shall be within -3% and +3% of optimum moisture content. If on-site native or imported materials cannot be conditioned to suitable moisture content because of a lack of suitable drying weather, sufficient space on site for soil conditioning or any other reason, the Contractor shall import suitable material at no additional cost to the Owner.

D. Make grade changes gradual. Blend slope into level areas.

E. Remove surplus fill materials from site.

F. Refer to Section 32 11 16.16 – *Aggregate Subbase Courses* for proofrolling requirements for pavement subgrade.

G. Bench fill material on all existing grades steeper than 4H:1V.

3.6 EXCESS WATER CONTROL

A. Unfavorable Weather
   1. Do not place, spread, or roll any fill material during unfavorable weather conditions.
   2. Do not resume operations until moisture content and fill density are satisfactory.

B. Flooding
   1. Provide dikes or channels to prevent flooding of subgrade; promptly remove all water collecting in depressions.

C. Softened Subgrade
   1. Where soil has been softened or eroded by flooding or placement during unfavorable weather, remove all damaged areas and recompact as specified for fill and compaction below.

D. Dewatering
   1. Provide and maintain at all times during construction ample means and devices with which to promptly remove and dispose of all water from every source entering the excavations or other parts of the work.
   2. Dewater by means that will ensure dry excavations and the preservation of the final lines and grades of bottoms of excavations.

3. Dewatering shall meet requirements of the Stormwater Pollution Prevention Plan (SWPPP). Drilling and boring waste to be disposed of at the local wastewater treatment plant.

E. Drainage

1. The Contractor shall use all means necessary to maintain positive drainage on site during and after completion of construction. Provide all temporary grading and drainage measures required to prevent ponding on subgrades and to prevent discharge of site drainage to surrounding properties except in compliance with the project SWPP Plan.

3.7 SCARIFY AND RECOMPACT

A. Scarify all areas beneath the proposed pavement to a depth of 12". Compact scarified areas to 98% standard proctor density.

3.8 WASTE EXCAVATION

A. Excess material waste or unsuitable materials will be removed from the site and legally disposed of by the Contractor at no additional cost to the Owner. There shall be no disposal of such materials on the project site.

3.9 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.1 foot (30mm).

3.10 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed.

B. Tests and analysis of fill material will be performed in accordance with ASTM D698.

C. Compaction testing will be performed in accordance with ASTM D698.

D. If tests indicate work does not meet specified requirements, remove work, replace, and retest at no cost to Owner. The Contractor shall coordinate with the Testing Agency when non-compliant work is ready for re-testing. The Contractor shall be responsible for all costs related to re-testing.

END OF SECTION

SECTION 31 23 16.13
TRENCH EXCAVATION AND BACKFILL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This section encompasses the work required for excavation of trenches, appurtenances, bedding, overexcavation of unsuitable material, and backfilling for the installation of utilities.

B. Definitions:
1. Maximum Density: Maximum dry weight in pounds per cubic foot (kilogram per cubic meter) of a specific material, as determined by ASTM D698, Standard Proctor Density.
2. Optimum Moisture: Percentage of water at maximum density.
3. Rubble: Buried concrete foundations, beams, walls, and other material which requires blasting or jackhammering for its practical and effective removal.
4. Earth Excavation: Earth excavation will include all material not otherwise classified. Decomposed or disintegrated shale which can be effectively plowed, spaded, or removed with power drive excavation equipment, and gravel base will be classified as earth excavation.
5. Overexcavation of Unsuitable Material: Overexcavation of unsuitable material is the removal of material that is too soft to provide adequate support as determined by the Owner's Quality Control Special Inspection and Testing Company for pipe being placed in the bottom of the trench.
6. Granular Material Backfill and Bedding: Shall consist of coarse sand, crushed rock or gravel, and shall be free from dust, clay, organics, and other undesirable materials.
7. Suitable Native Backfill: Excavated material free from roots, broken concrete, broken asphalt, rocks larger than 3" in size, and building debris or AASHTO Designation M145, soil classification group. Soils must reach suitable moisture content (refer to paragraph 3.06C) without impacting project schedule and meet compaction requirements (refer to paragraph 3.05G).

1.2 SUBMITTALS

A. Submit to testing agency 10-lb. samples of each bedding and backfill material to be used, packed tightly in containers to prevent contamination. If recent test results are available for fill materials to be used, disregard samples submission and submit such test results to the testing agency. Such test results are to clearly indicate types of materials and composition, hardness, compactability, and suitability for proposed usage.

B. Flowable mortar mix design.

C. Shoring/sheeting design if required.

1.3 JOB CONDITIONS

A. Length of Open Trench:
1. The maximum length of open trench shall be 200' (60m) in public right-of-way and 100' (30m) max. elsewhere.
2. The Contractor shall not leave open trench unattended without fencing.

B. Protection of Existing Underground Utilities:
   1. Iowa One Call shall be notified for utility locates 48 hours prior to any digging. All locates shall be “Joint Locates.”
   2. The location of existing utilities are shown on the plans based upon information and data supplied to the Owner or Design Professional by the owner of the utility. The utilities are shown on the plans for information only and are not guaranteed to be either complete or accurate. It is the Contractor's responsibility to contact all utilities and obtain utility staking prior to construction.
   3. Any damage caused to existing utilities shall be reported to the utility and repaired in accordance with the utilities' standards.
   4. The cost of repairs to damaged utilities shall be borne by the Contractor.
   5. If utility service must be interrupted to complete a construction operation, it shall be the Contractor's responsibility to obtain permission from the utility. The Owner shall be given at least 14 calendar days advance notice of the time of interruption and the expected duration of the interruption. If standby service is required by the utility, it shall be provided at the Contractor's expense.
   6. If a non-scheduled interruption of utility service results from accidental damage, the Contractor shall take immediate steps as necessary to notify the utility and restore service. The Contractor's personnel shall not leave the site until the interruption has been restored.
   7. All existing utilities crossing through the excavation trench shall be shored/supported as required to protect the utility. Some non-reinforced concrete encased ductbanks may exist on site that will require special support/shoring. All shoring/support systems are subject to approval by the Owner. The Contractor shall be responsible for repairing all damage to utilities caused by construction activities.

C. Work Within City Street or Utility Right-of-Way:
   1. When the Contractor is performing work within the right-of-way of other jurisdictions such as city street or utilities, such work shall comply with applicable permits or regulations of such jurisdiction.

D. Scheduling:
   1. Cleanup shall be performed promptly following utility installation backfill.
   2. Repair of trench settlement shall be performed promptly.

E. Erosion/Sedimentation Control:
   1. The Contractor shall comply with Plans, Specifications, and all applicable Federal, State, or Local erosion control regulations.
   2. The Contractor shall perform regular maintenance of all erosion/sedimentation control devices until time of final acceptance.

F. Maintenance:
   1. The Contractor is responsible for repair of any trench settlement up to the level of the adjacent grade that occurs during construction, as well as during the warranty period. This shall include restoration of the finish surface as appropriate.

G. Removal of Existing Abandoned Utilities in Conflict with Work:
   1. If abandoned utilities are found in conflict with the work, notify the Owner for direction.

PART 2 PRODUCTS

2.1 MATERIALS

A. Backfill:
1. Backfill in City and State R.O.W. to be IDOT Grad 11 Class A Roadstone.
2. Backfill around vaults and tunnels to be IDOT Grad 12A or 29. Refer to plan details for limits of porous backfill. Backfill beneath pavement subbase to 6" above vault/tunnel roof to be IDOT Grad 11 Class A Roadstone. In greenspace, backfill from 6" above vault/tunnel roof to within 8" off surface to be suitable native fill or imported suitable fill compacted to 95% standard proctor density.
3. Backfill around subdrains shall be gradation 29.
4. All Class A Roadstone shall be pre-wetted to within ±3% of optimum moisture content before delivery to project site.

B. Excavatable Flowable Fill (Controlled Low Strength Material):
1. Where compaction activities cannot take place, low strength flowable fill shall be used. Flowable fill shall have a max. compressive strength not to exceed 90 psi.

PART 3 EXECUTION

3.1 GENERAL

A. Restore obstructions removed to accommodate construction equipment or to facilitate excavation.

B. Exercise care in operating equipment beneath the drip line or adjacent to trees to prevent damage. If damage occurs, the Contractor shall retain a professional arborist at the Contractor's expenses to repair the damage.

C. Pile excavated material suitable for backfill in an orderly manner a sufficient distance from the edge of excavation to avoid rollbacks, slides, or cave-ins.

D. Excavate by open-cut method for utilities and structures except as noted on Plans.

E. The Contractor shall be responsible for providing barricades and protection around excavation and work areas.

3.2 SHEETING, SHORING, AND BRACING

A. Construct sheeting, shoring, and bracing required to hold walls of excavation and to provide safety for workers. Install sheeting, shoring, and bracing to protect existing utilities and structures and to provide dry conditions during construction installations.

B. Sheeting may be wood or steel.

C. Wood Sheeting Driven below Level of Pipe: Leave in place to a level of 5' (1.5m) below finish grade.

D. Pull all sheeting.

E. When moveable trench box is used below spring line of pipe, it shall be lifted prior to any forward movement to avoid pipe displacement.

F. Sheeting, shoring, and bracing shall not be paid for as a separate pay item, but shall be considered incidental to the project.

G. Sheeting and shoring shall be in accordance with OSHA and other applicable governmental regulations. The Contractor shall be solely responsible for complying with the regulations.

H. Provide the Owner's Representative with shop drawings of proposed sheeting or shoring, signed and sealed by a registered professional engineer licensed to practice in the state which the project is in.

3.3 PREPARATION

A. Clearing:
1. Remove vegetative material and obstructions as necessary for construction.
2. Material removed shall be disposed of properly by the Contractor off the project site.

3.4 PERFORMANCE

A. General:
1. General: Surplus and rejected unsuitable excavated material becomes property of the Contractor for disposal.

B. Excavation For Structures:
1. Topsoil shall be removed from the site and stockpiled for later distribution on the finished grade.
2. Rubble or rock shall be removed to 1' (300mm) below the bottom of the foundation and 1' (300mm) horizontally from any vertical surface.
3. Subgrade: The subgrade below each major portion of a utility structure shall be inspected by the Testing Agency prior to placing stone backfill or placing reinforcing bars.

C. Trench Excavation:
1. Excavated material shall be stored in such a manner as to avoid property damage. If damage does result, it shall be repaired at the Contractor's expense.
2. The base of the trench shall be excavated so as to provide a uniform and continuous bearing and support on solid and undisturbed material.
3. The minimum trench width shall be sufficient to allow space for jointing and bedding. The maximum allowable trench width at a point 12" (300mm) above the top of the pipe (pipe envelope) shall be as follows: 30" (750mm) for pipes 6-10" (150-250mm) in diameter. For pipes 12" (300mm) in diameter or larger, the maximum trench width shall be the outside diameter plus 24" (600mm). For elliptical pipes, it shall be the outside dimension at the spring line plus 24" (600mm).
4. If rubble or rock is encountered, the trench shall be excavated to provide clearance of at least 6" (150mm) below and 12" (300mm) on each side of the utility line and fittings.

5. Overexcavation of Unsuitable Material: When the Contractor encounters material that is not suitable for supporting the pipe line or structure being constructed, the Contractor shall notify the Owner's Representative and Testing Agency to obtain written instructions on how to proceed. Material removed prior to written authorization of the Owner's Representative will not be eligible for payment.

D. Dewatering:
1. Excavation, installation of bedding, pipes, structures, and backfilling shall be done in dry conditions. If the subgrade is saturated or standing water exists, the work area shall be dewatered prior to installation or backfilling operations.
2. The Contractor shall make provisions to handle water encountered during construction. The Contractor shall notify the Owner of the proposed method of dewatering.
3. The Contractor shall prevent surface water from flowing into the excavated area. Stream flow shall be diverted around or pumped past the area of construction. Water accumulating in the area of construction shall be removed.
4. Do not pump water onto adjacent property without approval of the Owner's Representative and adjacent property owner.
5. All required dewatering activities shall be considered incidental to the project and no additional compensation will be provided for required project dewatering.

E. Backfill for Structures:
1. Contractor shall contact the Testing Agency not less than two (2) business days prior to backfilling for testing.
2. Backfill shall not be placed adjacent to concrete structures until the concrete has achieved at least 75% of its design strength.
3. Backfill simultaneously on all sides of structures; protect structures from damage at all times.
4. Place and compact fill materials in continuous layers not exceeding six inches loose depth. Use a method so as not to disturb or damage structure waterproofing.
5. Compact backfill areas to 98% of maximum Standard Proctor Density (ASTM D4253) for clean granular material and sand backfill.
6. Contractor shall notify Testing Agency to conduct visual inspections of backfill and compaction of porous backfill such as IDOT Gradation 12A 29 material.

3.5 WASTE EXCAVATION

A. Excess material, waste or unsuitable materials shall be removed from the site and legally disposed of by the Contractor at no additional cost to the Owner. There shall be no disposal of such materials on the project site.

