TECHNICAL SPECIFICATIONS
FOR
MEADOW PARK APARTMENTS
RENOVATIONS
& COMMUNITY BUILDING
for
Big Rapids Housing Commission

October, 2016
**BIG RAPIDS HOUSING COMMISSION**  
**MEADOW PARK APARTMENTS**

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PART I - GENERAL

1.01 Maintenance of Survey Information

The Contractor shall be responsible for maintaining all layout information, elevations, bench marks, and general site information provided or approved by the Owner and/or Landscape Architect. Survey or layout information lost or displaced or in any way disturbed through neglect or any construction activity by the Contractor or any of his employees or representatives shall be restored by the Contractor at his expense.

1.02 Layout and Staking

The General Contractor shall be responsible for layout staking, grade staking and for getting approvals for all work for himself and/or his sub-contractor. The Contractor shall employ a Registered Land Surveyor who shall establish and maintain all lines and levels required for laying out and constructing the work. The Contractor agrees to assume all responsibility due to inaccuracy of any work of said Surveyor, and including incorrect benchmarks, their loss or disturbance.

The Contractor shall provide on-site assistance for any work specified to be laid out by the Landscape Architect. The Contractor shall also be responsible for any additional staking required for field adjustments by the Landscape Architect.

1.03 Soil Testing

The General Contractor shall be responsible for all soil testing throughout the course of the project on a daily basis or as required. Testing shall be done to ensure the stability of all graded areas and proposed items of work. All testing shall be conducted by a professional soil testing specialist. Results of all testing shall be delivered to the Landscape Architect weekly, upon completion.

1.04 Sub-Contractor Layout Verification

Each sub-contractor shall verify layout stakes, grades and other information as it pertains to his particular work and report any errors or inconsistencies to the Landscape Architect before commencing work. Starting the work shall imply his acceptance and willingness to correct any errors at his expense.

1.05 Protection of Existing Features

The Contractor shall save and protect, to the highest degree possible, all areas and features of the site that are not identified as construction items. Unnecessary disturbances or damage shall be considered the responsibility of the Contractor for complete restoration at no additional expense to the Owner.
1.06 **Water, Power, and Sanitary Sewer**

The Contractor shall provide all water, electrical, mechanical and toilet services and facilities as may be required to properly execute the Contract and provide proper maintenance throughout the guarantee period.

1.07 **Miss Dig**

The Contractor shall be responsible for notification to MISS DIG, one number utility alert (1-800-482-7171), for location of public utility service lines where digging or deep excavation operations could disturb or sever such lines. The Contractor shall pay for all repairs, restoration and damages resulting from failure to properly fulfill such notification and location requirements.
TECHNICAL SPECIFICATIONS
REMOVAL ITEMS - SECTION 02100

PART I - GENERAL

1.01 Description

This work shall consist of the complete removal of all items called for in the plans and specifications or as otherwise implied in a safe and orderly manner creating as little disturbance as possible.

All areas indicated for construction of any kind shall be cleared of any debris, undergrowth, weeds, stumps, roots, and marked trees which might interfere with the progress of that work. Unmarked trees or any plant materials indicated to be saved by the Landscape Architect shall be given special protection as specified.

PART II - PRODUCTS (Not Applicable)

PART III - EXECUTION

3.01 Protection of Items to Remain

Extreme care shall be utilized when removing any item adjacent to structures, utilities, paving, vegetation or any item not indicated for removal or relocation. These items shall be properly protected as required to keep them from damage or other disturbance of any kind during the course of the work.

Care should be taken to work from open areas when working around plants that are to be saved to avoid unnecessary soil compaction and other damages that might occur. Only hand methods shall be utilized for removal of roots and debris under the drip line of trees that are to remain.

3.02 Plant Damage Compensation

Damage inflicted to any trees or plant materials by the Contractor shall be compensated for at a rate established by the American Society of Consulting Arborists, Inc.
3.03 **Removal Responsibility**

All debris, trees, stumps, or soil to be cleared and removed from the project area shall be disposed of off the site at an approved disposal area at the arrangement and expense of the Contractor. No materials will be stockpiled on site for future disposal nor will any excavation areas be left in unsafe or unsightly conditions at days end. The Contractor will be responsible for all transportation and disposal fees associated with this work. Burning of cleared, grubbed, or construction waste materials is not permitted on the Owner’s property.

3.04 **Utility Shut-Off**

The Contractor shall ascertain the location of all existing utilities and accept total responsibility for shut-off and avoidance of all such utilities during construction. All utilities to be disconnected, plugged, and capped, or otherwise taken out of service shall be the responsibility of the Contractor and shall be properly executed with skilled tradesmen in accordance with the standards and practices of the trade.
TECHNICAL SPECIFICATIONS
EARTHWORK AND GRADING – SECTION 02200

PART 1 - GENERAL

1.01 Description

The work consists of all work as called for by the plans and/or proposal form and may include: rough and finish grading to approved grade stakes; excavation of organic or unstable soils; excavation, stockpiling and redistribution of topsoil; placement of sand base for construction items not covered by sub-contractors; placing and grading supplemental topsoil; and all other grading and excavation operations, unless otherwise called for in the plans and specifications, all in conformance to Act 347, Soil Erosion and Sedimentation Control, as locally administered and enforced.

PART II - PRODUCTS

2.01 Fill Materials

Fill and backfill materials shall be MDOT Class II or approved clean, porous granular materials free of clay, rock or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetation or other deleterious matter.

2.02 Subbase Materials

Subbase materials shall be the specified properly graded mixture of natural or crushed gravel, crushed stone, crushed slag or natural processed sand that will readily compact to the required density and remain in that state under normal conditions.

2.03 Topsoil

Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth. It shall be reasonably free from subsoil and stumps, roots, brush, stones (1 inch or more in any dimension), clay lumps or similar objects. Existing vegetation including brush and noxious weeds shall be removed from the soil surface and disposed of prior to stripping of the topsoil. Ordinary sod can be thoroughly broken up and intermixed with the soil during handling operations. Topsoil shall be classifiable as a loam, silt loam, silt clay loam, or clay loam, as determined from the Bureau of Plant Industrial, Soils and Agricultural Engineering, USDA triangular soil texture chart. The topsoil, unless otherwise specified or approved, shall have a pH range of approximately 5.5 to 7.5, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall not be less than 3% nor more than 20% as determined by the wet-combustion method (chromic acid reduction) test.
2.04 **Screened Imported Topsoil**

Prior to obtaining additional material to be used for imported topsoil, the Landscape Architect shall be notified of the source of topsoil to be furnished by the Contractor. The topsoil shall be inspected to determine if the selected soil meets the requirements of well drained soil specified and to determine the depth to which stripping will be permitted. At this time, the Contractor shall be required to take representative soil samples from several locations within the area under consideration to the proposed stripping depths for testing purposes as specified above, and shall have them professionally tested by a laboratory approved by the Landscape Architect prior to approval of the soil. Topsoil must be screened to remove all debris.

**PART III - EXECUTION**

3.01 **Stripping Topsoil**

Topsoil in areas that are to be graded shall be stripped to the depth designated and stockpiled in an area approved by the Landscape Architect outside of the construction work areas. Stockpiles shall be graded and shaped to ensure proper drainage and minimize wind erosion.

3.02 **Removal of Unsatisfactory Materials**

All organic, unstable or otherwise unsatisfactory soils shall be excavated to stable soil and replaced with an approved sand or gravel compacted as specified.

3.03 **Excavation for Structures**

Grading for structures shall be to the tolerances specified and shall extend sufficient distances from footings and foundations to permit placing and removal of formwork, installation of services, other construction operations and inspection.

