SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting and capping or sealing site utilities.

1.2 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.3 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site-clearing operations until temporary erosion and sedimentation control measures are in place. See Division 31 Section "Erosion and Sedimentation Control (Includes SWPPP)."

1.4 SOIL MATERIALS

A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 31 Section "Earth Moving."

1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 2 - EXECUTION

2.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly flag trees and vegetation to remain or to be relocated.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

2.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Refer to Division 31 Section "Erosion and Sedimentation Controls."

2.3 TREE PROTECTION

A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.

B. Do not excavate within tree protection zones, unless otherwise indicated.

C. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by the Owner’s Representative.

2.4 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner’s Representative not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without written permission of Owner’s Representative.

2.5 CLEARING AND GRUBBING

A. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density of 98 percent standard proctor.

2.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Temporarily stabilize per the SWPPP and Division 31 Section "Erosion and Sedimentation Control."

2.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

2.8 DISPOSAL

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

1. Submit schedule for recycling operations (if any) and obtain approval in writing from Owner’s Representative. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

2.9 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to witness filling operations of depressions caused by clearing and grubbing. Coordinate scheduled filling operations with the Owner’s testing agency.

END OF SECTION 31 10 00

SECTION 31 20 00 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and grasses, and exterior plants.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for slabs-on-grade.
4. Subbase course for concrete walks and pavements.
5. Subbase and base course for asphalt paving.
6. Excavating and backfilling for utility trenches.

1.2 SUBMITTALS

A. Building pad certification.

1.3 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site or on site borrow pit for use as fill or backfill.

E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Owner’s Representative. Authorized additional excavation and replacement material will be paid for according to Contract provisions changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Owner’s Representative. Unauthorized

excavation, as well as remedial work directed by Owner's Representative, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 QUALITY ASSURANCE

A. Imported (borrow) soil must be tested and certified, by the Owner's testing agency, as suitable material, free of any environmental contaminates. Coordinate imported materials and their source with Division 31 Section "Erosion and Sedimentation Control" and the Storm Water Pollution Prevention Plan. The Contractor will be liable for any and all clean-up costs associated with unapproved, imported materials.

1.5 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by the Owner's Representative and then only after arranging to provide temporary utility services according to requirements indicated.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Provide ASTM D 2487 or AASHTO M 145 classified soil materials.

C. Satisfactory Soils: Recommended materials free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

1. Satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction will be considered unsatisfactory soil materials.

D. Provide granular soils materials according to local department of transportation (DOT) regulations or as follows:

1. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
2. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
3. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
4. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
5. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade is specified in Division 31 Section "Site Clearing."

C. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section "Erosion and Sedimentation Control (Includes SWPPP)" during earthwork operations.

3.2 EXCAVATION

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. No changes in the Contract Sum or the Contract Time will be authorized except for rock excavation or removal of obstructions not specifically indicated in the Contract Documents.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

2. Authorized additional excavation and replacement material will be paid for according to Contract provisions as specified in Division 00 Section "General Conditions."

B. Excavation for Structures: Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections

C. Excavation for Walks and Pavements: Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

D. Excavation for Utility Trenches: Excavate trenches to indicated gradients, lines, depths, and elevations or as required by authorities having jurisdiction.

1. Trench Width: Provide a clearance of 12 inches on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
2. Trench Bottoms: Provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

a. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material, 4 inches deeper elsewhere, to allow for bedding course as required by authorities having jurisdiction.

3.3 SUBGRADE INSPECTION

A. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades. Proof-roll in presence of Owner’s testing agency.

B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Owner’s testing agency, without additional compensation.

3.4 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations, wall footings, utility pipe, or other construction as approved by the Owner’s testing agency.

3.5 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover or temporarily stabilize as specified in Division 31 Section "Erosion and Sedimentation Control (Includes SWPPP)."

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.6 UTILITY TRENCH BACKFILL

A. General: Backfill trenches as indicated on Drawings.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

C. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

D. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 03 Section "Cast-in-Place Structural Concrete."