3.6 FIELD QUALITY CONTROL

A. The Contractor shall furnish and provide equipment and personnel to provide access for the Owner's Representative to any test location and test depth that is necessary, in the Owner's Representative's opinion, to properly evaluate compactive effort.

B. If specified compaction rates are not attained, the Owner's Representative may require the Contractor to utilize different compaction methods or lift thickness.

C. Compaction Testing:
   1. The moisture density relation to be used in establishing compaction will be ASTM D698 (Standard Proctor) or ASTM D4253 (Relative Density).
   2. Compactive effort may be evaluated by the use of any of the following standard test methods:
      a. ASTM D-6938 (nuclear).
      b. Other ASTM test methods may be used with approval by the Design Professional.

END OF SECTION

SECTION 31 25 00
EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 DESCRIPTION

A. Work Included:
1. This section encompasses the work necessary to install temporary stormwater pollution control measures which shall be required of the Contractor. This work shall consist of furnishing, installing, maintaining, and removing temporary control measures as needed to prevent the discharge of silty or polluted stormwater from the construction site, or as ordered by the Owner's Representative. The control of stormwater pollution through the use of erosion/sediment control devices shall be in accordance with these specifications and the Iowa Department of Natural Resources National Pollutant Discharge Elimination System (NPDES) General Permit No. 2 for Stormwater Discharge Associated with Construction Activities.

B. Stormwater Detention Basins
1. Conflict with federal, state or local laws, rules or regulations.
a. In the event of conflict between these requirements and pollution control laws, rules, or regulations of federal, state, or local agencies, the more restrictive laws, rules or regulations shall apply.

C. Method of Measurement and Basis of Payment
1. No measurement of any facility shall be made. All labor and material to construct, maintain, and remove erosion/sediment control facilities shall be included in the lump sum bid price for erosion/sediment control.

1.2 SUBMITTALS

A. Submit manufacturer’s catalog data and installation instructions for all applicable erosion/sediment control products.

B. Certification and Sampling: The Owner's Representative reserves the right to sample and test any material offered for use. Acceptance shall be based on the certification and the results of any tests the Owner's Representative may perform.

PART 2 PRODUCTS

2.1 MATERIALS

A. Erosion Control
1. Disturbed areas of the construction site that will not be redisturbed for fourteen (14) days or more must initiate temporary or permanent erosion control measures immediately, except as precluded by snow cover. In the event of snow cover, erosion control measures must be initiated as soon as practical thereafter. The following erosion controls may be used on the site.
a. Stabilizing Crop - Temporary Seeding, Fertilizer and Mulching – Type 4
1) Shall be in accordance with the Urban Standard Specifications for Public Improvements Manual (SUDAS), Division 9 – Site Work and Landscaping, Section 9010 – Seeding.

2) Type 4 seed mixture (Urban Temporary Erosion Control Mixture): Short lived (6 to 8 months) mix for erosion control.

Common Name	Application Rate lb/acre
SPRING – March 1 – May 20	
Oats	65
Annual ryegrass	40
SUMMER – May 21 – August 14	
Oats	95
Annual ryegrass	50
FALL – August 15 – September 30	
Grain rye	65
Annual ryegrass	40

3) Apply a 6-24-24 commercial fertilizer at a rate of 300 lbs/ac.
4) Temporary mulching for conventional seeding
   a) Shall be dry cereal straw free from noxious weeds.
   b) Application rate: 1-1/2 tons per acre; 70 pounds per 1,000 sq ft. Application by machine or hand, anchored to the soil with a mulching tiller.

b. Permanent Seeding
   1) Shall be in accordance with Section 32 92 19 - *Seeding and Soil Supplements*.

c. Sodding
   1) Shall be in accordance with Section 32 92 23 - *Sodding*.

d. Hydraulic Erosion Control
   1) Shall be Flexterra High Performance Flexible Growth Medium (HP-FGM) by Profile Products, LLC or approved equal.

2. All temporary erosion controls shall be removed and disposed of as needed to accommodate final site restoration.

B. Sediment Control
1. Practices used on the construction site to divert flows away from disturbed areas, to store flows, or to limit the discharge of pollutants from the site to the degree attainable.
   a. Compost Filter Tube
      1) Shall be in accordance with the Urban Standard Specifications for Public Improvements Manual (SUDAS), Division 9 – Site Work and Landscaping, Section 9040 and meet all the requirements of this Section.
      2) Flow rates: AASHTO M 288-96.
      3) Strength: Material strength shall be sufficient to prevent tearing, ripping, or other significant damage throughout the intended period of use.

4) Biodegradability: The tube shall be made of natural materials that are biodegradable. Products shall begin to break down in approximately six months.
5) Filter Material:
   a) Use material derived from wood, bark, or other non-toxic vegetative feedstocks.
   b) Use material with no visible admixture of refuse or other physical contaminants, nor any material toxic to plant growth.
   c) Use material meeting the following particle sizes:

Sieve Size	Percent Passing
2”	100
1”	90-100
3/8”	0-30

b. Stabilized Construction Entrance / Contractor Staging and Laydown Area
   1) Maintain existing pavement or provide 6" thick layer of 3" clean macadam stone.
   2) Install TenCate Marafi RS380i geotextile filter fabric below stone or approved equal.

c. Permeable Ditch Checks
   1) Shall be Georidge by Nilex or approved equal.

d. Intake Protection – Area Drain
   1) Shall be Dandy Bag or Dandy Pop by Dandy Products, Flexstorm Catch-It by Inlet and Pipe Protection, Inc. (IPP) with standard woven bag or approved equal.

e. Intake Protection – Grated Curb Intake
   1) Shall be Dandy Curb Bag by Dandy Products, Grate Gator Type B by ACF Environmental, Inc. or approved equal.

f. Intake Protection – Open Throat Curb Intake
   1) Shall be GeoCurve Inlet Filter by GeoSolutions, Inc., Dandy Curb by Dandy Products, Gutter Gator by ACF Environmental, Inc. or approved equal.

2. All temporary sediment controls shall be removed and disposed of as needed to accommodate final site restoration. Once final stabilization is complete, all sediment controls shall be removed by the Contractor.

PART 3 EXECUTION

3.1 GENERAL EROSION AND SEDIMENT CONTROL REQUIREMENTS

A. General
1. Qualified personnel (provided by the Contractor) shall inspect disturbed areas of the construction site that have not reached "final stabilization" at least once every seven (7) calendar days.
2. Contractor shall limit the surface area of erodible earth. The Contractor shall provide immediate permanent or temporary erosion/sediment control measures to prevent contamination of adjacent streams of other watercourses, lakes, ponds, or other areas of water impoundment.
3. Contractor shall incorporate all permanent erosion/sediment control features into the project at the earliest practicable time.
4. Minimum erosion/sediment control devices are shown on the Drawings. It is the Contractor's responsibility to control erosion and sediment on the site. Additional controls shall be installed as required to satisfy this requirement.

B. Limitation of Area Disturbed
1. The surface area of erodible earth material exposed at one time by clearing and grubbing, by excavating, by fill, or by borrow shall be minimized at all times without written approval of the Owner's Representative.
2. The maximum quantity of exposed area may be increased or decreased based on weather conditions, construction procedures or site conditions by Owner's Representative.

C. Rivers, Streams, and Impoundments
1. Construction operations in rivers, streams, and impoundments shall be restricted to those areas which must be entered for the construction of temporary or permanent structures.
2. Frequent fording of live streams with construction equipment shall be minimized.

D. Borrow and Waste Areas
1. All on-site borrow and waste areas, shall meet the requirements of the erosion and sediment controls as identified in the Drawings. Contractor shall provide all erosion/sediment controls as necessary to contain material on site.

3.2 STABILIZING CROP – TEMPORARY SEEDING, FERTILIZER AND MULCHING – TYPE 4

A. Shall be in accordance with the Urban Standard Specifications for Public Improvements Manual (SUDAS), Division 9 – Site Work and Landscaping, Section 9010 - Seeding.
1. Fertilizer: Apply fertilizer immediately prior to seedbed preparation. Incorporate fertilizer into the top 2 to 3 inches of topsoil.
2. Seedbed Preparation: Till the soil to a minimum depth of 5 inches with a disk, harrow or field cultivator.
3. Seed Application: Sow seed with an endgate cyclone seeder or a hand-operated cyclone seeder. Cover the seed and lightly till with a disk, rigid harrow, spring tooth harrow or field cultivator.
4. Mulching: Mulch all seeded areas the same day the seed is sown. Work the mulch into the soil with mulch anchoring equipment.

3.3 PERMANENT SEEDING

A. Installation procedures shall be in accordance with Section 32 92 19 - *Seeding and Soil Supplements*.

3.4 SODDING

A. Installation procedures shall be in accordance with Section 32 92 23 - *Sodding*.

3.5 HYDRAULIC EROSION CONTROL

A. Installation shall be in accordance with the manufacturer's specifications and details.

B. Apply at a minimum rate of 3500 lbs/acre dry weight.

3.6 COMPOST FILTER TUBE

A. Conditions Where Applicable:
1. Slopes less than 10% grade.

B. Construction Requirements:
1. Pneumatically fill mesh filter tube of size and length as indicated on the Drawings.
2. Excess tube material shall be tied off and staked at both ends.
3. Maximum compost filter tube spacing:

	Tube Diameter (Ft)	
Slope	8"	12" or Greater
0-2%	75'	125'
2-5%	50'	75'
5-10%	30'	50'

4. Do not use in areas of concentrated flow. Compost filter tubes are only intended to control and filter sheet flow.
5. Compost filter tubes should be placed using "smiles" and j-hooks.
6. In order to prevent water flowing around the ends of compost filter tubes, point the ends upslope to place at a higher elevation.

C. Maintenance
1. Any deficiencies shall be immediately corrected.
2. Sediment shall be removed when the control has lost 33% of its capacity.
3. Upon final stabilization, remove and dispose of any excess silt accumulations, grade and dress the area to the satisfaction of the Owner's Representative and establish vegetation on all bare areas in accordance with the contract requirements.

3.7 STABILIZED CONSTRUCTION ENTRANCE / STAGING AND LAYDOWN AREA

A. Maintenance
1. Condition of the aggregate shall be monitored daily to prevent tracking or flow of mud onto the surrounding roads, drives, and parking lots.
2. Accumulation of mud must be removed, and more aggregate added as needed.

3.8 PERMEABLE DITCH CHECKS

A. Conditions Where Applicable
1. Permeable ditch check spacing shall be computed as follows:

Ditch Grade (%)	Approximate Spacing (Ft)
1	75
1.5	55
2	35
3	25
4	19
5	15
6	12
7	10
8	9
9	8
10	7

B. Construction Requirements
1. Installation shall be in accordance with the manufacturer's specifications and details.

C. Maintenance
1. Sediment shall be removed 2 times per month or when it reaches one-half of the original height.
2. Additional removal of accumulated sediment as requested by the Owner's Representative shall be paid per cubic yard (cubic meter).
3. Sediment removal includes disposal to a location that eliminates deposition into construction areas or water courses.
4. Regular inspections shall be made to ensure that the center of the check is lower than the edges. Erosion around the edges of the check shall be corrected immediately.

3.9 INTAKE PROTECTION - AREA DRAIN

A. Conditions where applicable: for use with flat grates (including round) and mountable curbs.

B. Construction Requirements:
   1. Installation shall be in accordance with the manufacturer's specifications and details.
   2. Install as shown on the Drawings and at other locations as directed by the Owner's Representative.

C. Maintenance:
   1. Remove all accumulated sediment and debris as required.

3.10 INTAKE PROTECTION – GRATED CURB INTAKE

A. Conditions where applicable: for use with flat curb intake frame and grates.

B. Construction Requirements:
   1. Installation shall be in accordance with the manufacturer's specifications and details.
   2. Install as shown on the Drawings and at other locations as directed by the Owner's Representative.

C. Maintenance:
   1. Remove all accumulated sediment and debris as required.
   2. Inspect for cuts, abrasions, and proper installation. Replace or reposition as necessary.
   3. Discontinue use if it creates a traffic hazard.

3.11 INTAKE PROTECTION – OPEN THROAT CURB INTAKE

A. Conditions where applicable: for use with open throat curb intakes.

B. Construction Requirements:
   1. Installation shall be in accordance with the manufacturer's specifications and details.
   2. Install as shown on the Drawings and at other locations as directed by the Owner's Representative.

C. Maintenance:
   1. Remove all accumulated sediment and debris as required.
   2. Inspect for cuts, abrasions, and proper installation. Replace or reposition as necessary.
   3. Discontinue use if it creates a traffic hazard.

END OF SECTION

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SECTION 32 11 16.16
AGGREGATE SUBBASE COURSES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Granular subbase to be placed under paved areas.

1.2 SUBMITTALS

A. Submit rock gradation.

B. Submit to testing agency minimum ten-pound (4.5kg) samples of each type of fill material to be used. Provide samples to appointed testing laboratory, packed tightly in containers to prevent contamination.