3.04 **Placing Fill**

During grading and filling operations, all fill shall be placed in ten inch (10"), or less, layers and compacted by operating heavy track or rubber tired equipment over it.

3.05 **Compaction of Soil**

Soil compaction for all graded or fill materials shall be at least 95% ASTM D 1557 or Proctor Density and shall be achieved under optimum moisture conditions unless otherwise specified.

3.06 **Grade Tolerance**

All earthwork grading shall be within one inch (1" or 0.083') of the elevations called for
on the plans. All pavement and surface grading; and curb and gutter elevations shall be within one quarter inch (1/8” or 0.0104') of the elevations called for in the plans. All grading shall drain uniformly to designated low points and all changes in elevation and transition areas shall be with gentle, rounded gradients.

No horizontal walk grades will exceed 5% (1 in 20) with the exception of curb ramps which may be up to 8.33% (1 in 12) for a distance of not over 6 feet. No walk cross slopes shall exceed 2% (1 in 50). No barrier free parking spaces and/or loading aprons shall exceed 2% (1 in 50) in any direction.

The Landscape Architect may check finished grades with a smart level to ensure compliance with the plans, Americans with Disabilities Act (ADA) and the requirements stated above. All paving not meeting these requirements shall be removed and replaced by the Contractor at no cost to the Owner.

3.07 Maintenance of Graded Areas

Recently completed sub and finished grade work areas shall be protected from erosion, traffic and accumulation of debris. The Contractor shall scarify, regrade and otherwise restore settled, eroded, and/or rutted areas to the specified grades and approval of the Landscape Architect.
TECHNICAL SPECIFICATIONS
BITUMINOUS CONCRETE PAVING - SECTION 02513

PART I - GENERAL

1.01 Description

This work shall consist of the placing of bituminous concrete as called for in the plans and details.

1.02 Weather Limitations

Apply bituminous prime and tack coats only when the ambient temperature in the shade is above 50° F. and when the temperature has not been below 35° F. for 12 hours immediately prior to application. Also, do not apply when the base surface is wet or contains an excess of moisture, which would prevent uniform distribution and the required penetration.

Construct asphalt concrete and patching surface course only when atmospheric temperature is above 40° F., when the underlying base is dry, and when weather is not rainy. Base course may be placed when air temperature is not below 30° F. and rising, when acceptable to the Landscape Architect.

1.03 Grade Control

Establish and maintain the required lines and grades, including crown and cross-slope for each course during construction operations.

Accessible parking spaces shall not have a slope greater than 2% (1’v:50’h) in any direction.

PART II - PRODUCTS

2.01 Materials

A. Bituminous Mixtures shall conform to the requirements of the current Michigan Department of Transportation's Standard Specifications for Construction and as noted herein. The base course will generally be Bituminous Base Mixture No. 2C or 13A; the leveling course, Bituminous Mixture No. 13A, and the top (wearing) course, Bituminous Mixture No. 36A or 4C unless otherwise specified in the proposal or on the plans. The wedging course, when specified, will be either
Bituminous Mixture No. 13A or 3C as specified on the plans.

The bituminous material for base mixtures shall have a PG Binder Grade of PG64-22 and the bituminous material for surface mixtures (wedging, leveling, and top course) shall have a PG Binder Grade of PG64-22 for 13A and 36A and PG64-28 for 3C and 4C.

Bituminous Mixtures shall be prepared in a bituminous mixing plant which has been pre-qualified by the Michigan Department of Transportation or as approved by the Landscape Architect and shall be in accordance with the current Michigan Department of Transportation's Standard Specifications for Construction.

B. Prime Coat and Tack Coat, when specified, shall conform to the current requirements of the Michigan Department of Transportation's Standard Specifications for Construction. Prime coat will be MS-OP and tack coat will be SS-1h unless otherwise specified.

C. Herbicide, Triox or equal shall be used for treatment of all subgrade areas prior to placement of aggregate base.

D. Seal Coat or Slurry Seal, when specified, shall conform to the current requirements of the Michigan Department of Transportation's Standard Specifications for Construction Section 506.

PART III - EXECUTION

3.01 Construction Methods

Construction methods to be used for placing bituminous mixtures shall conform to the requirements of the current Michigan Department of Transportation's Standard Specifications for Construction, except as noted herein.

All existing paved surfaces to be newly paved shall be thoroughly cleaned of loose and foreign materials and dry and shall be tack coated prior to placement at a minimum rate of .02 gal/sy. Prime coat cut surfaces to receive asphalt patch and between asphalt. All paving operations shall cease when the surface to repave is wet.

Joint and crack cleanout covers the work of removing existing joint sealant and foreign materials, to a depth of up to 1" from transverse and longitudinal joints and cracks prior to resurfacing. The work is usually done with a hooked
device, not unlike a stove poker. The pay item is "Joint and Crack, Cleanout", measured in feet of joints and cracks so treated. Cleaned cracks 1” wide and greater shall be filled with hand patching.

All mixing, spreading, finishing, compacting, constructing joints and joint and crack cleanout shall meet Michigan Department of Transportation's Standard Specifications for Construction

3.02 Equipment

Equipment to be used for placing bituminous pavements shall conform to the requirements of the current Michigan Department of Transportation's Standard Specifications for Construction.

3.03 Line Striping

Following completion of all bituminous paving, stripe all areas as per the plans and details.

All line striping must be laid out per the plans and specifications with marked with chalk lines for approval by Landscape Architect PRIOR to any striping work.

Utilize an acrylic latex emulsion paint, white in color, to provide a 4” wide dense line complete covering the pavement, use blue color for barrier free spaces. Use approved blue color for barrier free striping and symbols.

When called for on the plans, cold plastic overlay shall be used in lieu of paint. Cold plastic material and installation methods shall conform to MDOT Section 811.

Seal coated paving should be allowed to dry for a 24-hour period before striping.
TECHNICAL SPECIFICATIONS
CONCRETE WORK - SECTION 02514

PART I - GENERAL

1.01 Description
This work shall consist of all labor, equipment, and materials necessary for complete installation of site concrete work as called for in the plans and details.

1.02 Testing
Standard 6-inch cylinders for compression tests of the concrete shall be prepared from each pour. Concrete for test specimens and assistance for making them on the project will be furnished by the Contractor. The furnishing of molds, the actual making of the test cylinders and all testing will be performed by the Contractor.

The sample shall be tested in accordance with the specification of the American Society for Testing Materials, Serial Designation C-31 or the current Michigan Department of Transportation Specifications. If the average results from test specimens cured at an average temperature of 70° F are below the 28 day required compressive strength it will be sufficient reason for rejecting for further use the materials entering into the concrete.

PART II - PRODUCTS

2.01 Concrete
Concrete shall be Type A, air-entrained concrete with a slump of not less than 3 inches nor more than 4 inches unless otherwise specified.

Portland Cement shall conform to the requirements of the current ASTM Specifications for Air-Entraining Portland Cement.

Fine Aggregate shall conform to the requirements for "Natural Sand, 2NS" of the current Standard Specifications of the Michigan Department of Transportation.

Course Aggregate shall conform to the requirements for Course Aggregate, 6 A (limestone) of the current Standard Specifications of the Michigan Department of Transportation.

At location on Project selected by Landscape Architect, place and finish 2 each, 3’x3’. Demonstrate methods of obtaining consistent visual appearance, including materials, workmanship, and curing method to be used throughout Project. Retain
samples of cements, sands and aggregates used in mock-up for comparison with materials used in remaining Work.