E. Provide concrete encasement for piping or conduit less than 24 inches below surface of roadways only when indicated on the Drawings or as required by authorities having jurisdiction.

F. Place and compact initial backfill of subbase material or satisfactory soil.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing and Owner’s testing agency.

G. Place and compact final backfill as indicated on Drawings to final subgrade elevation.

H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.7 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations. Comply geotechnical engineer's written recommendations in Division 00 Section "Geotechnical Data."

3.8 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content or as directed by Owner’s Testing Agency.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, at no additional cost to the Owner, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight. See Division 31 Section "Dewatering"

3.9 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698, Standard Proctor:

1. Under structures, building slabs, future expansion areas, steps, walkways, and pavements, scarify and recompact top 8 inches of existing subgrade and each layer of backfill or fill soil material at 98 percent.
2. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.

3.10 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

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

1. Lawns, Unpaved Areas, and Walks: Plus or minus 1 inch.
2. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.11 SUBBASE AND BASE COURSES

A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase and base course under pavements and walks as follows:

1. Shape subbase and base course to required crown elevations and cross-slope grades.
2. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry unit weight according to ASTM D 698, Standard Proctor.

3.12 DRAINAGE COURSE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 98 percent of maximum dry unit weight according to ASTM D 698.

3.13 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing. Coordinate scheduled earth moving work with the Owner's testing agency.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by the Owner's testing agency.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.

E. Provide other field tests, such as bearing ratio of subgrades, subbases, and bases for paving, as required by authorities having jurisdiction.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest, at the Contractor's cost, until specified compaction is obtained.

3.14 BUILDING PAD CERTIFICATION

A. Submit two signed copies of the Building Pad Certification Form at the end of this Section once the building pad is complete and ready for turnover to the building contractor. Form must be completed by the Owner's testing agency, professional surveyor, and both the Site Contractor and the Building Contractor.

3.15 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project warranty period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

3.16 DISPOSAL OF SURPLUS AND WASTE MATERIALS

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

END OF SECTION 31 20 00

SECTION 31 25 00 - EROSION AND SEDIMENTATION CONTROL

PART 1 -GENERAL

1.1 SUMMARY

A. Section includes:

1. Temporary erosion and sedimentation control measures.
2. Storm Water Pollution Prevention Plan (SWPPP or SWP3)
3. The following forms:

a. Site Posting (Construction Site Notice)
b. Pre-Construction Meeting
c. Subcontractor Certification
d. Weekly Site Inspection Checklist
e. Inspector Certification/Training
f. Site Log for Earthwork Activities
g. Site Spill Log
h. Site Visit Log for EPA/Government Officials

1.2 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Conference: Conduct conference at Project site or other Owner approved location as specified by the SWPPP with applicable subcontractors, the civil engineer of record, the Owner, field inspector(s), and any applicable governing officials.

1.3 FIELD CONDITIONS

A. Review and certify the SWPPP prior to beginning onsite work.

B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied facilities when installing erosion controls. Coordinate all measures with applicable government authorities having jurisdiction over the connecting, adjacent, or surrounding roadways.

C. Utility Locator Service: Notify utility locator service for area where Project is located before installing erosion or sediment control measures.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Seed, sod, and or ground covers as indicated on the Drawings and as specified in Division 32 Section "Planting."

B. Erosion/Sediment control devices or Best Management Practices, (BMP’s) as indicated on the Drawings and in the SWPPP.

PART 3 - EXECUTION

3.1 PREPARATION

A. Review the SWPPP attached to this section and all applicable Drawings, checklist, logs, etc.

B. Ensure permits are in place from all governing authorities (federal, state, and local). Copies of all permits including but not limited to Notice of Intent(s) (NOIs), shall be maintained in the field office and on the Owner's Project Management Website.