C. If recent test results are available for fill materials to be used, disregard samples submission and submit such test results to the testing laboratory. Such test results are to clearly indicate types of materials and composition, hardness, compactibility, and suitability for proposed usage.

PART 2 PRODUCTS

2.1 GRANULAR SUBBASE

A. Abrasion: Less than 45, AASHTO T96.

B. Mud Balls: 4% maximum.

C. Gradation:

IDOT Gradation No. 14; 10% fines for normal pavement.

Sieve Size	Percent Passing
1.5 in.	100%
0.75 in.	70-90%
No. 8	10-40%
No. 200	3-10%

PART 3 EXECUTION

3.1 PREPARATION

A. Proofroll prepared subgrade prior to placing granular subbase. Pass/drive a loaded, 20-ton tandem dump truck over the prepared subgrade soil with a maximum allowable displacement of 1". Any areas that displace more than 1" shall be compacted until this criterion is met or those areas may be overexcavated and backfilled with Type 1 aggregate to 98% Standard Proctor Density at the Testing Agency's direction. All proofrolling shall be performed in the presence of the Owner's Representative. Do not begin granular subbase work until unsuitable subgrade conditions have been corrected.

B. For areas too small for a tandem dump truck to access, nuclear density testing of soil subgrade will be required.

3.2 GRANULAR SUBBASE

A. Check subgrade for conformity with elevations and sections immediately before placing aggregate subbase material. Subgrade shall have been prepared in accordance with Section 31 22 13 - Earthwork and Rough Grading.

B. Refer to Plan Details for subbase cross-section.

C. Granular subbase material shall be uniformly moist prior to, and during compaction. Material shall be pre-wetted to within ±3% of optimum moisture content prior to being delivered to the project site.

D. Place subbase material in compacted layers not more than 6 in. (150mm) thick to within ±1 in. (25mm) tolerance of top of finished subbase elevation.

E. Spread, shape, and compact all aggregate base material deposited on the subgrade during the same day.

F. Compact material to not less than 98% of maximum standard proctor density: ASTM D698.

3.3 IN-PLACE FIELD DENSITY TESTS

A. All testing will be provided by Owner.

B. Minimum field density testing requirement is one test per 2,000 square feet (185.5m^2) per lift.

END OF SECTION

SECTION 32 13 13
CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Section shall be used for all paving work unless local entities with jurisdictional authority have alternative requirements.

B. Pavement.

C. Curb and Gutter.

1.2 SUBMITTALS

A. Paving mix design for each different source of aggregate to be used. Mix designs shall be approved by the Iowa Department of Transportation or an independent testing laboratory.

B. Maturity Curves for paving mixes and maturity reading results.

C. Manufacturer's certification according to Table 7010.02.

D. Closeout Submittals:
1. Ready-mix delivery tickets, ASTM C94.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Aggregate Storage: Comply with Iowa DOT Article 2301.02, C.

B. Cement and Fly Ash: Comply with Iowa DOT Article 2301.02, C.

C. Admixtures: Store in suitable weather tight enclosures which will preserve quality.

D. Reinforcing Steel: Store off ground on timbers or other supports.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cement: Meet the requirements of Iowa DOT Section 4101 and Materials I.M. 401, including Type I and Type II cements and blended hydraulic cements Type 1P, Type 1S, and Type 1L.

B. Supplementary Cementitious Materials (SCM):
1. Fly Ash: Comply with Iowa DOT Section 4108.
2. Ground Granulated Blast Furnace Slag (GGBFS): Comply with Iowa DOT Section 4108.
3. Limestone: Comply with Iowa DOT Materials I.M. 401.

C. Fine Aggregate for Concrete:
1. Meet the requirements of Iowa DOT Section 4110 and Materials I.M. 409, Source Approvals for Aggregates.

2. Comply with the following gradation:

Sieve Size	Percent Passing
3/8”	100
No. 4	90 to 100
No. 8	70 to 100
No. 30	10 to 60
No. 200	0 to 1.5
Iowa DOT Article 4109.02, Gradation No. 1 in the Aggregate Gradation Table.	

D. Coarse Aggregate for Concrete:
1. Crushed stone particles with Class 2 durability complying with Iowa DOT Section 4115 and Materials I.M. 409, Source Approvals for Aggregates.
2. Comply with one of the following gradations:

Sieve Size	Gradation No. 3 Percent Passing	Gradation No. 4 Percent Passing	Gradation No. 5 Percent Passing
1 1/2”	100	100	-----
1”	95 to 100	50 to 100	100
3/4”	-----	30 to 100	90 to 100
1/2”	25 to 60	20 to 75	-----
3/8”	-----	5 to 55	20 to 55
No. 4	0 to 10	0 to 10	0 to 10
No. 8	0 to 5	0 to 5	0 to 5
No. 200	0 to 1.5	0 to 1.5	0 to 1.5
Iowa DOT Article 4109.02, Gradation No. 3, 4, and 5 in the Aggregate Gradation Table.			

3. The Design Professional may authorize a change in gradation, subject to materials available locally at the time of construction.

E. Water Requirements: Comply with Iowa DOT Section 4102. Potable water obtained from a municipal supply, suitable for drinking, may be accepted without testing.

F. Admixtures: Meet the requirements for the liquid admixtures shown below. Other admixtures may be used subject to the approval of the Design Professional.
1. Air Entrainment Admixture: Comply with Iowa DOT Section 4103.
2. Retarding and Water Reducing Admixtures: Comply with Iowa DOT Section 4103.
3. Accelerating admixtures (calcium chloride): Comply with Iowa DOT Article 2529.02.

G. Bars: Comply with Iowa DOT Section 4151 for tie bars and dowel bars. Meet the tie bar requirements for bar mats. All bars and tie wires must be epoxy coated.

H. Expansion Tubes: Comply with Iowa DOT Section 4191.

I. Metal Keyways: Comply with Iowa DOT Section 4191.

J. Supports for Bars: Comply with Iowa DOT Materials I.M. 451.01.

K. Joint Fillers and Sealers:
1. Joint Sealers: Comply with Iowa DOT Article 4136.02.
2. Preformed Expansion Joint Fillers and Sealers: Use the following types of preformed materials for filling expansion joints that comply with Iowa DOT Article 4136.03. When the type is not specified, use a resilient filler.
   a. Resilient filler.
   b. Flexible foam expansion joint filler.
   c. Tire buffings expansion joint filler.
   d. Elastomeric joint seals.

L. Liquid Curing Compound: Comply with Iowa DOT Section 4105.

M. Covering:
1. Burlap: Comply with Iowa DOT Section 4104.
2. Plastic Film: Comply with Iowa DOT Section 4106.
3. Insulating Cover: Comply with Iowa DOT Section 4106.

2.2 CONCRETE MIXES

A. Mix Design:
1. Comply with Iowa DOT Class C meeting the requirements of Materials I.M. 529. If higher durability mixes are specified, use C-SUD or CV-SUD mixes. Concrete pavement within City of Iowa City R.O.W. to be C-SUD mix.
2. Ensure compatibility of all material combinations. If the concrete materials are not producing a workable concrete mixture, a change in the material may be required. Changes will be at no additional cost to the Owner.
3. Seven-day compressive strength of moist-cured laboratory samples: 2,400 psi min. (16,462 kPa). See table for minimum compressive strength to reach prior to opening to traffic.
4. Twenty-eight day compressive strength of moist-cured laboratory samples: 4,000 psi min.(27,436 kPa).

B. Consistency and Workability:
1. Slump:
   a. Use an amount of mixing water that will produce workable concrete of uniform consistency. Unless specifically modified by the Design Professional, ensure slump, measured according to Iowa DOT Materials I.M. 317, is no less than 1/2 inch or no more than 2 1/2 inches for machine finish and no less than 1/2 inch and no more than 4 inches for hand finish.
   b. If it is not possible to produce concrete having the required consistency without exceeding the maximum allowable water to cement ratio specified, the cement content may be increased or water reducing admixture may be added. Obtain the Design Professional's approval. Do not exceed the maximum water to cement ratio. Additional cement or water reducer will be added with no additional cost to the Owner.
   c. The basic absolute volume of water per unit volume of concrete is based on average conditions. If material characteristics require that the total quantity of water used to secure the required consistency reduces the batch yield (computed on the basis of absolute volumes of the batch quantities used) by more than 2.0%, the Design Professional may adjust the proportions to correct the yield. This adjustment will not be a basis for adjustment of the contract unit price.

2. Air Content: Use an approved air entraining agent.
   a. For machine-placed pavement, use a target air content of 8% with a tolerance of plus or minus 2% when measured on the grade just prior to consolidation, as determined by Iowa DOT Materials I.M. 318. The target air content may be adjusted by the Design Professional based on random tests of the consolidated concrete behind the paving machine. These additional tests will be used to consider the need for a target value change and will not be used in the acceptance decision.
   b. For hand-placed pavement, use a target content for hand finish of 7% with a tolerance of plus or minus 1.5% when measured on the grade and just prior to consolidation, as determined by Iowa DOT Materials I.M. 318.

C. Use of Fly Ash and Ground Granulated Blast Furnace Slag (GGBFS) as Supplementary Cementitious Materials:
   1. Mix proportions for the various mixes using fly ash and GGBFS are included in Iowa DOT Materials I.M. 529. The maximum allowable fly ash substitution rate is 20%. Do not use a GGBFS substitution rate of more than 35% by weight (mass). The total supplementary cementitious material substitution rate is not to exceed 40%.
   2. If C-SUD or CV-SUD mixes are specified, the maximum allowable Class F fly ash substitution rate is 25% and the maximum Class C fly ash substitution rate is 35%. The maximum combination rate is 20% Class C fly ash and 20% GGBFS.
   3. When Type IP or IS cement is used in the concrete mixture, only fly ash substitution will be allowed. Between October 16 and March 15, supplementary cementitious materials will be allowed only when maturity method is used to determine time of opening. Transport, store, haul, and batch fly ash and GGBFS in such a manner to keep it dry.

PART 3 EXECUTION

3.1 EQUIPMENT

A. Batching and Mixing Equipment:
   1. General:
      a. Weighing and Proportioning Equipment: Comply with Iowa DOT Article 2001.20.
      b. Mixing Equipment: Comply with Iowa DOT Article 2001.21.
      c. Material Bins: Involves any structure in which materials are stored. Each part of any bin, including foundations and supports, must be adequate to withstand any stress to which it might be subjected to while in use.

   2. Batching:
      a. Ensure the batching plant is Iowa DOT calibrated and approved. Provide copy of current calibrations and approvals.
      b. Coordinate the batch plant operation and batch trucks with the paving operation in order to ensure a steady supply of materials.
      c. Operate the batch plant and trucks to minimize dust, noise, or truck nuisances.

3. Mixing:
   a. Construction or Stationary Mixer:
      1) Ensure the concrete is uniform in composition and consistency. If this condition is not produced because of the size of the batch, the size of the batch may be reduced or the mixing time increased, or both, until this result is obtained. If non-uniform, corrective action must be taken.
      2) Ensure the methods of delivering and handling the concrete are such that objectionable segregation or damage to the concrete will not occur, and they will facilitate placing with a minimum of handling.

   b. Ready Mixed Concrete:
      1) Ensure the concrete is uniform in composition and consistency. If non-uniform, concrete producers must take corrective action.
      2) Ready mixed concrete is defined as concrete proportioned in a central plant and mixed in a stationary mixer for transportation in trucks without agitation, proportioned at a central plant, and only partially mixed in a stationary mixer for transportation and finish mixing in a transit mixer, or proportioned at a central plant, and then mixed in a transit mixer prior to or during transit.
      3) When necessary to add additional mixing water at the site of placement, mix the batch at least an additional 30 revolutions of the drum at mixing speed.
      4) Ensure each vehicle in which concrete will be delivered is capable of discharging concrete having a slump not over 2 inches at an overall rate for its entire load of not less than 1.25 cubic yards per minute. Ensure the concrete is delivered at a rate sufficient to maintain a sustained rate of progress of not less than 100 feet per hour for the width and depth of pavement to be placed.

   c. All Methods: Identify each truck load by a plant charge ticket showing plant name, contractor, project data, quantity, class, time batched, and water added at site.

B. Concrete Placement Equipment:
   1. General:
      a. In handling concrete from the mixer to the place of deposit, take care to avoid segregation.
      b. When concrete is deposited through a chute, slope the chute to allow concrete to flow slowly without segregation. Place the delivery point of the chute as close as possible to the point of deposit. Keep chutes and spouts clean. Thoroughly flush them with water before and after each run. Discharge the water outside the paving area in an approved concrete washout area.
      c. Provide alternate plan for concrete delivery in event of equipment failure.
      d. Take concrete samples from material placed on the subgrade or subbase.

2. Concrete Transfer Equipment:
   a. Utilize placers, conveyors, buckets, or buggies designed specifically for transporting concrete.
   b. Do not allow concrete to free fall into or out of transfer equipment.
   c. Meet the requirements of Section 7010, 2.02, B, 2 for air entrainment of the concrete mix and testing for compliance.