Water for mixing and curing the concrete shall be from Municipal Potable Water Supply, unless otherwise specified.

2.02 Reinforcing

Steel Reinforcement Materials shall conform to the requirements of current Standard Specifications of the Michigan Department of Transportation.

2.03 Additives

Curing of the concrete shall be performed by one of the appropriate methods as specified for "Concrete Curing Agents" in the current Standard Specifications of the Michigan Department of Transportation. Only clear curing agents or other methods that will not affect the natural colorations of the concrete will be permitted. Care shall be taken to avoid using agents or methods that affect the future use of specified sealants.

Calcium chloride shall not be used in any concrete without written approval from the Landscape Architect.

Ready mix concrete shall conform to the requirements of ASTM C 94. Batch plants must meet the requirements of ACI 304. Hand mixing will not be permitted except in emergencies or for very small quantities.

Air entraining admixtures shall conform to ASTM C 260 and shall be constituted so that the total air content is not less than 5% nor more than 8%.

2.04 Synthetic Fiber Reinforcing

Synthetic fiber reinforcing shall be 100% virgin homo polymer polypropylene fibrillated fibers as manufactured by the Fibermesh Company, 125 Meridan, Dearborn, Michigan, (313) 278-7205, by Forta Corporation, 100 Forta Drive, Grove City, Pennsylvania 16127 (1-800-245-0306), or approved equal.

Synthetic fibers shall be incorporated into all concrete whether indicated on the drawings or not. The incorporation of said fibers shall be documented on the delivery ticket from the ready mix producer.

Fibers shall be added to the concrete in strict accordance with manufacturer's printed instructions. Synthetic fibers shall be 3/4" in length and shall be added at a rate of 1-1/2 lbs./cubic yard of concrete.
PART III - EXECUTION

3.01 Concrete Mixing

The proportioning of aggregates and cement shall be weight in accordance with the current Michigan Department of Transportation "Mortar Voids" theory with the quantities of each shown on the delivery tickets for each batch.

Concrete shall be mixed only as required for immediate use and any which has developed initial set shall not be used. Concrete which has partially hardened, shall not be remixed or retempered. The use of a fractional sack of cement will not be permitted unless the fractional part is measured by weight. The mixer shall be cleaned thoroughly each time when out of operation for more than 30 minutes.

Concrete mixes will be measured as described in the current "Method of Slump Test for Consistency of Portland Cement Concrete" of the ASTM Designation C-143. The concrete shall at all times be of such consistency and workability, that it can be puddled readily into corners and angles of the forms and around joints, dowels, tie bars and reinforcement without excessive spading, segregation or undue accumulation of water or laitance on the surface.

The mixing of concrete in truck mixers enroute from the batching plant to the site of the work will be permitted only for mixers equipped with an approved revolution counter which will either record the number of revolutions of the mixer drum at mixing speeds and the number of revolutions at agitating speeds, for each batch, or will record the revolutions of the mixer drum only when the mixer is operating at mixing speeds. Truck mixers not so equipped shall mix the concrete at the batching plant site. The mixing shall be done on a reasonable level area, sloping not more than 2 percent in any direction.

The concrete shall be discharged within a period of one hour after the introduction of the mixing water with the dry materials or within a period of 1-1½ hours after the cement has been placed in contact with the aggregates, and it shall be within the specified limits for consistency and air content and it shall not be segregated.

3.02 Forming

Concrete which is improperly formed, is out of alignment or level or displays surface defects shall be removed and replaced by the Contractor at no additional cost to the Owner unless patching or other corrective measures are approved. Approved permission to patch or otherwise correct such defects does not waive the Owners Agent's right to require complete removal of the defective work if the corrective measures do not adequately restore the quality and appearance of the concrete.

Forms shall be metal or wood, straight and free from distortion, and of sufficient
strength to resist springing during the process of depositing and finishing the concrete. Wood forms or flexible steel forms shall be used on circular curb or special sections and shall be defined as any curved section of curb or wall constructed on a radius of 150 feet or less. They shall be of an approved section with a flat surface on top. The forms shall be of the full depth of the structure and shall be well built, substantial and unyielding. They shall be securely staked, braced, and tied to the required line and grade and sufficiently tight to prevent leakage of mortar. The inside surface of the forms shall be oiled with a light, clear paraffin-base oil which will not discolor or otherwise injuriously affect the concrete as on the walls to be treated with Thoroseal or equal.

Placing concrete shall not be permitted until the subgrade and forms have been approved by the Landscape Architect. The subgrade shall be wetted and the concrete deposited to the proper depth. The concrete shall be spaded sufficiently to eliminate all voids and tamped to bring the mortar to the surface, after which it shall be floated smooth and even by means of a wooden float.

3.03 Reinforcement

All steel reinforcement shall be accurately placed in the position shown on the approved plans and firmly held during the placing of concrete. When placed in the work, it shall be free from dirt, rust, mill scale, paint, oil or other foreign material. Bars shall be placed with a variation in spacing between adjacent bars of not more than one-sixth of the spacing shown on the plans, and the clear distance from the near surface of the concrete to the reinforcement shall not vary from the distance shown on the plans by more than one-fourth the plan distance. Bars shall be tied at all intersections except where the spacing is less than one foot in each direction in which case alternative intersections shall be tied. Supports for reinforcement which are to remain in the work shall be either precast concrete blocks of approved shape and dimensions, or approved preformed steel bar-chairs.

Bars shall not be spliced except as provided on the plans or as authorized by the Landscape Architect.

3.04 Finishing

Edges on all concrete shall be rounded to a radius of 1/4 inch with an approved finishing tool unless otherwise specified. All joints shall be rounded with an approved double edging tool having a radius of 1/4 inch on each side and the surface shall then be brushed lightly to produce a slightly roughened surface and remove the finishing tool marks except where otherwise specified.

All Portland Cement Concrete shall be finished with a light broom finish in the direction indicated on the plans, unless otherwise specified.

Location of control joints are subject to Landscape Architects approval.
Exposing Aggregate: Begin exposing aggregate when paving will bear weight of cement mason on knee boards without indentation. Brush with bristle broom and fine water spray to remove excess mortar until exposure of aggregate is uniform and at proper depth as approved by the Landscape Architect.

3.05 Protection

Protection of Concrete shall be performed in the following manner:

Sealant for curing shall be applied immediately in accordance with manufacturer’s recommendations. (See part 3.05a)

Protection Against Rain - The Contractor shall take such precautions as are necessary to protect the concrete from damage.

Hot Weather Limitations - Casting of concrete during hot weather shall be limited by the temperature of the concrete at the time of placing. Concrete shall not be cast when the temperature of the concrete is above 90°F. Care shall be taken to properly wet and protect all concrete placed in direct sun or in hot weather.

Cold Weather Limitations - No concrete shall be placed unless the temperature of the air in the shade and away from artificial heat is at least 25°F and rising unless specifically approved.

Protection from Cold Weather - The Contractor shall be responsible for the concrete placed during cold weather and any concrete injured by frost action shall be removed and replaced at his expense.

3.06 Sealant

Sealant for curing shall be Kure-N-Seal 25 LV by Sonneborn. Sealant shall be applied at a coverage rate of 250 square feet per gallon. For application, proper surface preparation and drying time, consult the coatings manufacturer for more instructions. Sealant must comply with ASTM C 1315-96 Type I, Class A. Kure-N-Seal 25 LV by Sonneborn is available from S. A. Morman & Co. ph. 1.800.968.8012.