3.2 IMPLEMENTATION AND DOCUMENTATION

A. Inspect, repair, and maintain erosion and sedimentation control measures, per the SWPPP, during construction until permanent vegetation has been established.

B. Execute required site inspection checklists (utilizing the "on-line" inspection system or other reporting methods required by the SWPPP/Owner), documents, and site logs in the SWPPP.

C. Update, maintain, alter, or add temporary erosion and sediment controls in conjunction with the SWPPP and ongoing earthwork activities as required for the Project.

D. Maintain an up-to-date Site Plan in the field office. Continually update the Site Plan with notations that coordinate with the site checklists and logs per the SWPPP.

E. The Owner has the right and authority to limit earth-moving activities and to direct the Contractor to immediately provide permanent or temporary pollution control measures.

F. Install permanent erosion measures such as pavement and lawn areas as soon as practically possible to minimize temporary pollution control measures.

G. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

H. Ensure that all permits are properly terminated including but not limited to filing a proper Notice of Termination (NOT) with all governing authorities.

3.3 CLOSEOUT DOCUMENTS

A. Before retainage can be released, the Contractor must provide the Owner with a final copy of all documents making up the SWPPP including certifications, noted plans, checklists, and logs.

1. Retain a copy of the above documentation for a minimum of three years from final acceptance.

END OF SECTION 31 25 00

SECTION 32 12 16 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes

1. Hot-mix asphalt paving.
2. Hot-mix asphalt patching and overlays.

1.2 SUBMITTALS

A. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

B. Material Certificates: For each paving material, from manufacturer.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall be registered with and approved by authorities having jurisdiction or the DOT of the state in which Project is located.

B. Regulatory Requirements: Comply with state or local DOT for asphalt paving work.

C. Asphalt-Paving Publication: Comply with AI MS-22, "Construction of Quality Asphalt Pavements," unless more stringent requirements are indicated.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

1. Tack Coat: Minimum surface temperature per requirements of asphalt course.
2. Asphalt Base and Surface Course: Minimum surface temperature of 40 deg F and rising at time of placement.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Coarse Aggregate: Conform to INDOT Specifications Section 904.03. Sound; angular crushed stone, or crushed gravel.

B. Fine Aggregate: Conform to INDOT Specifications Section 904.02. Sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.

C. Mineral Filler: Conform to INDOT Specifications Section 904.02. Rock or slag dust, hydraulic cement, or other inert material.

D. Asphalt Binder: Conform to INDOT Specifications Section 902.

E. Tack Coat: Conform to INDOT Specifications Section 406.

F. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.

G. Overlay Fabric or Paving Mat: Fiberglass non-woven geotextile fabric; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.

1. Basis-of-Design Product: Owens Corning; TruPave.

2.2 MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction; designed according to procedures in AI MS-2, "Asphalt Mix Design Methods"; and complying with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Base Course: INDOT Specifications Division 400.
3. Surface Course: INDOT Specifications Division 400.
4. Provide mixes with a history of satisfactory performance in geographical area where Project is located.

PART 3 - EXECUTION

3.1 COLD MILLING

A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.

3.2 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd.

C. Patching: Fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact flush with adjacent surface.

D. Joint/Crack Treatment: Install joint sealant, emulsion, or “gutter seal” type products as specified in Division 32 Section "Paving Joint Sealants" to seal joints of patched surfaces.

3.3 SURFACE PREPARATION

A. Proof-roll subbase as specified in Division 31 Section "Earth Moving."

B. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

C. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

D. Tack Coat: Apply when overlaying existing pavement, on adjacent horizontal surfaces such as curbs, and between base and surface courses when the two courses are not installed in a continuous installation.

1. Apply at a rate of 0.05 to 0.15 gal./sq. yd.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.4 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Spread mix at minimum temperature of 250 deg F
2. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.5 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

3.6 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F
2. Install and compact longitudinal joints to achieve a uniform density of pavement.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.7 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/4 inch
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/4 inch.
2. Surface Course: 1/8 inch.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections. Coordinate Work with the Owner's testing agency.