3. Concrete Pumps:
   a. Do not pump concrete through aluminum conduit or tubing.
   b. Use the concrete pump to deliver the material as close to horizontal as possible, keep restrictions and drops to a minimum, and avoid free fall.
   c. Meet the requirements of Section 7010, 2.02, B, 2 for air entrainment of the concrete mix and testing for compliance.
   d. Sample the first load after pumping a minimum of 3 cubic yards. Sample after each significant change in boom angle.
   e. Sample before and after the pump to determine if any changes in the slump and other significant mixture characteristics occur.
   f. When sampling at the end of the placement line, take care to ensure that the sample is representative of the concrete being placed from the pipeline. Note: Changes to the placement rate or boom configuration can result in changes in the concrete properties. Typically, the vertical position of the boom results in the greatest potential for air loss while the horizontal position of the boom has the least potential. Location of pumping equipment should be determined so that it is possible to maintain a consistent, low boom angle as much as possible during placement.
   g. If air test shows that air entrainment is outside of the allowed range, follow procedure as outlined in Section 3.7.E.
   h. Leaks in the line or pump hydraulics, which would allow air to be added to the concrete, are prohibited.

C. Consolidating and Finishing Equipment:
   1. Consolidating and Finishing Equipment: Use a paving machine that meets all of the following:
      a. Is designed for the specific purpose of placing, consolidating, and finishing concrete pavement.
      b. Develops vertical edges on the pavement.
      c. Is self-propelled and equipped with a means for spreading the concrete to a uniform depth before it enters the throat.
      d. Vibrates the concrete to the full width and depth being placed in a single passage. Use vibrating tubes or arms working in the concrete or a vibrating pan operating on the surface of the concrete.
      e. Produces a surface reasonably free of voids and tears.
      f. When the paver is operated on previously placed concrete, prevent damage to the pavement surface.
      g. For slip form pavers, use a paver equipped with automatic horizontal and vertical grade controls.
      h. Hand methods utilizing air screeds and vibrating screeds may be used for short pavement runs, cul-de-sacs, driveways, and some intersections.

i. Use a laser guided screed that meets all of the following:
   1) Designed for the specific purpose of placing and finishing of concrete pavement using a 3-dimensional surface model.
   2) All equipment for laser guided screed, including the guidance system, will meet the project design model tolerances.
   3) Will provide consolidation to full width and full depth of concrete placement. Provide intermediate consolidation by using external handheld vibrators.
   4) Produces a surface reasonably free of voids and tears.
   5) Provide boom-style screed (drive-in screeds are not allowed) with an auger boom, placement head (water spray mechanism not allowed), guidance equipment, and software to produce 3-dimensional surface.
   6) Produces pavement smoothness as specified in part 3.7.F.

2. Vibrators for Machine Paving:
   a. Consolidate, with a single pass of an approved internal or surface vibrator, the full width and depth of concrete requiring a finishing machine. Operate internal vibrators within a frequency range of 4,000 to 8,000 vibrations per minute. The Design Professional may authorize the minimum vibration frequency to be lowered to 3,500 vibrations per minute for particular sections of paving, such as superelevations. Operate surface vibrators within a frequency range of 3,500 to 6,000 vibrations per minute.
   b. Avoid operating vibrators in a manner to cause a separation of the mix ingredients, either a downward displacement of large aggregate particles or an accumulation of laitance on the surface of the concrete. When forward motion of the paver is reduced, vibrator frequency may need to be reduced to avoid separation of the mix.
   c. If a vibrator fails to operate within the specifications, repair or change the vibrator before the paving begins:
      1) The following day, or;
      2) The same day if the continuous paving that day is stopped at a header or at the end of a session.
   d. If two adjacent vibrators fail to operate within the specifications, stop the paving operation and repair or replace the vibrators.
   e. Stop vibrators whenever forward motion of the paver is stopped.
   f. Set the internal vibrator penetration depth into the concrete pavement to mid slab or as deep as possible while passing above reinforcing steel. Provide an operating position locking device so that no part of the vibrating unit can be lowered to the extent that it will come in contact with reinforcing steel or tie bars while paving.
   g. Do not exceed the manufacturer’s recommendations for vibrator horizontal spacing. Do not exceed 16 inches from center to center.
   h. Mount the longitudinal axis of the vibrator body approximately parallel to the direction of paving. Tilt the trailing end of each vibrator downward to an approximate slope of 15 degrees below horizontal.
   i. Use vibrators that meet or exceed the following specifications at the manufacturer's design frequency of 10,000 vpm:
      1) Amplitude (peak to peak) 0.070 inches.
      2) Centrifugal force 1,200 pounds.

3. Vibrators for Hand Methods: Use a vibration rate between 3,500 to 6,000 vibrations per minute, and use an amplitude sufficient to be perceptible on the surface of the concrete more than 12 inches from the vibrating unit.
4. Hand Finishing Equipment: Provide all finishing tools necessary for proper finishing of the concrete including straightedges for checking and correcting finished concrete surfaces.
5. Forms:
   a. Rigid Forms: Steel, minimum thickness of 5 gage, height at least equal to design thickness of pavement with base width at least 6 inches.
      1) Minimum section length of 10 feet, joint connections designed to allow horizontal and vertical adjustment with locking device to hold abutting sections firmly in alignment.
      2) Bracing, support, and staking must prevent deflection or movement of forms.

   b. Flexible Forms: Use steel or wood flexible forms for curves with a radius less than 100 feet.
      1) Bracing, support, and staking must prevent deflection or movement of forms.
      2) Ensure that forms used to shape back of curbs at returns have height at least equal to design thickness of pavement and curb height.
      3) Forms must be free from scale and surface irregularities.

6. Curing Equipment: Use pressure sprayer capable of applying a continuous uniform film of curing compound. Use equipment with a shield if wind conditions do not allow proper coverage.
7. Concrete Saws: Use power operated concrete saws capable of cutting hardened concrete neatly.
8. Joint Sealing Equipment: Use equipment capable of cleaning the joint and heating and installing sealant in joints according to manufacturer's recommendations.

3.2 PAVEMENT CONSTRUCTION

A. Removal of Pavement:
   1. Sawcut pavement to full depth at the edges of removal. A second saw cut, 2 inches inside the initial saw cut, may be required to prevent damage to adjacent pavement.
   2. Do not damage pavement that is to remain. Do not use heavy equipment adjacent to new concrete until the opening strength is achieved.

B. Final Subgrade/Subbase Preparation:
   1. General:
      a. Meet the requirements of Section 32 11 16.16 for subgrade construction, subgrade treatment, and subbase construction.
      b. Trim the subgrade or subbase to the final grade for placement of concrete.
      c. Unless otherwise ordered by the Design Professional, the subgrade or subbase, at time of placing concrete for concrete pavement, must be in a uniformly moist but not muddy condition to a depth of not less than 1 inch.

2. Subgrade and Subbase Loading:
   a. Concrete trucks may drive over the subbase as long as this does not rut, pump or tear the finished rock surface. The Contractor shall provide other means of concrete placement if this causes any damage to the subbase.
   b. Enter and exit from side streets to minimize repetitive loading on the subgrade or subbase by concrete trucks.
   c. Do not allow loads in excess of the legal axle load on the completed subgrade or subbase.
   d. Partially loaded trucks may be required.
   e. If subgrade or subbase failure occurs, coordinate the repair with the Owner.

3. Paving Suspended:
   a. Suspend the paving operation where subgrade or subbase stability has been lost.
   b. Do not place concrete on a subgrade or subbase that has become unstable, bears ruts or tire marks of equipment, or that is excessively softened by rain until such subgrade or subbase has been reconsolidated and reshaped to correct the objectionable condition.
   c. If necessary, scarify to a minimum depth of 6 inches, aerating, and recompacting at no additional cost to the Owner. Meet the compaction requirements of Section 32 11 16.16 and the details in the construction documents.

4. Maintenance of Subgrade or Subbase: Maintain the completed subgrade or subbase during subsequent construction activities.

C. Surface Fixture Adjustment:
   1. Adjust manhole frames and other fixtures within area to be paved to conform to finished surface.
   2. Clean outside of fixture to depth of pavement before concrete placement.
   3. Construct boxouts where allowed for later adjustment of fixtures.

D. Setting of Forms: When forms are used, meet the following requirements.
   1. Ensure forms have sufficient strength to support paving operations being used.
   2. Set base of forms at or below subgrade elevation with top of forms at pavement surface elevation. With Design Professional approval, extra height forms may be used to shape the back of integral curb and edge of pavement; set base at or below subgrade elevation with top of form at top of curb elevation.
   3. Place and secure forms to required grade and alignment. Do not vary the top face of the form from a true plane by more than 1/8 inch in 10 feet, and do not vary the vertical face from a true plane by more than 1/4 inch in 10 feet.
   4. If the soil supporting the forms is softened by rain or standing water so that the forms are inadequately supported, or if voids occur under the forms, remove forms. Rework subgrade to proper elevation and density, and reinstall forms.
   5. Ensure forms are free of latent concrete and coated with release agent before concrete is placed.

E. Bar and Reinforcement Placement: Ensure bars are clean, straight, free from distortion and rust, and are firmly secured in position as specified in the contract documents. Place all bars in approved storage to prevent damage; do not distribute along the work site except as needed to avoid delay in paving.

1. Tie Bars:
   a. Place bars prior to vibration. For slip form paving, tie bars may be installed after vibration, provided the concrete is consolidated around the bars. Bars may be supported by approved chairs or may be placed in position by a machine or method approved by the Design Professional.
   b. Use approved continuous bolsters with runners to support reinforcement for bridge approach sections. Place the supports transversely across the approach and space them longitudinally no greater than 4 feet. For double reinforced approach sections the top layer of reinforcing may be chaired off the bottom layer of reinforcing using approved continuous high chairs with runners, provided they are positioned directly above the continuous bolsters with runners supporting the bottom layer of reinforcing. Hold epoxy coated reinforcing steel in place with epoxy or plastic-coated bar supports and epoxy or plastic-coated tie wires.

2. Dowel Bar Assemblies:
   a. When dowel bar assemblies are required in the contract documents, accurately place these assemblies as shown. To prevent their movement during subsequent concrete paving operations, securely stake or fasten to the base to line and grade.
   b. Do not use assemblies that are damaged prior to placement. If assemblies are damaged after placement, replace prior to paving. Ensure horizontal and vertical alignment of the load transfer bars does not exceed 1/4 inch from parallel to line and grade. Place each assembly so the bars are in a horizontal plane at T/2 ± 1/2 inch.
   c. Check the placement of each assembly and the position of the bars within the assembly using a suitable template or other device approved by the Design Professional. If the assembly is found to be placed outside of the above tolerances, correct the placement.
   d. Cutting the tie wires of the load transfer assemblies is optional.

3. Bar Mats for Reinforced Pavement:
   a. When reinforced pavement is specified, assemble bar mats accordingly and firmly fastened together at all bar intersections.
   b. Place, secure, latch, and tie bar mats for a continuous mat as specified in the contract documents. Displacement during concrete placement operations is not allowed.
   c. Use chairs to ensure proper placement of bar mats.

4. Tie Bars and Dowel Bars in Existing Pavement:
   a. When anchoring in existing concrete, use a grout system according to the manufacturer's instructions. Obtain the Design Professional’s approval for the grout system.

b. For horizontal installations, use either a pressure injection system with mechanical proportioning and mixing, or use encapsulated chemical anchors. Install as follows:
   1) Ensure drilled holes to receive the grout match the dimensions and spacing specified in the contract documents. When not specified in the contract documents, the maximum nominal diameter of the hole must be 1/8 inch larger than the outside diameter of the dowel or bar, or as recommended by the manufacturer. Drill holes for tie bars and dowel bars into the face of the existing pavement at midpoint. To ensure proper horizontal alignment, do not allow any hole misalignments to exceed 1/4 inch in the vertical or horizontal plane. Clean the hole with compressed air immediately prior to placing the grout.
   2) Use a polymer grout to secure the dowels in the existing pavement. Inject the grout into the rear of the hole with pressure. Use sufficient grout so that when the bar to be grouted is placed in position, excess grout will be forced out the front of the hole. Rotate the bar during the insertion process to ensure complete coating with the grouting material. Hand proportioning and mixing is not allowed.
   3) If using grout with approved encapsulated anchors, install according to the manufacturer's recommendations.
   4) Use horizontal installation procedures for vertical or angled installations; however, pourable grouts may be used. Pourable grouts must be mechanically mixed.