Sealant for curing of exposed aggregate and sandblasted concrete shall be Kure-N-Seal 30 by Sonneborn. Sealant shall be applied at a coverage rate of 250 square feet per gallon. For application, proper surface preparation and drying time, consult the coatings manufacturer for more instructions. Sealant must comply with ASTM C1315-96, Type 1, Class A. Kure-N-Seal 30 by Sonneborn is available from S. A. Morman & Co. ph. 1.800.968.8012.

For subsequent coating applications, use Sonosil Curing aid, hardening and
dustproofing compound for concrete. For application, proper surface preparation and drying time, consult the coatings manufacturer for more instructions. Sonosil by Sonneborn is available from S. A. Morman & Co. ph. 1.800.968.8012.

3.07 Curing

Forms shall be left in place for a period of not less than 12 hours. Immediately after they have been removed, all porous or honeycomb areas thus uncovered shall be filled smooth with mortar consisting of one part cement and two parts fine aggregate. Also, the ends of all expansion joints shall be cut open to the full width of the expansion joint material.

The main supporting forms, including all shoring and bracing shall remain in place for a period of not less than seven (7) days, and for such longer period as the Landscape Architect may direct.

3.08 Expansion Joints

Contractor to indicate the layout of the proposed expansion joints required in all concrete areas if not shown on construction documents.

Expansion joints at to be placed at a minimum of 30’ intervals to correct elevation and profile.

Contractor to align curb, gutter; and sidewalk expansion joints.

Place joints between paving components and building or other appurtenances.

Location of expansion joints is subject to approval of the Landscape Architect.
TECHNICAL SPECIFICATIONS
JOINT FILLER AND SEALANT - SECTION 02515

PART I - GENERAL

1.01 Description

This work shall consist of the complete installation of specified expansion joint filler and joint sealant as called for in the plans and details.

1.02 Submittals

Sealant manufacturer's instructions, including limitations for application and priming. Indicate on the brochure or by transmittal which primers will be used or submit printed statement from sealant manufacturer that no primers are required for maximum adhesion.

Sealant manufacturer's standard color range for color selection. Color will be selected by the Landscape Architect.

PART II - PRODUCTS

2.01 Expansion joint material shall be pre-molded, non-staining and compatible with sealant and primer, and of a resilient nature such as closed cell resilient foam or sponge rubber. Sonoflex - F closed cell foam as manufactured by Sonneborn Building Products and available from Ersco Corporation, 2643 - 28th Street, Wyoming, Michigan, A/C 616-531-7050, or approved equal shall be used. Materials impregnated with oil, bitumen, or similar materials shall not be used. Provide back-up materials only as recommended by sealant manufacturer in writing. Joint material shall be 33% to 50% larger than joint width.

2.02 Expansion joint cap shall be white cap or snap-cap premolded P.V.C. expansion joint cap.

2.03 Joint sealant shall be Sonolastic SL 1 self-leveling polyurethane sealant as manufactured by Sonneborn Building Products and available from Ersco Corporation, Wyoming, Michigan.

PART III - EXECUTION

3.01 Joint Preparation

All joints surfaces shall be dry and thoroughly clean. Remove all loose particles, dirt, paint, foreign matter, or curing compound by means not injurious to the material to be
sealed and that will not change the appearance of the exposed surfaces adjacent to the sealant joint.

3.02 Sealant Application

All joints shall be neatly finished to assure proper filling of voids, elimination of air pockets and maximum contact at joint interfaces.

After surfaces of joints are cleaned, joint interfaces shall be primed and then joint sealant installed over expansion joint material. Sealant shall be brought close to the surface without overflowing and form a slightly concave joint seal.

Where required because of excessive slope, a non-sag variety of the same joint sealant shall be installed with a caulking gun and the joints tooled. Where required to avoid smearing exposed surfaces of joint use masking tape and remove after installation.

No sealant shall be applied to a joint at temperatures other than those per manufacturer's recommendations.

Wherever possible, sealant application shall be scheduled for seasonal periods (medium temperature) when joints are at their normal size.

Sealant SHALL NOT be applied over incompatible materials, oil base or asphaltic products, any migratory saturant or any other materials or sealant in which the bonding properties and adverse effects resulting from the combination are not known.

Modification of a sealant by the addition of liquids or powders to alter its flow properties SHALL NOT be permitted.

A sealant SHALL NOT be used if the date of manufacture indicates that the sealant is more than 12 months old. Where a lesser period is recommended by the manufacturer, the lesser period shall govern.

3.03 Quality

Any sealed joint not completely filled or properly finished shall be reopened and replaced as directed and sealed as specified. No rough or unsightly work shall be accepted.
PART I – GENERAL

1.01 Description

These specifications shall be for the furnishing, assembly and installation of play equipment and/or site amenity materials. This work consists of procuring, storing, unpacking, assembly and erection of all site play equipment and/or site amenity in accordance with the plans, specifications, and manufacturer’s specifications unless otherwise indicated on the plans and specifications.

1.02 Delivery of Materials

The Owner shall be notified at least 48 hours in advance of the delivery of all equipment or materials. The Contractor shall be wholly and completely responsible for loss, damage, or any other occurrence that might affect the complete installation as planned and shall make complete replacement or repair of lost or damaged items.

PART II - PRODUCTS

2.01 Play Equipment and/or Site Amenities

All play equipment and/or site amenities shall be the same as that described by the manufacturer and of the same specific series, model, order, or other qualifying designation. All colors shall be as selected, after the bid, by the Owner and the Landscape Architect.

2.02 Safety Design

All play equipment shall conform to the most current standards of safety in design and construction of play equipment as determined by the equipment manufacturers and national play equipment study committee, whether by written ordinance or by “preferred” practice. The current safety standards to be met or exceeded shall include, but not be limited to, the following: ASTM (American Society of Testing and Materials) standards and CPSC (Consumer Project Safety Commission) guidelines and ADA (The Americans with Disabilities Act).

Railings or other type control devices shall be provided at open ledges over 2’-0” high, slide entrances bordering moving parts or equipment or similar conditions as part of the overall piece of equipment. All openings shall conform to all state and federal regulations.
Units shall be designed and manufactured with ultimate user safety in mind incorporating materials of adequate strength for intended use, structurally sound, and of accident free design for each play option feature.

2.03 Equipment Surfaces

All equipment surfaces shall be finished with durable, vandal resistant materials and shall be free of holes, cracks, voids, chips, abrasions, burrs, or any other form of roughness or weakness in the surface area. Surfaces shall also be free of protruding fastener ends, pinch points, sharp edges or points, sharply protruding assembly members, slippery areas, or similar potentially hazardous, visually unattractive, or functionally inappropriate conditions as determined by the Landscape Architect and/or the Owner.

2.04 Materials

All materials shall be to the highest standards of the industry for such materials. Wood shall be long grained, all heart redwood, others as specified or equal, free of bark, chips, splinters, checks, or similar irregularities and shall be straight, square, and true to dimension.

All metal parts, except stainless steel, shall be corrosion resistant by treatment with hot dip zinc galvanized or baked, electrostatically applied dry powder polyester coating capable of withstanding ASTM B-117 Salt Spray Test for at least 1,000 hours without failure. All edges shall be folded and crimped to a smooth, rounded condition, and all seams and unions of two or more pieces shall be secured with continuous, smooth welds. All pipe shall be Schedule 40, or approved equal. All plate metal shall be of the gauge, thickness, or shear strength designated in the representative play equipment listed in the Proposal Form. All metal bends shall be smooth, of uniform curvature, and free of stress cracks or distortion in the metal or its protective coating(s).