B. Replace and compact hot-mix asphalt where core tests were taken.

C. Additional testing and inspection work to correct or repair unsatisfactory work will be at the expense of the Contractor.

D. Remove and replace or install additional hot-mix asphalt, at the Contractor's expense, where test results or measurements indicate that it does not comply with specified requirements.

3.9 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

END OF SECTION 32 12 16

SECTION 32 13 13 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Exterior cement concrete pavement for the following:

a. Parking lots.
b. Curbs and gutters.
c. Walkways.
d. Concrete pads

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete pavement mixture.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Reinforcement: ASTM A 1064, fabricated from as-drawn steel wire into flat sheets.

B. Deformed-Steel Welded Wire Reinforcement: ASTM A 1064, flat sheet.

C. Reinforcing Bars: ASTM A 615, Grade 60; deformed.

D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified.

2.2 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:

1. Portland Cement: ASTM C 150, INDOT section 901.01.

B. Normal-Weight Aggregates: ASTM C 33, Class D or higher coarse aggregate, INDOT section 904.03 uniformly graded. Provide aggregates from a single source.

C. Air-Entraining Admixture: ASTM C 260.

D. Water-Reducing Admixture: ASTM C-494, Type A.

2.3 RELATED MATERIALS

A. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

B. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber not greater than 1/2 inch or ASTM D 1752, cork or self-expanding cork in preformed strips.

C. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.

D. Water: Potable and complying with ASTM C 94.

2.4 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, with the following properties:

1. Compressive Strength (28 Days): 3000 psi
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.50.
3. Slump Limit: 4-6 inches except 8 inches acceptable for concrete having HRWR admixture (super-plasticizer).
4. Air Content: 4.5 to 7.5 percent.

B. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

C. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Proof-roll subbase as specified in Division 31 Section "Earth Moving."

3.2 PAVEMENT SUBBASE COURSE:

A. Place aggregate base course material on prepared subgrade as specified in Division 31 Section "Earth Moving."

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.5 JOINTS

A. General: Form construction and isolation joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

D. Contraction Joints: Sawcut joints, 1/8 inch wide sectioning concrete into areas as indicated. Sawcut contraction joints for a depth equal to at least one-fourth of the concrete thickness.

E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

B. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

C. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

D. Screed pavement surfaces with a straightedge and strike off.

E. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these methods.

3.9 PAVEMENT TOLERANCES

A. Comply with tolerances as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, no minus.
3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.
4. Joint Spacing: 3 inches.
5. Contraction Joint Depth: Plus 1/4 inch, no minus.
6. Joint Width: Plus 1/8 inch, no minus.

3.10 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement.

C. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 13

SECTION 32 13 73 - PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Expansion and contraction joints within pavement, walks and curbs.
2. Joints between cement concrete and asphalt pavement.
3. Joints between concrete or asphalt and building walls, columns or structures.

1.2 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples: For each type and color of joint sealant required.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.

1. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

2.2 JOINT SEALANTS

A. Sealant for Expansion and Contraction Joints within Cement Concrete Pavement and Between Concrete Walks, Pads, Paving, and Building Walls, Columns, and Structures: Cold applied two-part pourable urethane joint sealant, ASTM C 920, Type M, Grade P, Class 25, Use T

1. Products:

a. Master Builders Solutions; brand of MBCC Group; MasterSeal SL 2.
b. Pecora Corporation; Dynatrol II-SG.
c. Tremco, Inc.; Vulkem 445SSL
d. Sika Corporation; Sikaflex - 2c SL

2. Color: Match Concrete.

B. Sealant for Joints Larger Than 1/4 inch Between Cement Concrete and Asphalt Pavement or Within Asphalt Pavement (Including Longitudinal Joints, Cracks or Butt Joints.): Polymeric hot applied single-component formulation complying with ASTM D 6690.

1. Products:

a. Meadows, W. R., Inc.; Sealtight Hi-Spec.
b. Crafco, Inc.; Mastic One.