F. Concrete Pavement Placement:
   1. All pavement shall be placed such that the surface has positive drainage. It is the Contractor's responsibility to check grades after forms are set to verify positive drainage prior to pouring concrete. Contractor shall notify Owner's Representative if any potential drainage issues exist. Owner's Representative will direct the Contractor how to modify grades and proceed. Any areas of concrete that do not drain shall be removed and replaced in full panels until positive drainage can be obtained. Any costs associated with replacing panels to obtain positive drainage shall be paid for by the Contractor.
   2. Use paving machine for all uniform width pavements 8 1/2 feet or more in width and 250 feet or more in length, unless alternate methods are approved by the Design Professional. Screeds may be used on short pavement runs up to 250 feet.
   3. Place, consolidate, and finish the concrete to the full depth and width conforming to the specified crown and cross-section in a single operation.
   4. Keep a uniform pile of concrete in front of the paving machine, up to a maximum of 6 to 8 inches above the design surface elevation. Distribute and spread the concrete as soon as placed. A mechanical concrete spreader may be used.
   5. Deposit the concrete upon the in-place bars keeping segregation to a minimum.
   6. Use shovels, not rakes, to do necessary hand spreading and spading.
   7. Do not allow the edges of pavement, including all longitudinal construction joints, to deviate from the line shown on the plans by more than 1/2 inch at any point.
   8. If the paving machine operates on adjacent pavement, protect pavement from damage.

9. When placing by hand methods, consolidate the concrete by using vibrating units. Use a definite system or pattern in the operation of the vibrator so the full width of concrete in each linear foot of lane will receive adequate and uniform consolidation. The system and methods of vibrating is subject to approval of the Design Professional. Do not use vibrating equipment as a tool for moving concrete laterally.

G. Integral Curbs: All curbs shall be integral. Integral curbs are placed with the pavement in a single paving machine operation; however, hand methods may be allowed for radius, returns, and sections of curb and gutter 100 feet or less in length or in other special sections where mechanical equipment cannot be used.
1. Pave, edge, protect, saw, and cure curb in same manner as pavement.
2. Finish curb as rapidly as finishing operations on pavement permit. Maximum distance behind paving machine is 100 feet.
3. Complete final finish on curbs by hand methods, including the use of a 6 foot straightedge.
4. Check surfaces of curb and gutter with 10 foot straightedge; correct variations greater than 1/8 inch.
5. For drop curb at driveways and where sidewalks intersect streets, use forms to shape the backs of such curbs.
6. When using hand methods for building curb, the following additional requirements will apply:
    a. Remove free water, latency, dust, leaves, or other foreign matter from the slab prior to placing concrete for curb.
    b. Use freshly mixed concrete; do not store concrete in receptacles at side of pavement for use in curb at a later time; do not use concrete requiring retempering.
    c. Consolidate curb concrete to obtain adequate bond with the pavement slab and to eliminate honeycomb in the curb. Avoid disturbing the alignment of forms or the gutter flow line.

H. Finishing:
1. Grade and Crown: Promptly after concrete has been placed and vibrated, strike off the surface to the true section by the screed. Finish the surface true to crown and grade.
2. Watering the Surface: The practice of lubricating the pavement surface by sprinkling water by spray, brush, or other methods to afford greater ease in finishing operation is not allowed.
3. Floats: Finish surface with wood or magnesium floats; finish from both sides simultaneously if pavement is placed to full width with one pass of paving machine.
4. Straightedging:
    a. After the longitudinal floating has been completed and the excess water has been removed, and while the concrete is still plastic, test the pavement surface for trueness.
    b. Immediately fill any depressions found with freshly mixed concrete, struck off, consolidated, and refinished.
    c. Check surface longitudinally while concrete is still plastic; correct any surface deviations greater than 1/8 inch in 10 feet.

5. Surface Treatment:
   a. Drag Surface Treatment: Unless otherwise specified, texture the finished surface with an artificial turf or burlap drag treatment.
      1) Pull the artificial turf or burlap drag longitudinally over the finished surface to produce a tight, uniform, textured surface, and round the edges in a workmanlike manner.
      2) Remove the artificial turf or burlap drag from the pavement surface at regular intervals and clean with water to remove accumulated concrete from the fabric in order to maintain a consistent finished texture.
      3) When the desired texture is not attained, the Design Professional may require the final finish be a broom finish.

   b. Surface Tining: When surface tining is specified, use a longitudinal tining. Under special circumstances, when specified in the contract documents, transverse tining may be required.
      1) Longitudinal:
         a) Complete longitudinal surface tining using a machine with a wire broom or comb. For small or irregular areas, or during equipment breakdown, hand methods may be used. Use a broom or comb with a single row of tines 1/8 inch (+/- 1/64 inch) in width and uniformly spaced at 3/4 inch intervals. The depth of the grooves must be a minimum of 1/8 inch to a maximum of 3/16 inch in the plastic concrete.
         b) Use equipment with horizontal and vertical string line controls to ensure straight grooves.
         c) Conduct this operation at such time and in such manner that the desired surface texture will be achieved while minimizing displacement of the larger aggregate particles and before the surface permanently sets.
         d) At longitudinal joints, leave a 2 to 3 inch wide strip of pavement surface (centered along the joint) that is not grooved for the length of the joint.

      2) Transverse:
         a) If transverse surface tining is required or allowed, use a machine with a wire broom or comb. For small or irregular areas, or during equipment breakdown, hand methods may be used. Use a broom or comb with a single row of tines 1/8 inch (+/- 1/64 inch) in width and randomly spaced from 3/8 inch to 1 5/8 inch with no more than 50% of the spacing exceeding 1 inch. The depth of the grooves must be a minimum of 1/8 inch to a maximum of approximately 3/16 inch in the plastic concrete.
         b) Conduct this operation at such time and in such manner that the desired surface texture will be achieved while minimizing displacement of the larger aggregate particles and before the surface permanently sets.

c) Where abutting pavement is to be placed, the tining should extend as close to the edge as possible without damaging the edge.
d) If abutting pavement is not to be placed, do not tine the 6 inch area nearest the edge or 1 foot from the face of the curb.

6. Edge Finish: Before the concrete has taken its initial set, finish all edges of the pavement with an 1/8 inch radius edging tool.

I. Surface Curing:
1. Apply liquid curing compound in a fine spray to form a continuous, uniform film on the horizontal surface and vertical edges of pavement, curbs, and back of curbs immediately after surface moisture has disappeared, but no later than 30 minutes after finishing. With approval of the Design Professional, the timing of cure application may be adjusted due to varying weather conditions and concrete mix properties to ensure acceptable macrotexture is achieved.
   a. Use a white pigment liquid curing compound for concrete not receiving an asphalt overlay. When specified in the contract documents, use a linseed oil solution.

2. Apply compound with power sprayer; rate of application not less than 15 square yards per gallon (0.067 gallon per square yard); do not dilute compound. For concrete receiving an asphalt overlay, use a minimum rate for dark-colored cure of 12.5 square yards per gallon (0.08 gallon per square yards).
3. Ensure liquid curing materials are well agitated in the supply drum or tank immediately before transfer to the sprayer. Keep curing materials well agitated during application.
4. Hand operated sprayers may be used for small and irregular areas.
5. If forms are used, apply to pavement edges and back of curbs within 30 minutes after forms are removed.
6. If, due to other operations, the coating is damaged within 72 hours after being applied, immediately re-coat the affected areas. Coating of the sawed surface with curing compound will not be allowed on joints that are to be sealed. When pavement is opened to traffic prior to 72 hours after application of the curing coating, a re-coating will not be required.

J. Construction of Joints:
1. General:
   a. Construct joints of the type, dimensions, and at the locations specified in the contract documents.
   b. Place longitudinal joints coincident with or parallel to the pavement centerline.
   c. Place all transverse joints at right angles to the centerline and extend the full width of the pavement.
   d. Place all joints perpendicular to the finished grade of the pavement and do not allow the alignment across the joint to vary from a straight line by more than 1 inch.
   e. Exercise care in placing, consolidating, and finishing the concrete at all joints.

2. Saw Joints:
   a. Mark joint locations with a string line before sawing.
   b. Begin transverse joint sawing as soon as the concrete has hardened sufficiently to allow sawing without raveling or moving of aggregate. Saw joints before uncontrolled cracking takes place.
   c. Saw all joints in a single cutting operation for a specific joint. Make saw cuts true to line and to the dimensions specified in the contract documents.
   d. Discontinue sawing a joint if a crack develops ahead of the saw.
   e. Saw joints within 24 hours of the concrete being placed.
   f. If necessary, continue the sawing operations both day and night.
   g. The concrete must be capable of supporting the sawing operations to allow the use of an early green concrete saw.
   h. Repair or replace pavement with uncontrolled or random cracking at no additional cost to the Owner. Use repair methods approved by the Design Professional. Repair or replace at the direction of the Design Professional.
   i. Use wet sawing for dust control.

3. Construction Joints:
   a. Place longitudinal and transverse construction joints where specified in the contract documents, at boxouts, and at headers.
   b. Locate and place forms for boxouts on grade prior to paving.
   c. If concrete placement is delayed for more than 30 minutes or at the end of each day, construct a Days Work (DW) or a Rigid Tie (RT) transverse construction joint within 5 feet of a planned transverse contraction joint.
   d. Finish the edges of the pavement at construction joints with a 1/8 inch radius edging tool.

4. Expansion Joints:
   a. Install expansion joints as specified in the contract documents.
   b. Prevent movement of or damage to joint assembly when placing concrete; set joint material low enough to clear the finish machine.
   c. Construct double width expansion joint in curb over expansion joint in pavement. The backside of the joint must be clear of concrete.
   d. Align the expansion joint straight and true. After the mechanical finishing equipment has passed over the joint, check the joint for movement. If movement in excess of 1/2 inch has occurred, immediately correct the installation to its intended position.
   e. If joint fillers are assembled in sections, or if joints as a whole are constructed in sections, do not allow offsets between adjacent fillers.
   f. Where more than one section is used in a joint, securely lace or clip the sections together.
   g. Supplemental vibration equipment is required for proper consolidation of the concrete.
   h. After the surface finishing has been completed, finish the edge of the joint with a 1/8 inch edging tool.

5. Joint Sealing:
   a. Timing:
      1) Unless otherwise allowed or approved by the Design Professional, before any portion of the pavement is opened to the Contractor's equipment or to general traffic, clean and seal joints that require sealing.
      2) The Design Professional may limit the wheel loads and axle loads of equipment operating on the pavement during this operation, if prior to the age and strength specified in Part 3.06, Use of Pavement. Additional tests to determine the pavement strength may be required.

   b. Cleaning:
      1) For those joints that are not to be sealed, cleaning is not required.
      2) Within 3 hours after a joint has been wet sawed to the finished dimension, flush the wet sawing residue away from the sawed faces using a high pressure water blast operating with a minimum pressure of 1,000 pounds per square inch. Within 3 hours after a joint has been dry sawed to the finished dimension, blow the dry sawing residue from the joint using air compressors that provide moisture and oil free compressed air.
      3) Immediately prior to installation of sealant, clean joints with an air blast. Do not perform sealing until visual examination verifies the joint surfaces appear dry, in addition to being clear of dust and contamination.

   c. Sealing:
      1) Prepare and install joint sealer in the joint and to the proper level specified in the contract documents and as recommended by the manufacturer.
      2) Heat hot-poured sealers in a thermostatically controlled heating kettle; heat the material to the temperature required for use, but not above that recommended by the manufacturer. After sealing, remove excess sealer from the pavement surface.
      3) Seal joints the same day they are cleaned. Apply sealant only when the joint surfaces appear dry by visual examination.
      4) Place joint sealer only when the pavement and ambient air temperatures are 40°F or above. When near this minimum, additional air blasting or drying time, or both, may be necessary to ensure a satisfactory bond to the joint faces. When this sealer cannot be properly placed due to late fall work, submit a joint construction plan and sealing details to the Design Professional for approval before commencing paving. Delay the cleaning, sealing, and, if required, resawing of joints until the following spring. This delay requires the Design Professional’s approval.
      5) When surface correction is required, repair seals damaged from the corrective work. Joint preparation, cleaning, and sealing may be delayed until after corrective work, provided the pavement is not opened to traffic before corrective work is performed.

K. Pavement Backfill: Following slipform paving operations, place backfill material along the pavement within 48 hours of pavement attaining opening strength or as directed by the Design Professional to prevent flow of water and any subsequent damage caused by undermining of the pavement. Prior to placement of full backfill material, construct check dams or other protection as appropriate to ensure no damage to the subgrade and/or subbase occurs.

L. Form Removal:
1. Timing:
a. Remove forms after the initial set of the concrete has taken place.
b. Remove stakes and forms with care to prevent cracking, spalling, or over stressing concrete. If damage does occur, repairs will be made as required by the Design Professional.

2. Honeycomb Repair:
a. When the forms are removed, fill honeycombs with mortar composed of 1 part cement and 2 parts fine aggregate by weight.
b. If the honeycombing is to the degree and nature that it is considered by the Design Professional as defective work, remove and replace at no additional cost to the Owner.

3. Paving Protection: In the area adjacent to the curbs and pavement edge, immediately place backfill after the forms are removed. Construct dams or other protection to ensure that no saturation or erosion of the subgrade under or near the pavement occurs. This may include check dams, pumping, etc.

3.3 CURB AND GUTTER CONSTRUCTION

A. Complete the construction of curb and gutter separate from pavement in the same manner as for pavement in Section 32 13 13, paragraph 3.2.

B. Use a paving machine for curb and gutter. For curb and gutter sections less than 250 feet, hand finish methods may be used.