All non-ferrous materials shall be nonflammable or treated to the highest standard in the industry for flame resistance. Synthetic nonflammable materials shall have high melt or physical distortion temperature ratings and shall comply with the highest standards of the industry for vandal resistance and safety. All synthetic materials shall have similar characteristics of flexibility; impact fracture, cracking or shattering, and/or structural integrity at temperatures below 20° Fahrenheit as they do at 70° Fahrenheit.

2.05 Fasteners

All fasteners shall be hot-dipped, zinc galvanized steel, or approved equal, of vandal resistant head tool key design, locking or non-loosening design of a smooth, flush, or rounded, slightly protruding character; free of objectionable sharp projections or other potentially harmful conditions in the judgment of the Landscape Architect and/or Owner.
PART III - EXECUTION

3.01 Installation

All site amenities shall be assembled and set in/on the ground in accordance with the manufacturers instructions unless otherwise specified or detailed. Footings shall be concrete as specified and to a depth and diameter as recommended by the manufacturer. Top of footing elevations shall be even or below the bottom of the barrier free play surfacing.

3.02 Assembly

All play equipment and/or site amenities shall be shipped and received in well packaged, prefabricated ready for assembly condition with all parts and sub-assemblies properly identified in accordance with at least one full or complete set of assembly instructions with step-by-step directions and diagrams for the entire assembly and installation operations. All parts and sub-assemblies shall be true to dimension and shape, properly finished and packaged with all necessary hardware and special tools necessary for complete rigid and permanent erection of the equipment to the expectations of the Owner and Landscape Architect and as represented by the manufacturer or his representative.

3.03 Securing Hardware

Whether stated on the manufacturers installation instruction or included in the furniture hardware, the Contractor shall be responsible for trimming all bolts and other similar fastener items to within three-eighths inch (3/8”) of the nuts/fasteners and securing the nuts in a manner that will prevent removal; such as peening, x-spreading, double nutting or tack welding, which shall be approved by the Owners agent prior to commencement of the work.

3.04 Manufacturer Installation Instructions

Manufacturer installation instructions follow, which support related information found elsewhere in the plans and specifications. The Contractor shall secure any other instructions required for proper installation from the specific manufacturers, which may not be included but required.
TECHNICAL SPECIFICATIONS
WOOD FIBER BARRIER-FREE SURFACING - SECTION 02770

PART I - GENERAL

1.01 Description

The bidder shall provide labor and materials necessary for the complete installation of the wood fiber surfacing in accordance with the construction details and in accordance with manufacturer's installation instructions.

The following manufacturers of the wood fiber surfacing shall be acceptable when they meet every criteria for this specification:


4. GTImpax available from Sinclair Recreation: 800-444-4954

1.02 Special Requirements

Bidder must obtain complete manufacturer’s installation instructions and will provide and install the wood fiber surfacing according to manufacturer’s installation instructions.

Bidder must certify wood fiber surface material is from virgin hardwoods.

A certificate of insurance must be provided by the bidder which shall provide coverage for product liability with the limit of liability not less than $2,000,000.00.

A 1/2 cubic foot sample of the wood fiber surfacing shall be submitted for approval by Landscape Architect prior to purchase or installation.

The bidder will provide a written Limited Lifetime Warranty on the geotextile fabric if fabric is specified or detailed. The bidder will provide a written five (5) year Limited Warranty (performance) from date of installation. The bidder also provides a three (3) year Limited Warranty (biological degradation) from date of installation.
PART II - PRODUCTS

2.01   Materials

Material used will consist only of recently harvested North American hardwoods including Oak, Maple, Ash, Poplar, Hickory, Beech, Birch and Locust. All woods shall have been debarked and shall be free of soil, leaves, twig material and other contaminants which hasten decomposition. Absolutely no soft woods are permitted due to inferior surface stability for handicap accessibility and the rapid rate of decomposition.

The wood fiber will consist of randomly sized wood fibers, the majority of which do not exceed 1.5” in length and containing 10% to 20% fines to aid in compaction. It is generally understood that the manufacturing process allows a few oversized pieces. These pieces shall all be removed during the installation process.

The moisture content shall be between 25% and 55% by weight.

No chemical treatment or additives are allowed.

Positively no recycled wood from pallets or waste wood is permitted due to the possibility of contamination and the risk of poor surface stability.

Wood fiber shall have no twigs, bark, leaf debris or other organic material incorporated within.

The density of the material shall be from 18 lbs. per cubic foot to 23 lbs. per cubic foot. Wood fiber surfacing shall be randomly-sized good fibers, approximately ten (10) times longer than wide. The material shall meet the gradation requirements of ASTM-C-136. Bidder shall guarantee sieve analysis of wood fiber as follows: greater than 85% passing 3/8" sieve, less than 50% passing #60 sieve.

PART III - EXECUTION

3.01   Installation

Install the wood fiber surfacing material in 4-inch "lifts" (4 inches at a time). Wood fiber shall be dampened prior to installation.

Compact each 4" lift using a 3-ton eccentric hand-operated vibratory roller to compact each lift. The material will compact approximately 30 - 40%. Add successive 4-inch lifts of wood fiber surfacing and repeat the process until all of the material is installed to a level which will allow for further settlement and compaction to the finished depth. Prior to the final rolling of the finished surface, it is critical that the surface be as level as possible.
If the layout of the playground equipment makes it difficult to use a hand-operated vibratory roller, a 2-1/2 ton plate compactor may be used. All material on adjacent surfaces must be swept or raked clean without depositing any other contaminating materials (dirt, concrete chips, leaves, etc.) into the wood fiber surfacing.

4.01 Testing and Certification

ASTM testing and certification: Manufacturer must be in compliance and provide testing data for the following standards as set forth by the American Standard for Testing Materials (ASTM), for surface system under and around playground equipment.

1. ASTM F1951-99 (previously ASTM PS 83-97) Determination of accessibility of surface systems under and around playground equipment.

2. ASTM F1292-96 IMPACT ATTENUATION of surface systems under and around playground equipment.

TECHNICAL SPECIFICATIONS
WOOD CONSTRUCTION - SECTION 02820

PART I - GENERAL

1.01 Description

This work consists of providing all labor, equipment, and materials necessary for complete construction of wood elements and related structures and equipment including all wood, hardware, fasteners, and related construction materials as called for in the plans and details.

1.02 Codes and Regulations

All work shall be in complete conformance to all local codes, ordinances and regulations.

All permits shall be obtained and paid for by the Contractor.

PART II - PRODUCTS

2.01 Materials

Timber posts and framing material shall be No. 2 Grade Southern Yellow Pine treated to a minimum net retention of 0.40 for above or ground contact, and 0.60 for water contact, pounds per cubic foot of Alkaline Copper Quaternary (ACQ) or approved equal; as called for on the plans. Timbers to be mill finished unless otherwise specified.

Lumber to be used for benches, decking, railings, planters and related work shall be No. 2 Grade Ponderosa Pine treated to a minimum retention of 0.40 pounds per cubic foot of Alkaline Copper Quaternary (ACQ) or an approved equal; as called for on the plans.

Rough sawn lumber or timbers shall not be used unless specifically called for on the plans.

2.02 Fasteners

All fasteners and related hardware shall be hot-dipped, galvanized or stainless
steel (Type 304 and 316). Do not place hot-dipped galvanized and stainless steel components in contact with each other.

All hot-dipped galvanized products shall be manufactured with a G185 coating, 1.85 oz/ft² per ASTM A653 and as recommended for use with ACQ treated lumber with retention of 0.40 pounds per cubic feet or greater.

Fasteners and anchors shall conform to ASTM A123, and fasteners and connectors shall conform to ASTM A153.