2. Color: Black

2.3 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials as required that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

B. Provide one of the following types of backer materials as applicable:

1. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.
2. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.
3. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience.

C. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

D. Install backer materials to support sealants during application and at position required to produce optimum sealant movement capability. Do not leave gaps between ends of backer materials. Do not stretch, twist, puncture, or tear backer materials. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

E. Install sealants at the same time backings are installed to completely fill recesses provided for each joint configuration and to produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

G. Protect applied sealant from traffic and other damage until sealants cured enough not to track. Provide temporary barricades or other protective measures recommended by the manufacturer.

END OF SECTION 32 13 73

SECTION 32 17 00 - PAVING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pavement markings
2. Precast concrete parking bumpers
3. Precast concrete bollards
4. Metal bollards
5. Tactile warning surfacing

1.2 SUBMITTALS

A. Product Data: Manufacturer's printed product data for each product specified.

B. Samples: For each product specified to match color as specified in Division 01 Sections.

1. Provide 6 inch by 6 inch sample showing finish for concrete bollards.

1.3 QUALITY ASSURANCE

A. Americans with Disabilities Act (ADA): Title III Regulations, 28 CFR Part 36 ADA Standards For Accessible Design, Appendix A, Section 4.29.2 Detectable Warnings On Walking Surfaces.

1.4 JOB CONDITIONS

A. Environmental Requirements: Apply marking paint in dry weather when temperature is 50 deg F or above and anticipated to remain above 50 deg F for four hours after completing application.

PART 2 - PRODUCTS

2.1 PAVEMENT MARKING PAINT

A. Marking paint: High solids, water based acrylic paint containing ultraviolet resistant pigments.

1. Products:

a. Benjamin Moore and Co.; INSL-X, TP-22XX Latex Traffic Paint.
b. PPG Paints; Zoneline Traffic & Zone Marking Paint, 11-53 Series.
c. The Sherwin Williams Co.; Pro-Park Traffic Marking Paint, B97 Series

2. Colors: As specified in Division 01 Section "Exterior Finishes and Colors."

    a. Verify all colors meet requirements of authorities having jurisdiction.

2.2 PARKING BUMPERS

A. Precast Concrete Parking Bumpers: Precast, air-entrained concrete, 2500-psi minimum compressive strength, 4-1/2 inches high by 9 inches wide by 72 inches long. Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.

1. Dowels: Galvanized steel, 3/4-inch diameter, 10-inch minimum length.

2.3 CONCRETE BOLLARDS

A. Basis-of-Design Manufacturer: Day Precast Company, Toledo, Ohio, 419-536-2909 or a comparable product meeting Detail B on ASD-161 from a local precast concrete company.

1. Product meeting Detail B on ASD-161 from a local precast concrete company is encouraged by Owner.

B. Concrete Materials:

1. Portland gray cement conforming to ASTM C-150 Type 1. Air content 5-7 percent. Minimum 4000 psi compression strength at 28 days.
2. Aggregates: All aggregates to meet ASTM C33 specifications, to be cleaned of foreign matter and properly graded to size.

C. Size and Shape: As indicated on Drawings.

D. Finish and Color: Light sandblast, natural gray.

E. Reinforcing: Manufacturer’s standard neoprene fibers or reinforcing bars, ASTM A 615/A 615M, Grade 60, #3, deformed.

F. Provide PVC insert for #9 dowel.

G. Installation Dowel: Galvanized Reinforcing Bars, ASTM A 615/A 615M, Grade 60, #9 deformed bar, ASTM A 767/A 767M, Class I zinc coated after fabrication and bending.