3.4 PAVEMENT PROTECTION

A. Weather Conditions: Do not place concrete when stormy or inclement weather or temperature prevents good workmanship. Temperature restrictions and protection requirements may be modified by the Design Professional under unusual conditions.
1. Cold Weather:
a. Paving: Do not place aggregates containing frozen lumps, and do not place concrete on a frozen subgrade or subbase. Take all necessary actions to prevent the pavement from freezing.
1) Concrete mixing and placement may be started, if weather conditions are favorable, when the air temperature is at least 34ºF and rising. At the time of placement, concrete must have a temperature of at least 40ºF.
2) Stop mixing and placing when the air temperature is 38ºF or less and falling or if the temperature stops rising and does not reach 38ºF.

b. Protection: Prior to applying protection, cure all concrete pavement and curb/gutters, including exposed edges of the pavement and curb. In addition, protect concrete less than 36 hours old as follows:

Night Temperature Forecast	Type of Protection*
35°F to 32°F	One layer of burlap for concrete.
31°F to 25°F	Two layers of burlap or one layer of plastic on one layer of burlap
Below 25°F	Four layers of burlap between layers of 4 mil plastic or equivalent commercial insulating material approved by the Engineer

*Keep protection in place until one of the following conditions is met:

1) The pavement is 5 calendar days old.
2) Opening strength is attained.
3) Forecasted low temperatures exceed 35°F for the next 48 hours.
4) Forecasted high temperatures exceed 55°F for the next 24 hours and subgrade temperatures are above 40°F.
   a) Shut down paving operations in time to comply with protection requirements outlined above. During cold weather, allow more time for finishing and protection. Perform all finishing and covering operations prior to darkness. Temperature restrictions and protection requirements may be modified by the Design Professional.
   b) Equivalent commercial insulating material approved by the Engineer may be used. This material must be waterproof and have a minimum R value of 1.0. If initial set has not yet occurred, place a layer of burlap on top of concrete prior to placing insulating blankets.
   c) Use a method of protection and materials that will maintain the concrete temperature above 40°F.

2. Hot Weather: When climatic or other conditions are such that there is high ambient temperature, high concrete temperature, low relative humidity, or high wind speed at the time of delivery to the work site, during placement or during the first 24 hours after placement, concrete shall be mixed, placed and protected in accordance with ACI Standard 305, "Guide to Hot Weather Concreting."
3. Rain Protection:
   a. Have materials available, near the work site, for proper protection of the edges and surface of concrete. Protective material may consist of sheets of burlap or plastic film. Also have planks or other material with suitable stakes that can be used as temporary forms available.
   b. If initial set has not occurred, take every precaution necessary to protect the surface texture of the concrete.
   c. If so determined by the Design Professional, failure to properly protect concrete will constitute cause for removal and replacement of defective pavement.

B. Night Conditions: Perform all finishing and covering operations prior to darkness (half an hour after sunset). Do not commence construction until half an hour before sunrise. Do not place or finish concrete under artificial light, unless approved by the Design Professional.

C. Protection from Traffic:
1. General:
a. Protect the new pavement and its appurtenances from traffic, both public and that caused by the Contractor's own employees and agents, at no additional cost to the Owner. This includes the erection and maintenance of warning signs, lights, barricades, watchmen to direct traffic, and pavement bridges or crossovers.
b. Do not operate equipment with metal tracks, metal bucket blades, or metal motor patrol blades directly on new paving. Do not unload soil or granular materials, including base rock for storage and future reloading directly onto new paving.

2. End of Day's Run:
a. At the end of each day's run, erect and maintain safety barriers and fencing as necessary to protect the pavement from damage.
b. Install safety fences after completion of finishing and curing operations. Leave fences in place and maintained until the concrete has attained the minimum strength or age.
c. Intermediate safety fences may be required for the purpose of opening the pavement for access to a side road, side street, or entrance.

3. Repair of Damages: At the discretion of the Design Professional, and at no additional cost to the Owner, repair or replace any part of the pavement damaged by traffic or other causes occurring prior to final acceptance of the pavement.

3.5 USE OF PAVEMENT

Time for opening pavement for use may be determined by maturity method complying with Iowa DOT Materials I.M. 383 or age and test results. The minimum age and test results needed for opening are shown in Table 7010.01.

Table 7010.01: Minimum Age and Tested Strength of Pavement Before Opening

Class of Mix	Type of Cement	Minimum Age For Opening*	Minimum Compressive Strength (psi)	Minimum Flexural Strength Center Point (psi)
C	Type I	7 Days**	3,000	575
M	Type I	48 Hours	3,000	575

* Opening without testing only allowed upon approval of Design Professional
** Five calendar days for concrete 9 inches thick or more.

3.6 TRANSPORTATION RESTRICTIONS

A. Do not use concrete transported with continuous agitation when the cement has been in contact with the aggregate more than 90 minutes before it is placed. With the approval of the Design Professional, an approved retarding admixture may be used at the rates required in Iowa DOT Materials I.M. 403.

B. Do not use concrete transported without continuous agitation if the period elapsed between the time the concrete is mixed and the time it is placed is greater than 30 minutes. With the approval of the Design Professional, an approved retarding admixture may be used at the rates required in Iowa DOT Materials I.M. 403 and the mixed-to-placed time may be extended.

C. Ensure the methods of delivering and handling the concrete are such that objectionable segregation or damage to the concrete will not occur, and concrete placing will occur with a minimum of rehandling.

D. Thoroughly clean the truck compartment in which concrete is transported and flush with water to ensure that hardened concrete will not accumulate. Discharge the flushing water from the truck compartment to the designated discharge point before it is charged with the next batch.

3.7 QUALITY CONTROL

A. Workmanship: The Contractor is responsible for correction of concrete work which does not conform to the specified requirements, including strength, tolerances, and finishes.

B. Tests for Concrete Materials:
   1. Materials and installed work may require testing and retesting, as directed by the Design Professional, at any time during the process of the work. Allow free access to material stockpiles and facilities at all times. Tests, not specifically indicated to be done at the Owner's expense, including the retesting of rejected materials and installed work, shall be done at the Contractor's expense.
   2. Report test results in writing to the Owner's Representative on the same day that tests are made. Reports of compressive strength tests shall obtain the project identification name and number, date of concrete placement, name of Contractor, name of concrete supplier and truck number, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength, and type of break for both seven day tests and 28-day tests.
   3. Additional Tests: Additional tests of in-place concrete will be required when test results indicate the specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Owner. Tests to determine the adequacy of the concrete shall be by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for such tests conducted and any other additional testing as may be required when acceptable concrete is verified.

C. Concrete Quality Control Testing During Construction:
   1. An independent testing laboratory will be retained by the Owner to perform all quality control tests and to submit test reports to the Owner's Representative.
      a. The independent testing laboratory will perform inspections, tests, and other services specified and as required by the Owner's Representative.
      b. Reports will be submitted by the independent testing laboratory to the Owner's Representative indicating observations and results of tests and indicating compliance or non-compliance with contract documents.
      c. The Contractor shall cooperate with the independent testing laboratory; furnish samples of materials, design mix, equipment, tools storage and assistance as requested.
         1) Notify the independent testing laboratory 48 hours prior to expected time for operations requiring services.
         2) Make arrangements with the independent testing laboratory and pay for additional samples and test required for Contractor's use.

      d. Retesting required because of non-conformance to specified requirements shall be performed by the independent testing laboratory on instructions by the Owner's Representative. Payment for retesting will be charged to the Contractor by deducting inspection or testing charges from the Contract Sum/Price.

D. Testing: Provide the following material certifications and testing required to be performed by the following:

Table 7010.02: Material Certifications and Testing

Material or Construction Item	Tests	Applicable Standard*	Methods of Acceptance of Sampling and Testing	Field Sampling and Testing	
				Frequency (minimum)	Responsible Party
Fine Aggregates	Gradation	I.M. 302, 306, 336	Cert. Plant Insp.**	1/250 CY or min 1/day	Supplier/ Contractor
	Moisture	I.M. 308, 527	Cert. Plant Insp.**	1 per 1/2 day	
	Specific Gravity	I.M. 307	Cert. Plant Insp.**	1/250 CY or min 1/day	
	Quality	I.M. 209	Approved Source	Prior to use	
Coarse Aggregates	Gradation	I.M. 302, 306, 336	Cert. Plant Insp.**	1/250 CY or min 1/day	
	Moisture	I.M. 308, 527	Cert. Plant Insp.**	1 per 1/2 day	
	Specific Gravity	I.M. 307	Cert. Plant Insp.**	1/250 CY or min 1/day	
	Quality	I.M. 209	Approved Source	Prior to use	
Portland Cement	Quality	I.M. 401	Approved Source	Prior to use	
Fly Ash	Quality	I.M. 491.17	Approved Source	Prior to use	

GGBFS	Quality	I.M. 491.14	Approved Source	Prior to use	
Curing Compound	Quality	Iowa DOT Section 4105	Approved Source	Prior to use	
Joint Sealer	Quality	I.M. 436.01	Approved Source	Prior to use	
Epoxy Dowel Bars and Assemblies	Quality	I.M. 451.03B	Approved Source	Prior to use	
Tie Bars	Quality	I.M. 451	Approved Source	Prior to use	
Plastic Concrete	Air Content	I.M 318, 327	Field Test	1/200 CY or min. 1/day	Owner/Testing Agency
	Slump	I.M. 317	Field Test	1/200 CY or min. 1/day	
	Cylinders 4"	I.M. 315	Field Test	Set of 6/200 CY or one set/day	
	Thickness	----------	Field Test	1/200 CY	
Hardened Concrete	Strength	I.M. 383	Maturity Tests***	Prior to placement	Owner/Testing Agency
	Smoothness	Part 3.7, Quality Control	Field Test - Straightedge	Project length	Contractor
	Smoothness	Part 3.7, Quality Control	Field Test - Profilograph	Project length	

* Refers to the Iowa DOT Materials (Instructional Memorandums) I.M.s, Iowa DOT Standard Specifications, or SUDAS Standard Specifications.
** Certified plant inspection per Iowa DOT Materials I.M. 527.
*** The Contractor is responsible for developing the maturity curve for the specified mix, taking maturity readings, and delivering a copy of the results to the Design Professional.

E. Air Content:
1. Air content of the concrete will be evaluated according to Iowa DOT Materials I.M. 318 and 327.
2. When a test result is outside the tolerance for the target air content, the contractor will be notified immediately. An air test will then be immediately run behind the paver to aid in identifying the limits of the non-complying air. A test result between 5% and 8% behind the paver will be considered complying. This test will represent all concrete from the back of the paver back to the last documented complying test. Make immediate adjustments to the mix production and placement process to bring the air content back within tolerance. Do not use succeeding loads below the lower target air content tolerance by more than 0.5%. Each subsequent load will be tested until air content is within tolerance for two consecutive loads. For all incorporated, non-complying concrete that is out of tolerance, the Design Professional will determine if removal and replacement is required.

F. Pavement Smoothness: Evaluate pavement smoothness for all PCC pavement and overlay surfaces.
   1. Straightedge: The contractor shall check PCC pavement surfaces with a 10 foot straightedge placed parallel to the centerline. Areas showing high spots of more than 1/4 of an inch in 10 feet will be marked. Complete surface corrections according to the procedures in Iowa DOT Section 2316 to an elevation where the area or spot will not show surface deviations in excess of 1/8 inch when tested with a 10 foot straightedge. Surface corrections will be completed at the direction of the Design Professional with no additional cost to the Owner.

G. Defects or Deficiencies: Remove and replace or repair pavement containing excessive cracks, fractures, spalls, or other defects at no additional cost to the Owner. The method of replacement or repair will be determined by the Design Professional.

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SECTION 32 13 13.10
CONCRETE PAVING FOR SIDEWALKS AND SHARED USE PATHS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Installation of Sidewalks.

1.2 DESCRIPTION OF WORK

A. Install sidewalk.

1.3 SUBMITTALS

A. PCC mix design.

B. Submit type and color of detectable warnings.

C. Closeout Submittals:
1. Results of required testing.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Portland Cement Concrete: See Section 32 13 13.

PART 2 PRODUCTS

2.1 PORTLAND CEMENT CONCRETE

A. Class B or C concrete with materials complying with Section 32 13 13. Use coarse aggregate of Class 2 durability or better.

B. Comply with the following for PCC mixes for sidewalks unless otherwise approved by the Design Professional.

Table 7030.01: PCC Mixes		
	Machine Finish	Hand Finish
Type of Concrete	Class B or C	Class B or C
Slump Minimum	1/2 in.	1/2 in.
Slump Maximum	2 1/2 in.	4 in.
Percent Air Content		
• Target	7%	7%
• Minimum	6%	6%
• Maximum	8 1/2%	8 1/2%

C. Liquid Curing Compound: Comply with Iowa DOT Section 4105.

D. Pavement Sealant: All paving placed between September 1 and March 31 shall be sealed to protect from de-icing agents with one of the following products, or approved equal:
   1. Hydrozo 40 Silane. Note that this product requires a 28-day cure prior to application. Pavement must be power-washed prior to application.
   2. Consolideck Singlestep.
   3. Lin-Seal by W.R. Meadows.