All decking, handrails and bench members to be installed with screw fasteners typical.

All composite decking materials to be installed using manufacturers recommended fasteners for use installing to pressure treated framing material.

Nails shall not protrude through the backside in any situation unless called for. On pressure-treated lumber, use "Maze Stormguard PTL" anchor-down or screw-down nails or approved equal.

Fasteners shall be the proper type, size, material and finish for each application and conform to the following:

- Nails and Staples: FS FF-N-105
- Wood Screws: FS FF-S-111
- Bolts and Studs: FS FF-B-575
- Nuts: FS FF-N-836
- Washers: FS FF-W-92
- Lag Screws and Lag Bolts: FS FF-B-561
- Masonry Anchoring Devices: For Expansion Shields, Nails and Drive Screws, Comply with FS FF-S-325
- Toggle Bolts: FS FF-B-588
- Bar or Strap Anchors: ASTM A 575 Carbon Steel Bars
PART III - EXECUTION

3.01 Construction Methods

Set carpentry work accurately to required grades and layout with members plumb and true. Fit carpentry work accurately to assure maximum strength at all joints by using adequate fastening, blocking and bracing as shown on the plans.

Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate the work with a minimum of joints or the optimum jointing arrangement.

Do not wax or lubricate fasteners that depend on friction for holding power.

Tighten bolts and lag screws at installation and retighten as required for tight connections prior to closing in or at completion of work.
Install all deck boards with “cup” side down.

Space wood decking 1/8” uniformly between boards or as indicated by plans or details.

Space and gap composite decking as per manufacturer’s recommendations.

Sand all cuts smooth and remove all splinters and rough areas from all exposed lumber.

3.02 Special Treatment

All cuts on pressure treated lumber (not scheduled for staining) to be brushed with a generous coat of Cuprinal Clear No. 20 wood preservative, copper napthenate or approved equal.
TECHNICAL SPECIFICATIONS
PIPE RAILINGS - SECTION 02825

PART I - GENERAL

1.01 Description

This work consists of furnishing and installing P.V.C. coated zinc galvanized steel pipe railings including all fasteners and related hardware necessary for a complete usable installation.

PART II - PRODUCTS

2.01 Materials

Pipe shall be the diameter and wall thickness of type SS-40 as manufactured by the Allied Tube and Conduit Corporation, 16100 South Lathrop, Harvey, Illinois 60426, or approved equal, unless otherwise called for on the plans.

<table>
<thead>
<tr>
<th>Industry O.D.</th>
<th>Pipe Wall Thickness Minimum</th>
<th>Wt./Ft. Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3/8&quot;</td>
<td>.104</td>
<td>1.35</td>
</tr>
<tr>
<td>1-5/8&quot;</td>
<td>.111</td>
<td>1.84</td>
</tr>
<tr>
<td>2&quot;</td>
<td>.120</td>
<td>2.28</td>
</tr>
<tr>
<td>2-1/2&quot;</td>
<td>.130</td>
<td>3.12</td>
</tr>
<tr>
<td>3&quot;</td>
<td>.160</td>
<td>4.64</td>
</tr>
<tr>
<td>3-1/2&quot;</td>
<td>.160</td>
<td>5.71</td>
</tr>
<tr>
<td>4&quot;</td>
<td>.160</td>
<td>6.56</td>
</tr>
</tbody>
</table>

Steel strip used to manufacture the pipe shall conform to ASTM A 569-85.

Galvanizing shall be hot-dipped zinc per ASTM B-6, high grade and special high grade at 1.0 ounces per square foot per ASTM A 90-81.

Chromate conversion coating shall be 30 micrograms per square inch.
PART III - EXECUTION

3.01  **Construction Method**

All railings shall be installed to lines and grades called for on the plans in straight horizontal and vertical alignment and parallel to walk or deck surfaces unless otherwise specified.

Welded of otherwise scratched or damaged areas shall be touched up with a galvanized paint, such a Galvanoleum, and finish painted with a compatible approved acrylic or epoxy color coat.

Railings shall be securely set in all posts and anchor plates as detailed on the plans.

All installation procedures shall conform to ASTM F-567.
PART I - GENERAL

1.01 Description

This work consists of the complete construction of all lawn areas as indicated on the plans or disturbed during construction, including the finish grading, tilling and cleaning the seed bed; seeding; fertilizing; mulching; weed control; specified watering; and maintaining the seeded areas through the required mowings.

PART II - PRODUCTS

2.01 Grass seed shall be applied at the rate of six pounds (6#) per thousand square feet in the following mixture.

<table>
<thead>
<tr>
<th>SEED</th>
<th>PERCENT/WEIGHT</th>
<th>MINIMUM PERCENT GERMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merit Kentucky Bluegrass</td>
<td>10%</td>
<td>85%</td>
</tr>
<tr>
<td>Monopoly Kentucky Bluegrass</td>
<td>10%</td>
<td>85%</td>
</tr>
<tr>
<td>Touchdown Kentucky Bluegrass</td>
<td>10%</td>
<td>85%</td>
</tr>
<tr>
<td>Manhattan II Perennial Ryegrass</td>
<td>25%</td>
<td>85%</td>
</tr>
<tr>
<td>Fiesta II Perennial Ryegrass</td>
<td>25%</td>
<td>85%</td>
</tr>
<tr>
<td>Pennlawn Creeping Red Fescue</td>
<td>20%</td>
<td>85%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>85%</td>
</tr>
</tbody>
</table>

2.02 Mulch for hydro-mulching shall be commercially available wood cellulose fiber or wood pulp for use in spray applicators and shall be applied at a rate of 1,250 pounds per acre. All seed areas must be completely and uniformly covered.

2.03 Tackifier for mulch shall be GeoPro Matrix as available from Price & Company, Inc., telephone 1-800-248-8230.

2.04 Straw/Coconut fiber combination blanket shall be by North American Green, number SC150BN, as available from Price & Company, Inc., telephone 1-800-248-8230.
PART III - EXECUTION

3.01 Seeding Operations

The Contractor shall till; fine grade; remove all sticks, stones, debris, clay lumps, sod clods and other undesirable materials in the top four (4") inches of soil and have the Landscape Architect approve the seed bed before seeding.

After the seedbed has been prepared and approved by the Landscape Architect, the Contractor shall sow the specified seed mixture with a Brillion, or equal, mechanical seeder.

The Contractor shall incorporate an equal ratio, complete fertilizer such as 10-10-10 or 12-12-12 in the top two inches (2") of soil or in the hydro-slurry mix at a rate of four hundred pounds per acre (400#/acre).

After the seed is installed the entire seedbed area shall be hydro-mulched as specified. All seed areas must be completely and uniformly covered. Light and uneven areas will not be accepted. Care should be taken to prevent overspray of mulch on curbs, walks, pavement, etc. All overspray must be cleaned off.

For slopes of 5 on 1 (20%) or greater, the contractor shall incorporate GeoPro Matrix in combination with hydroseeding at a rate of 2000 lbs per acre. GeoPro Matrix is available through Price & Company, Inc., telephone 1-800-248-8230.

For slopes of 4 on 1 (25%) or greater and all drainage swales, the contractor shall cover the entire area with the straw/coconut combination blanket in accordance with the manufacturer’s recommendations.

3.02 Season of Seeding

The normal seasonal dates for seeding shall be August 20 through October 10 and April 15 to May 25. The Landscape Architect may approve seeding of irrigated areas outside of these dates. The Landscape Architect must approve seeding at other times of the year.

Seeding shall not be done when the ground is excessively wet, frozen or otherwise intillable.