2.4 METAL BOLLARDS

A. Fabricate from ASTM A-53, Type E or S, Grade B, Schedule 40 steel pipe.

B. Color: As specified in Division 01 Section "Exterior Finishes and Colors."

1. Verify all colors meet requirements of authorities having jurisdiction.

2.5 TACTILE WARNING SURFACE

A. General:

1. Pattern: In-line pattern of truncated domes measuring nominal 0.2 inch height, 0.9 inch base diameter, and 0.45 inch top diameter, spaced center-to-center 2.35 inches as measured side by side.
2. Field Area: Non-slip surface with a minimum of 40 - 90 degree raised points 0.045 inches high, per square inch;
3. Dimensions: 2 feet by 3 feet unless indicated otherwise.

B. Tile System:

1. Basis of Design Manufacturer: ADA Solutions, Inc.
2. Configuration: Cast-in Place.
3. Material: Vitrified polymer composite (VPC) epoxy polymer composition with an ultra violet stabilized coating employing aluminum oxide particles in the truncated domes.
4. Slip Resistance (Coefficient of Friction): 1.18 dry, 1.05 wet.
5. Fire Resistance: ASTM E 84-15B flame spread: Less than 15.
6. Color: Brick Red.

C. Liquid Applied System:

1. Basis of Design Manufacturer: Vanguard ADA Systems of America.
2. Material: Resins, reactive monomers, pigments, glass beads, and fillers, resistant to ultra-violet light.
3. Viscosity: 6000 - 12000 cps, ASTM D2196.
4. Tracking: None after 60 minutes max., ASTM D711.
5. VOC: 25 g/l maximum, ASTM D2205.
6. Hardness: Shore Durometer, A-1, 80 minimum after 24 hours.
7. Tensile Strength: 125 psi minimum at break, ASTM D638.
8. Percent Elongation: 20 percent minimum, ASTM D638.
9. Water Absorption: Maximum 0.5 percent, ASTM D570.
10. Skid Resistance: Minimum 45, ASTM E303.
11. Color: Red.

PART 3 - EXECUTION

3.1 PAVEMENT MARKING

A. Verify that new asphalt is complete and has been accepted by Owner's Representative.

B. Thoroughly clean surfaces free of dirt, sand, gravel, oil, and other foreign matter. Protect adjacent curbs, walks, and other items from paint application.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

E. Apply stripes straight and even in accordance with Drawings.

F. Remove overspray, spills, or drips from surfaces other than those requiring marking paint.

G. Barricade marked areas until paint is dried and ready for traffic.

3.2 PARKING BUMPERS

A. Securely attach precast concrete parking bumpers into pavement with not less than two galvanized steel dowels embedded in holes drilled or cast into parking bumpers at one-quarter to one-third points. Firmly bond each dowel to parking bumper and to pavement. Securely install dowels into pavement and bond to wheel stop. Recess head of dowel beneath top of parking bumper.

3.3 TACTILE WARNING SURFACE

A. Install tactile warning surface as recommended by manufacturer and as follows:

1. Tile System:

    a. Pour concrete true and smooth to the required dimensions and slope prior to the tactile warning surface placement. Immediately after finishing concrete, the electronic level should be used to check that the required slope is achieved.
    b. Place tile true and square to the curb edge in accordance with the Drawings.
    c. Tamp or vibrate tactile warning surface tile into the fresh concrete so that the field level of the tactile warning surface is flush to the adjacent concrete surface. Do not embed by stepping on tactile warning surface tile.
    d. Immediately after placement, check the tactile warning surface tile elevation to adjacent concrete. Ensure that the field surface of the tile is flush with the surrounding concrete and back of curb so that no ponding is possible on the tile at the back side of curb.
    e. Keep traffic from tactile warning surface tile until concrete has set.

2. Liquid Applied System:

    a. Grind Concrete Surface.
    b. Surface Temperatures: Do not exceed 88 deg. F, or be below 35 deg. F. Make adjustments in mixing ratios for extreme temperatures.
    c. Apply base coat and dome pattern according to manufacturer’s written instructions and as specified.

3.4 PRECAST CONCRETE BOLLARDS

A. Install bollards as indicated on Drawings at locations shown on Drawings.

B. Handle and install security planters/bollards in conformance with manufacturer's recommendations and as indicated on Drawings. Drill and dowel sidewalk, set bollards true and plumb in mastic, and install sealant at base to sidewalk.