E. Covering:
   1. Burlap: Comply with Iowa DOT Section 4104.
   2. Plastic Film: Comply with Iowa DOT Section 4106.
   3. Insulating Cover: Comply with Iowa DOT Section 4106.

F. Pavement subdrain piping shall conform to SUDAS Standard Specifications Division 4 – Sewers and Drains Section 4040 – Subdrains and Collectors.

2.2 DETECTABLE WARNINGS

A. Use manufactured detectable warning panels with a non-slip surface and raised truncated domes. Detectable warning plates shall be cast iron, factory powder coated “brick red”. Comply with the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (also known as PROWAG) for contrast and dimension requirements.

2.3 ISOLATION AND EXPANSION JOINT SEALANT

A. Use a 2-part polyurethane, self-leveling sealant complying with ASTM C 920. Application temperature range of 40 to 120°F. Minimum elongation 700%. SL-2 by Sonneborn, Sikaflex-2c SL by Sika, or approved equivalent. Color - concrete grey.

2.4 SIDEWALK EXPANSION JOINT MATERIAL

A. Full depth, preformed, asphaltic or polyurethane foam joint filler. See construction documents for thickness.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

A. Sidewalks:
   1. Remove all vegetation and roots from ground surface.
   2. Construct grade to final subgrade elevation.
      a. Cut area: Remove all material that will be displaced by the sidewalk.
      b. Fill area: Scarify the surface to be covered with embankment to a depth of at least 6 inches and compact. Construct embankment in lifts of 6 inches or less and compact each lift. Tamp surface with a mechanical tamper until firm and unyielding.

   3. Remove all soft, spongy, or yielding spots and fill the void with suitable backfill material.

3.2 ADJUSTMENT OF FIXTURES

A. Adjust fixtures to conform to the finished pavement surface. Cooperate and coordinate with the utility agency to ensure proper fixture adjustment.

3.3 PCC SIDEWALKS

A. Form Setting: Comply with Section 32 13 13 with the following additional requirements and exceptions.
   1. Slip form paving equipment may be allowed in lieu of setting forms, if approved by the Design Professional.
   2. Wood forms are allowed.
   3. Use of an automated subgrade trimmer is not required.
   4. Set forms true to line and grade and hold them rigidly in place by stakes placed outside the forms and flush with or below the top edge of the forms.

B. Concrete Pavement Placement:
   1. Sidewalk:
      a. Maintain moist subgrade in front of paving operation.
      b. Deposit concrete on the subgrade as required to minimize rehandling to prevent segregation.
      c. Hand spread with shovels, not rakes.
      d. Place concrete as required to slightly overfill the space between the forms.
      e. Consolidate with vibrators and smooth by use of a straightedge.
      f. Do not contaminate freshly mixed concrete with earth or other foreign materials.

C. Finishing:
   1. Sidewalks:
      a. Use a wood float to depress the large aggregate and create a dense surface.
      b. Allow concrete to set until all shine has disappeared from the surface.
      c. Smooth with a metal trowel until surface is free from defects and blemishes.
      d. Construct joints by sawing or by using a jointer or groover tool.
      e. Finish edges of sidewalk or driveway with an edging tool having a radius of approximately 1/2 inch. Ensure tool marks do not appear on the finished surface.
      f. Brush with a medium broom perpendicular to the direction of travel to provide a non-skid surface.

D. Curing: When curing is specified in the contract documents, comply with Section 32 13 13.

E. Form Removal: Comply with Section 32 13 13 – Concrete Paving.

F. Pavement Protection: Refer to Section 32 13 13 – Concrete Paving.

G. Use of Pavement: Refer to Section 32 13 13 – Concrete Paving.

H. Jointing:
   1. Construction Joints:
      a. Locate construction joints to provide uniform joint spacing.
      b. Place a construction joint at the close of each day's work or when depositing of concrete is stopped for 45 minutes or more.
      c. Form construction joint by using a header board. Set perpendicular to the surface and at right angles to the centerline.

2. Transverse Contraction Joints:
   a. Sidewalks:
      1) Space sidewalk contraction joints equal to the width of the sidewalk.
      2) Form transverse contraction joints to a depth of 1 1/4 inches with a pointed trowel or jointing tool. In lieu of forming, joints may be sawed within 12 hours of placement with a 1/8 inch blade saw to a depth of 1/3 the pavement thickness. Use a straightedge if joints are sawed with a hand-held saw.

3. Longitudinal Contraction Joints:
   a. Sidewalks: Saw joint to 1/8 inch wide and to a depth of 1/3 the pavement thickness.

4. Isolation Joints:
   a. Install isolation joints where sidewalks abut roadway pavement, parking lots, buildings, and structures.
   b. For a sidewalk constructed with a tol, install an isolation joint on the property side of the sidewalk and a 'C' or 'E' joint on the street side of the sidewalk.
   c. Install a 1/2 inch or 3/4 inch thick strip of preformed resilient joint material, according to Section 32 13 13, to the full depth of concrete. Trim any isolation joint material protruding above the finished work to the level of the abutting concrete.
   d. If the isolation joint is to be sealed, place the preformed material 1/2 inch below the level of the abutting concrete.

5. Joint Sealing:
   a. Do not seal construction or contraction joints in sidewalks or driveways.
   b. If sealing of expansion or isolation joints is specified in the contract documents, trim preformed joint material to a depth of 1/2 inch below the concrete surface. Ensure the joint is clean and dry. Install joint sealant per manufacturer's recommendations.

3.4 DETECTABLE WARNING INSTALLATION

A. Manufactured Panels:
   1. Comply with details in construction documents.
   2. Install according to manufacturer's recommendations.
   3. Set panels in fresh concrete.

3.5 TOLERANCES

A. Check finished surface with a 10 foot straightedge placed parallel to the centerline.

B. Ensure the cross-section and profile of the pavement is constructed to within a tolerance of 1/4 inch in 10 feet (0.2%) of the design grades. This does not allow maximum slopes to be exceeded.

C. Mark areas showing bumps of more than 1/4 inch in 10 feet and grind down with an approved grinding tool to an elevation where the area will not show deviations in excess of 1/8 inch.

3.6 CLEANING

A. Remove all litter and construction materials or tools immediately after the end of the curing period.

B. Remove excess dirt from the site.

C. Broom clean completed sidewalks.

3.7 TESTING

A. General: Concrete testing shall comply with Section 32 13 13.

B. Concrete Compression Tests: When the concrete volume placed on a single day exceeds 5 cubic yards, comply with the following test requirements. When deficiencies are encountered, comply with Section 32 13 13.
   1. Prepare at least four 4”X8” test cylinders per day.
   2. If the concrete volume placed on a single day exceeds 100 cubic yards, prepare one test cylinders for each 100 cubic yards placed.
   3. Provide 7 and 28 calendar day tests according to ASTM C 39. Minimum compressive strength is 2,000 psi at 7 days and 4,000 psi at 28 days.

3.8 SIDEWALK AND CURB RAMP COMPLIANCE

A. Compliance with cross slopes and grades, as well as all other elements, for sidewalks and curb ramps is crucial. If the construction cannot be completed as specified in the contract documents, it may be necessary to adjust slopes within the accepted legal limitations. Contact the Design Professional prior to placement of the concrete if changes from the values specified in the contract documents are being made.

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SECTION 32 91 12.13
TOPSOIL PLACEMENT AND GRADING

PART 1 GENERAL

1.1 WORK INCLUDED

A. Finish grade subsoil.

B. Place, level, and compact topsoil.

1.2 SUBMITTALS

A. Submit topsoil and compost source.

B. Submit 10-lb. (4.5kg) sample of topsoil mix to Owner.

C. Submit 10-lb. (4.5kg) sample of imported subsoil fill to testing laboratory in air tight containers.

D. If recent test results are available for fill materials to be used, disregard samples submission and submit such test results to the testing laboratory. Such test results are to clearly indicate types of materials and composition, hardness, compactibility, and suitability for proposed usage.

1.3 PROTECTION

A. Protect landscaping and other features remaining as final work.

B. Protect existing structures, fences, roads, sidewalks, paving and curbs.

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil: Reused as approved by the Owner.

B. Topsoil: Imported, friable loam; free of subsoil, roots, grass, excessive amount of weeds, stone, and foreign matter; acidity range (pH) of 5.5 to 7.5; containing a minimum of 4% and a maximum of 25% organic matter. All topsoil is to be approved by the Owner prior to spreading. Topsoil with large amounts of sand may not be approved.

C. Testing:
1. Contractor shall have a sample of topsoil tested by AgSource Laboratories (1701 Detroit St., PO Box 247, Ellsworth, IA 50075). Topsoil shall be analyzed for each type of planting on site such as lawn, flower beds, or tree and shrub beds. The results of the soil analysis shall be provided to Owner prior to incorporation of the topsoil.
2. Results must fall within the Testing Lab's recommended ranges for each type of planting. Submit results to Owner for review.
3. Schedule test a minimum of 6 weeks prior to allow for processing and review by Owner.

PART 3 EXECUTION

3.1 INSPECTION

A. Verify site conditions and note irregularities affecting work of this Section.

B. Beginning work of this Section means acceptance of existing conditions.

C. Prior to topsoil arriving on site, Owner shall approve the physical soil samples.

3.2 SUBSOIL PREPARATION

A. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, in excess of 1/2" (12mm) in size. Remove subsoil contaminated with petroleum products.

B. Tilling:
1. In areas excavated during construction, the Contractor shall till 2 to 3 inches of topsoil into the top 8 to 12 inches of subsoil. Subsoil shall be tilled and blended with topsoil layer to avoid sharp transitions in the soil profile. Then place the depth of topsoil called out in paragraph 3.5 on top of the tilled area.
2. In areas that have not been excavated during construction but are to be planted or seeded, till the subsoil to a depth of 4 to 6 inches before incorporating topsoil or other amendments. Then place the depth of topsoil called out in paragraph 3.5 on top of the tilled area.
3. Do not till within the drip line of existing trees.

3.3 PLACING TOPSOIL

A. Place topsoil in areas where seeding or sodding is scheduled.

B. Use topsoil in relatively dry state. Place during dry weather.

C. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of subgrade.

D. Remove stone, roots, grass, weeds, debris and foreign material while spreading.

E. Manually spread topsoil around trees, plants, and buildings to prevent damage.

F. Lightly compact placed topsoil.

G. Remove surplus subsoil and topsoil from site.

H. Final grade of planting beds and small turf areas shall be done by hand to avoid compaction and ensure all debris and clods over 1 inch are removed. Large scale seeding or sodding projects may be graded using small tractors, gills, etc.

I. Leave stockpile area and site clean and raked, ready to receive landscaping.

J. Notify Owner upon completion of final grade. Contractor shall not install planting material or turf until final grade has been approved by Owner.

3.4 TOLERANCES

A. Top of Topsoil: Plus or minus 1/2 inch (12mm).

3.5 SCHEDULE OF LOCATIONS

A. See paragraph 3.2B, Tilling, for subsoil preparation and additional topsoil requirements.

B. The following paragraphs identify compacted topsoil thicknesses for various locations:
1. Seeded Grass: 6 in. (150mm).
2. Sod: 4 in. (100mm).

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SECTION 32 92 19
SEEDING AND SOIL SUPPLEMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This part of the Specifications includes providing labor, materials, equipment, and supervision required to provide seeding.

1.2 QUALITY ASSURANCE

A. Seeding is to be installed by a single firm specializing in seeding as specified.

B. Source Quality Control: Ship seeding materials with certificates of inspection required by governing authorities. Comply with regulations applicable to seeding materials.

C. Do not make substitutions. If specified material is not obtainable, submit proof of non-availability to Owner's Representative, together with proposal for use of equivalent material.

D. Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

1.3 SUBMITTALS

A. Manufacturer's or vendor's certified analysis of fertilizer.

B. Seed vendor's certified statement for each grass seed mixture required, stating botanical and common name, percentages by weight, and percentages of purity, germination, and weed seed for each grass seed species.

C. Planting Schedule: Proposed seeding schedule, indicating dates for seeding work during normal seasons. Once accepted, revise dates only as approved by Owner's Representative in writing, after documentation of reasons for delays.

Preferred season for this work is as follows: April 15 – June 15

For projects requiring fall planting, obtain approval for planting dates with Owner. General planting dates for fall are August 15 – October 15.

D. Any deviations from this schedule must be approved by the Owner's Representative. Maintenance and warranty conditions may be impacted by such deviation.

E. Closeout Submittals:
1. Furnish detailed written recommended maintenance program to the Owner with a copy to the Owner's Representative, prior to final inspection of the seeding.

1.4 DELIVERY, STORAGE AND HANDLING

A. If seed is mixed prior to delivery on the site, it shall be tagged showing a guaranteed statement of composition of mixture and percentage of purity and germination of each variety.