3.03 Repairs

The Contractor shall be responsible for the repair of any damage to existing lawns, which may result from his work and such repairs shall be made swiftly in a thorough and workmanlike manner, with minimum inconvenience to the Owner and users of the site. Repairs shall be made to the satisfaction of the Landscape Architect.

Where lawn areas have been disturbed or damaged, the damaged lawn areas, ruts and depressions shall be cultivated, filled with topsoil, settled to proper grades and seeded to
3.04 **Maintenance**

This work consists of all labor, equipment, materials and means necessary to completely nurture, cultivate, sustain, care for or otherwise maintain all seeded lawn areas including additional fertilization and weed control as required to achieve as thick, healthy weed free turf.

All seeded lawn areas shall be maintained by the Contractor for a period of sixty (60) days following germination and for at least three (3) complete mowings.

**A. Lawn Mowing**

The first mowing shall occur when the grass is approximately 3½ inches in height. Mowings shall occur when the grass is within ¼ inch of 3 inches in height. Cut grass 2 inches to 2½ inches high. Not more than 1/3 of the height of the grass shall be removed in any single cutting.

All mowing shall be done with clean, freshly sharpened and properly adjusted rotary or reel type mowing equipment of reputable make and design. Mowing is not permitted when the grass blades are wet. Clippings shall be left if the grass is cut within the specified heights. Cuttings of more than 1/3 of the height shall have all clippings removed. Mowing direction should be varied with each mowing to change the patterns of wear and cut. All edge areas shall be cleanly trimmed to the same height as the rest of the lawn area.

All walks, ground cover beds, parking areas, drives and related areas shall be free of clippings or related mowing and maintenance waste before mowing is considered complete and before the Contractor leaves the job site.

**B. Lawn Watering**

Watering shall occur on a regular basis throughout the maintenance period and shall be adjusted to include natural rainfall if ½ inch or more falls in a two consecutive day period.

All lawn areas shall receive at least 1½ inches of water per week in porous soils and 1 inch of water in clay soils. One inch (1") of water is approximately 640 gallons of water per 1,000 square feet of lawn. Water shall be applied in not more than two equal applications per week in any given area to ensure complete and thorough wetting of the soil and root systems. Frequent, light waterings shall not be permitted.

If an irrigation system is available, the contractor shall be responsible for its complete operation during the maintenance period.
Care shall be taken to water all areas equally by adjusting rates of application required for different soils and exposure conditions.

Every effort shall be made to water from early morning to approximately one (1) hour before mid-day. Watering during the mid-day period or during very high winds shall not be permitted without expressed approval by the Owner.

The Contractor shall furnish and/or arrange for with the Owner, all equipment and materials necessary to properly conduct all watering operations in a timely, efficient and orderly manner.

The Owner shall make available all equipment, facilities, access and water necessary for the Contractor to connect to, control, locate or otherwise utilize to achieve the specified rates and schedules for lawn watering.

The Contractor shall utilize all existing water services and irrigation systems; in the manner they were intended, to uniformly and thoroughly water all lawn areas. Spray from watering devices shall not be directed across walks, drives or parking areas or against buildings, except by expressed approval from the Owner.

Rotation of watering areas shall be in an organized, orderly manner with every effort made to completely water physically contiguous areas.

All watering shall be by spray application at rates that permit continuous absorption without puddling or flowing off-site or into other areas. Flood watering will not be permitted.
PART I - GENERAL

1.01 Description

This work consists of restoration seeding of all areas disturbed during construction, or as indicated on the plans, including the finish grading, tilling and cleaning the seed bed; seeding; fertilizing; mulching; weed control; and maintaining the seeded areas until grass cover is established.

PART II - PRODUCTS

2.01 Grass seed shall be applied at the rate of six pounds (6#) per thousand square feet in the following named mixtures. A mixture of one half (1/2) Premium Ecology Seed Mix and one half (1/2) Olde English Seed Mix.

<table>
<thead>
<tr>
<th>SEED (Premium Ecology) (3# per Thousand Sq. Ft.)</th>
<th>PERCENT/WEIGHT</th>
<th>MINIMUM PERCENT</th>
<th>GERMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brigade Hard Fescue</td>
<td>80%</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>Magic Chewing Fescue</td>
<td>20%</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SEED (Olde English) (3# per Thousand Sq. Ft.)</th>
<th>PERCENT/WEIGHT</th>
<th>MINIMUM PERCENT</th>
<th>GERMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creeping Red Fescue</td>
<td>15%</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>Kentucky Blue Grass 98/85</td>
<td>15%</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>Anthem II Tall Fescue</td>
<td>30%</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>Affinity Ryegrass</td>
<td>20%</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>Annual Rye</td>
<td>20%</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.02 Mulch shall be threshed straw of either oats or wheat, free from matured seed or noxious weeds, or species detrimental to the development of the grass seedbed.

2.03 Tackifier for mulch shall be GeoPro Matrix as available from Price & Company, Inc., telephone 1-800-248-8230.

2.04 Straw/Coconut fiber combination blanket shall be by North American Green, number SC150BN, as available from Price & Company, Inc., telephone 1-800-248-8230.

PART III - EXECUTION

3.01 Seeding Operations

The Contractor shall till; fine grade; remove sticks, stones, debris, clay lumps, sod clods and other undesirable materials in the top four (4") inches of soil and have the Landscape Architect approve the seed bed before seeding.

The Contractor shall incorporate an equal ratio, complete fertilizer such as 10-10-10 or 12-12-12 in the top two inches (2") of soil at a rate of four hundred pounds per acre (400#/acre).

After the seedbed has been prepared and approved by the Landscape Architect, the Contractor shall sow six pounds (6#) per thousand square feet of the specified seed mixture with a broadcast seeder. The Landscape Architect may approve other methods of sowing.

Entire seedbed shall be mulched with straw. The straw must be placed within one (1) day after the seed has been placed. Mulching operations shall not be performed during periods of excessively high winds, which may prevent the proper placing of the straw. Straw shall be spread uniformly at a rate of two (2) tons per acre, or about one (1) bale per thousand square feet, to provide a minimal coverage of ¼”.

Immediately after placement of the straw, Contractor shall stabilize the entire straw mulched area with GeoPro Matrix at a rate to completely stabilize and control any blowing or movement of the straw mulch. These rates shall be in accordance with the recommendation of the manufacturer/distributor. GeoPro Matrix is available through Price & Company, Inc., telephone 1-800-248-8230.
For slopes of 5 on 1 (20%) or greater, and other areas as shown on the plans, the contractor shall cover the entire area with the straw/coconut fiber combination blanket in accordance with the manufacturer’s recommendations.

3.02 Repairs

The Contractor shall be responsible for the repair of any damage to existing site areas, which may result from his work and such repairs shall be made swiftly in a thorough and workmanlike manner, with minimum inconvenience to the Owner and users of the site. Repairs shall be made to the satisfaction of the Landscape Architect.

Where site areas have been disturbed or damaged, the damaged areas, ruts and depressions shall be cultivated, filled with topsoil, settled to proper grades and seeded to the satisfaction of the Landscape Architect.

3.03 Maintenance

This work consists of all labor, equipment, materials and means necessary to completely nurture, cultivate, sustain, care for or otherwise establish all seeded lawn areas including reseeding, over seeding, additional straw mulch, additional GeoPro Matrix, additional fertilization and weed control as required to achieve a uniform, healthy coverage.

All seeded areas shall be maintained by the Contractor until fully established and for a minimum period of sixty (60) days following germination.

3.04 Acceptance

All seeded areas shall be 85% covered after three (3) months from the germination date. Re-application of seed will be required at that time if the areas seeded do not meet the coverage requirements.