3.5 METAL BOLLARDS

A. Anchor bollards in place with concrete footings as indicated on Drawings. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

B. Fill bollards solidly with concrete, mounding top surface to shed water.

END OF SECTION 32 17 00

SECTION 32 31 13 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Chain-Link Fences
2. Gates

1.2 SUBMITTALS

A. Shop Drawings: Show locations, components, materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections, details of post anchorage, attachment, bracing, and other required installation and operational clearances.

PART 2 - PRODUCTS

2.1 CHAIN-LINK FENCE FABRIC

A. General: Height indicated on Drawings. Comply with ASTM A 392, CLFMI CLF 2445, and requirements indicated below:

1. Steel Wire Fabric: Metallic-coated wire with a diameter of 0.148 inch.

a. Mesh Size: 2 inches
b. Metallic (Zinc) Coating: ASTM A 392, Type II.

2. Selvage: Knuckled at both selvages.

2.2 FENCE FRAMING

A. Posts and Rails: Comply with ASTM F 1043 for framing, ASTM F 1083 for Group IC round pipe, and the following:

1. Group: IA, round steel pipe, Schedule 40.
2. Fence Height: As indicated.
3. Strength Requirement: Light industrial according to ASTM F 1043.
4. Coating for Steel Framing: Metallic coating.

2.3 SWING GATES

A. General: Comply with ASTM F 900 for single or double swing gate types as indicated.

1. Metal Pipe and Tubing: Galvanized steel. Comply with ASTM F 1083 and ASTM F 1043 for materials and protective coatings.

B. Frames and Bracing: Fabricate members from round, galvanized steel tubing with outside dimension and weight according to ASTM F 900 and the following:

1. Gate Fabric Height: 2 inches less than adjacent fence height.
2. Leaf Width: As indicated.
3. Frame Members: Tubular steel, 1.90 inches round.

C. Frame Corner Construction:

1. Welded or assembled with corner fittings and 5/16-inch- diameter, adjustable truss rods for panels 5 feet wide or wider.

D. Hardware: Latches permitting operation from both sides of gate, hinges, and keepers for each gate leaf more than 5 feet wide. Fabricate latches with integral eye openings for padlocking; padlock accessible from both sides of gate.

2.4 FITTINGS

A. General: Comply with ASTM F 626.

B. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. zinc.

2.5 CAST-IN-PLACE CONCRETE

A. Materials: Portland cement complying with ASTM C 150, Type I aggregates complying with ASTM C 33, and potable water.

1. Concrete Mixes: Normal-weight concrete air entrained with not less than 3500-psi compressive strength (28 days), 3-inch slump, and 1-inch maximum size aggregate.

2.6 GROUT

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.

B. Post Excavation:

1. Interior: Center and align posts by core drilling slab.
2. Exterior: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

C. Post Setting:

1. Interior: Anchor posts in concrete by core drilling holes 1-inch greater than post outside diameter. Clean holes of all loose material, and insert posts, imbedment of 6-inch required.

    a. After posts are set, fill annular space between post and hole setting of grout solid with hydraulic grout and tamp for consolidation. Check each post for vertical and top alignment, and hold in position during
    b. Cover anchorage joint with round steel flange welded to post.

2. Exterior: Set posts in concrete at indicated spacing into firm, undisturbed soil.

    a. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

D. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment.

E. Line Posts: Space line posts uniformly at 10 feet o.c.

F. Post Bracing and Intermediate Rails: Install according to ASTM F 567. Install braces at end and gate posts and at both sides of corner and pull posts.

G. Top Rail: Install according to ASTM F 567.

H. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2 inches between finish grade or surface and bottom selvage, unless otherwise indicated.

I. Tie Wires: Attach wire per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.

J. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

3.2 GATE INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

END OF SECTION 32 31 13