B. If seed is to be mixed at the site, it shall be delivered in original containers bearing producers certification of germination and purity.

C. Tags shall show producers or dealers Iowa Permit Number and date of testing; test date shall be no more than 90 days previous to time of use.

D. Fertilizers shall conform to State of Iowa laws and regulations. If delivered in bulk, bills of lading or other labels shall be furnished to the Design Professional or labels indicating analysis and weight information from each container shall be preserved and furnished to the Design Professional within twenty-four (24) hours of application.

E. Handling of materials as recommended by manufacturer.

F. Store all packaged materials off ground and protect from moisture.

G. Storage of all materials in locations designated and approved by Owner's Representative.

1.5 JOB CONDITIONS

A. Utilities: Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required.

B. Grade Stakes: Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.

C. Protection: Protect existing irrigation system, structures, utilities, sidewalks, pavements, and other facilities during seeding operations. Repair any damage at no cost to the Owner.

1.6 SEQUENCING AND SCHEDULING

A. Planting Time: Proceed with, and complete seeding as rapidly as portions of site become available, working within seasonal limitations for each kind of seed required.

B. Chronological procedure for seeding is to remove any existing vegetation, disc, fertilize, prepare the seed bed, seed, and then mulch. See Part 3 Site Grading regarding treatment of vegetation.

1.7 SPECIAL PROJECT WARRANTY

A. Warranty lawns to provide germination as specified and for seed emergence.

B. Replacement cost shall be borne by Contractor except for possible replacements resulting from loss or damage due to occupancy at project in any part, vandalism, civil disobedience, acts of neglect on the part of others, physical damage by animals, vehicles, fire, or losses due to curtailment of water by local authority, or to "Acts of God". Droughts, floods, tornadoes, winds of hurricane force, and hail are not normal and the damage they do can not be calculated in a bid.

1.8 GUARANTEE

A. If less than 70% of seed fails to become established and survive to the next season in any given area three (3) square feet or larger, the Contractor shall be responsible for preparing the seedbed as specified in Part 3 and reseeding at the rate specified in Part 3.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. Hydraulic Seeder: Use hydraulic seeding equipment with a pump rated at no less than 100 gallons per minute. The equipment must have a suitable working pressure and a nozzle adapted to the type of work. Supply tanks must have a means of agitation. Calibrate tanks and provide them with a calibration stick or other approved device to indicate the volume used or remaining in the tank.

2.2 SOIL AMENDMENTS

A. Apply a 6-24-24 commercial fertilizer or the equivalent units of nitrogen, phosphate, and potash at the rate of 300 pounds per acre.

2.3 SEEDING MATERIALS

A. Grass Seed: Provide fresh, clean, new-crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. All seed shall be Blue Tag Certified. Certified Blue Tag and Analysis Tag shall be on every bag. All bagged seed mixtures shall have a Certified Blue Mixture Tag on each bag.

B. Seed Mixes:
1. The seed shall be purchased from an established seed dealer or certified seed grower, shall meet the requirements of the Iowa Department of Agriculture regulations, and shall be labeled accordingly.
2. Residential lawn mix.

a. Sunny locations:

	Pure Live Seed % by Weight	Purity	Germination
Kentucky Bluegrass	70	95	85
Creeping Red Fescue	20	98	85
Perennial Ryegrass	10	95	90

1.

2.4 HYDRAULIC MULCH

A. Shall be Flexterra High Performance Flexible Growth Medium (HP-FGM) by Profile Products LLC or approved equal.

2.5 WATER

A. Water used in the work shall be suitable for irrigation and free from ingredients harmful to plant life. Hose and other water equipment required for the work shall be furnished by the Contractor.

PART 3 EXECUTION

3.1 PREPARATION FOR SEEDING

A. Limit preparation of seedbed to areas that will be seeded immediately upon completion.

B. Work areas accessible to field equipment to a depth of no less than 3 inches. Use mechanical rotary tillage equipment for the preparation of seedbed. Where weed growth has developed extensively, they may be disked into the ground. If weed growth develops sufficiently to interfere with proper seedbed preparation, mow the weeds and remove them from the project at no additional cost to the Owner.

C. Use crawler type or dual-wheeled tractors for seedbed preparation. Operation equipment in a manner to minimize displacement of soil and disturbance of the design cross-section. Harrow ridging in excess of 4 inches due to operation of tillage equipment prior to rolling with the cultipacker. Roll the area with no less than one pass of the cultipacker prior to permanent seeding.

D. Shape and fine grade to remove rills or gullies, water pockets, undesirable vegetation, and irregularities to provide a smooth, firm, and even surface true to grade and cross-section. Prepare to a fine texture and without soil lumps. Till parallel to the contours.

E. Smooth the seedbed with a cultivator-type tillage tool having a rake bar or a rock rake. Pick up and remove all debris, such as rocks, stones, concrete larger than 2 inches (1/2 inch maximum for lawn seeding), or roots and other objectionable material that will interfere with the seeding operation. A spring tooth cultivator may be used in lieu of a rock picker. Remove the rock by hand after each use of the cultivator; repeat the process until the soil is relatively free of rocks.

F. Choose equipment to minimize soil compaction. Operate equipment in a manner to minimize displacement of soil and disturbance of the design cross-section. Roll the area with at least one pass of the cultipacker. Remove ruts that develop during the sequence of operations before subsequent operations are performed.

G. Repair erosion or other damage which occurs during seed bed preparation.

H. Apply commercial fertilizer at the rate specified in 2.2.

I. Apply fertilizer prior to seeding and drag or till into the top one inch (1") of the soil surface.

J. Seedbed Preparation for Temporary Seed: Till the soil to a minimum depth of 5 inches with a disk, harrow, or field cultivator.

3.2 SEEDING

A. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.

B. Sow seed uniformly using a drill type seeder. Each application of seed shall overlap the previous application by one-half (1/2) the application width to insure double coverage.

C. Sow seed mix in at the rate specified in 2.3.

D. After seeding, firm the seed bed using a cultipacker or roller.

3.3 HYDRAULIC MULCHING FOR SEEDING

A. Place mulch in hydraulic mulching equipment specifically manufactured for hydraulic seeding.

B. Mix materials with fresh potable water using a combination of both recirculation through the equipment's pump, and mechanical agitation to form a homogenous slurry.

C. Apply mixture within 1 hour after materials are placed in the hydraulic seeder.

D. If necessary, dampen dry, dusty soil, to prevent balling of the material during application.

E. Apply the slurry evenly over all specified areas at a minimum application rate of 3,500 lb/acre dry weight.

F. Retain and count empty bags of mulch to ensure final application rate.

3.4 WATER

A. The Contractor will be required to water all lawn areas that are seeded within seven (7) calendar days after seed is spread. The Contractor shall provide all necessary water maintenance as required by weather conditions for the first sixty (60) calendar days after installation or to Substantial Completion of the Project, whichever is later.

3.5 MAINTENANCE

A. Begin immediately following installation.

B. All maintenance including mowing and weeding shall be performed by the Contractor for the first sixty (60) calendar days after installation or until Substantial Completion of the Project, whichever is later.

C. To include:
1. Repair of eroded areas prior to acceptance.
2. Maintenance of a uniform mulch cover until initial acceptance.

D. Until initial acceptance and approval is received, reseed or overseed, using seed mix originally specified, all seeded areas to produce uniformity.

E. The Contractor shall be required to mow and maintain vegetation between 2 and 4 inches in height, except for natural prairie grass and wildflower. Not more than 1/3 of the grass lead shall be cut in any mowing.

F. The Contractor will be required to remove weeds and repair or replace, or both, all seeding and mulching that is defective or becomes damaged. When seeding is approved and accomplished out of season and all other work on the contract has been satisfactorily completed but a determination cannot be made as to whether or not an established stand of grass has or may result, then payment for the areas seeded out of season will be withheld until such time as this requirement has been met.

3.6 REPAIR OF LAWN AREAS DISTURBED BY THIS CONTRACT

A. Repair disturbed areas for seeding by tilling, shaping, and raking as required.

3.7 CLEANUP AND PROTECTION

A. During seeding work, keep pavements clean and work area in an orderly condition.

B. Upon completion of job, clean-up all debris, caused by work, and excess material and leave area within contract limits in a neat and clean condition.

3.8 INSPECTION AND ACCEPTANCE

A. Upon completion of the work and fulfillment of the requirements of this Section, notify the Owner’s Representative in writing that the work is ready for final inspection.

B. Request a definite date for final inspection.

C. Notify the Owner’s Representative seven (7) calendar days prior to the requested final inspection date.

D. Reseed and maintain all seeded lawn areas which do not meet the requirements of this Section at the time of final inspection.

E. Replacement work shall be as specified for original seeding.

F. Replacement work shall be reinspected before acceptance.

END OF SECTION

SECTION 32 92 23
SODDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sodding of designated areas.

1.2 SUBMITTALS

A. Growers Certification: Grass species and location of field from which sod is cut.

B. Planting Schedule: Propose sodding schedule, indicating dates for sodding work during normal seasons. Once accepted, revise dates only as approved by Owner's Representative in writing, after documentation of reasons for delays.

Preferred season for this work is as follows:
April 15 – June 15

For projects requiring planting outside his range, obtain approval for planting dates with Owner.

C. Watering Schedule.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Protect root system from exposure to wind or sun.

B. Protect sod from dehydration, contamination, and heating during transportation, and delivery.

C. Do not deliver more sod that can be installed in the same day.

D. Do not tear, stretch, or drop sod.

1.4 JOB CONDITIONS

A. Begin installation of sod after preceding related work is accepted by the Owner.

B. Protection: Erect signs and barriers against vehicular traffic.

PART 2 PRODUCTS

2.1 SOIL CONDITIONERS

A. Fertilizer nutrients by weight: Nitrogen 6%; Potassium Peroxide 24%; Phosphoric Anhydride 12%.

2.2 SOD

A. Grass Species: Comply with SUDAS Section 9020 2.01.

B. Grade: Field grown.

C. Uniformly mowed height when harvested 1-1/2 in. to 2-1/2 in. (37mm to 63mm).

D. Weeds: Free of Bermuda grass, quack grass, Johnson grass, poison ivy, nut sedge, nimble will, Canada thistle, bindweed, bent grass, wild garlic, ground ivy, perennial sorrel, and brome grass.

E. Uniform in color, leaf texture, and density.

F. Sod should be approved by the Owner's Representative prior to placement.

G. Peat sod is not allowed.

2.3 WATER

A. Free of substances harmful to plant growth.

PART 3 EXECUTION

3.1 INSPECTION

A. Owner must review and approve finish grades by the Contractor before sodding can begin.

B. Verify that soil preparation and related preceding work have been complete.

C. Do not start work until conditions are satisfactory.

3.2 PREPARATION

A. Scarify soil to depth of 2 in. (50mm) in compacted areas.

B. Apply soil conditioners.

C. Water dry soil to depth of 4 in. (100mm) 48 hours before sodding.

3.3 INSTALLATION

A. Transplant sod within 24 hours after harvesting.

B. Begin sodding at bottom of slopes.

C. Lay first row of sod in straight line with long dimension of pads parallel to slope contours.

D. Butt side and end joints.

E. Stagger end joints in adjacent rows.

F. Do not stretch or overlap sod.

G. Peg sod on slope ratio of 1 in 3 or greater with minimum of two stakes per square yard.

H. Sprinkle sod immediately after transplanting.

I. Roll sod, except on pegged areas, with roller weighing not more than 150 lbs. per ft. of roller width (223kg/m).

J. Water sod and soil to depth of 4 in. (100mm) within four hours after rolling.

K. Resod areas larger than 1 sq. ft. (93mm^2) not having uniform stand of grass.

3.4 PROTECTION

A. Erect temporary barricades if necessary.

B. Provide compost filter tubes or silt fence to protect slopes from erosion.

3.5 LAWN ESTABLISHMENT

A. Watering: The Contractor shall provide all necessary water maintenance as required by weather conditions for the first sixty (60) calendar days after installation or to Substantial Completion of the Project, whichever is later.

3.6 CLEANING

A. Immediately clean spills from paved and finished surface areas.

B. Remove debris and excess materials from project site.

3.7 MAINTENANCE AND GUARANTEE

A. Begin immediately following installation of sodding and continue for the first sixty (60) calendar days after installation or until Substantial Completion, whichever is later.

B. Include weeding, rolling, mowing, replacing bare spots, resetting to proper grades and other related operations.

C. The Contractor shall be required to mow and maintain vegetation between 2 and 4 inches in height, except for natural prairie grass and wildflower. Not more than 1/3 of the grass lead shall be cut in any mowing.

D. The Contractor will be required to remove weeds and repair or replace, or both, all seeding and mulching that is defective or becomes damaged. When seeding is approved and accomplished out of season and all other work on the contract has been satisfactorily completed but a determination cannot be made as to whether or not an established stand of grass has or may result, then payment for the areas seeded out of season will be withheld until such time as this requirement has been met.

E. All sod shall be guaranteed to be in vigorous growing conditions in one growing season.

END OF SECTION

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