3.05 Season

The normal seasonal dates for seeding shall be August 20 through October 10 and April 15 to May 25. Dormant seeding at other times of the year may be approved by the Landscape Architect. Seeding shall not be done when the ground is excessively wet, snow covered, frozen or otherwise intillable.
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Wall sheathing.
   2. Roof sheathing.

B. Related Requirements:
   1. Section 061000 "Rough Carpentry" for plywood backing panels.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

   1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS


B. <Double click to insert sustainable design text for certified wood.>
C. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

D. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat all plywood unless otherwise indicated.

2.4 WALL SHEATHING

A. Plywood Sheathing: DOC PS 1, Exterior, Structural I sheathing.

1. Span Rating: Not less than 24/0.
2. Nominal Thickness: Not less than 1/2 inch.

2.5 ROOF SHEATHING

A. Plywood Sheathing: DOC PS 1, Exterior, Structural I sheathing.

1. Span Rating: Not less than 24/0.
2. Nominal Thickness: Not less than 1/2 inch.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Screws for Fastening Sheathing to Wood Framing: ASTM C 1002.
2.7 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
2. ICC-ES evaluation report for fastener.

D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

END OF SECTION 061600
SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section Includes:
   1. Framing with dimension lumber.
   2. Wood blocking and nailers.
   3. Plywood backing panels.
B. Related Requirements:
   1. Section 061600 "Sheathing" for sheathing, subflooring, and underlayment.
   2. Section 061753 "Shop-Fabricated Wood Trusses" for wood trusses made from dimension lumber.

1.3 DEFINITIONS
A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.
C. Exposed Framing: Framing not concealed by other construction.
D. OSB: Oriented strand board.
E. Timber: Lumber of 5 inches nominal size or greater in least dimension.

1.4 DELIVERY, STORAGE, AND HANDLING
A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat all rough carpentry unless otherwise indicated.

2.3 DIMENSION LUMBER FRAMING

A. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade.

1. Application: All interior partitions.
2. Species:
   a. Hem-fir (north); NLGA.
   b. Southern pine or mixed southern pine; SPIB.
   c. Spruce-pine-fir; NLGA.
   d. Hem-fir; WCLIB, or WWPA.
   e. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
   f. Northern species; NLGA.
   g. Eastern softwoods; NeLMA.
   h. Western woods; WCLIB or WWPA.
B. Load-Bearing Partitions: No. 2 grade.
   2. Species:
      a. Hem-fir (north); NLGA.
      b. Southern pine; SPIB.
      c. Douglas fir-larch; WCLIB or WWPA.
      d. Southern pine or mixed southern pine; SPIB.
      e. Spruce-pine-fir; NLGA.
      f. Douglas fir-south; WWPA.
      g. Hem-fir; WCLIB or WWPA.
      h. Douglas fir-larch (north); NLGA.
      i. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
   1. Blocking.
   2. Nailers.
   3. Rooftop equipment bases and support curbs.
   5. Furring.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.

C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
   1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 as appropriate for the substrate.
   1. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.6 METAL FRAMING ANCHORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Cleveland Steel Specialty Co.
   2. KC Metals Products, Inc.
   3. Phoenix Metal Products, Inc.
   4. Simpson Strong-Tie Co., Inc.
   5. USP Structural Connectors.

B. Allowable design loads, as published by manufacturer, shall meet or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

   1. Use for interior locations unless otherwise indicated.

D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
   1. Use for wood-preservative-treated lumber and where indicated.

E. Stainless-Steel Sheet: ASTM A 666, Type 304.
   1. Use for exterior locations and where indicated.

F. Bridging: Rigid, V-section, nailless type, 0.050 inch thick, length to suit joist size and spacing.

G. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch above base and with 2-inch-minimum side cover, socket 0.062 inch thick, and standoff and adjustment plates 0.108 inch thick.

H. Hold-Downs: Brackets for bolting to wall studs and securing to foundation walls with anchor bolts or to other hold-downs with threaded rods and designed with first of two bolts placed seven bolt diameters from reinforced base.
Bolt Diameter: \[\frac{5}{8} \text{ inch}] \text{[3/4 inch]}.

2. Width: \[2-1/2 \text{ inches}] \text{[3-3/16 inches]}.

3. Body Thickness: \[0.108 \text{ inch}] \text{[0.138 inch]}.

4. Base Reinforcement Thickness: \[0.108 \text{ inch}] \text{[0.239 inch]}.

I. Wall Bracing: T-shaped bracing made for letting into studs in saw kerf, 1-1/8 inches wide by 9/16 inch deep by 0.034 inch thick with hemmed edges.

J. Wall Bracing: Angle bracing made for letting into studs in saw kerf, 15/16 by 15/16 by 0.040 inch thick with hemmed edges.

2.7 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

B. Water-Repellent Preservative: NWWDA-tested and accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.

D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

E. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

F. Do not splice structural members between supports unless otherwise indicated.

G. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

   1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
H. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.

2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.

3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.

I. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

J. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.

2. Use copper naphthenate for items not continuously protected from liquid water.

K. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

L. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:


2. ICC-ES evaluation report for fastener.

M. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
C. Provide permanent grounds of dressed, pressure-preserve-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WALL AND PARTITION FRAMING INSTALLATION

A. General: Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction unless otherwise indicated.

1. For exterior walls, provide 2-by-6-inch nominal-size wood studs spaced 24 inches o.c. unless otherwise indicated.
2. For interior partitions and walls, provide 2-by-4-inch nominal-size wood studs spaced 16 inches o.c. unless otherwise indicated.

B. Construct corners and intersections with three or more studs, except that two studs may be used for interior non-load-bearing partitions.

C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.

1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal depth for openings 48 inches and less in width, 6-inch nominal depth for openings 48 to 72 inches in width, 8-inch nominal depth for openings 72 to 120 inches in width, and not less than 10-inch nominal depth for openings 10 to 12 feet in width.
2. For load-bearing walls, provide double-jamb studs for openings 60 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.

D. Provide diagonal bracing in exterior walls, at both walls of each external corner, at 45-degree angle, full-story height unless otherwise indicated. Use 1-by-4-inch nominal-size boards, let-in flush with faces of studs.

3.4 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
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SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1.6 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and as follows:
   1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL
   A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
      1. ACI 301.
      2. ACI 117.

2.2 FORM-FACING MATERIALS
   A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
   B. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
   C. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
      1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
      2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.

2.3 STEEL REINFORCEMENT
   A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
   B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
C. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, ASTM A 775/A 775M epoxy coated.

C. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.

D. Zinc Repair Material: ASTM A 780/A 780M.

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

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.5 CONCRETE MATERIALS

A. Regional Materials: Concrete shall be manufactured within 500 miles of Project site.

B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

C. Cementitious Materials:

2. Fly Ash: ASTM C 618, Class F or C.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.

D. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
E. Air-Entraining Admixture: ASTM C 260/C 260M.

F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Retarding Admixture: ASTM C 494/C 494M, Type B.
   3. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

G. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. BASF Corporation; Construction Systems.
      b. Euclid Chemical Company (The); an RPM company.
      c. GCP Applied Technologies Inc. (formerly Grace Construction Products).
      d. Sika Corporation.

H. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. BASF Corporation; Construction Systems.
      b. Cortec Corporation.
      c. GCP Applied Technologies Inc. (formerly Grace Construction Products).
      d. Sika Corporation.

2.6 FIBER REINFORCEMENT

A. Synthetic Micro-Fiber: Fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches long.

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. BASF Corporation; Construction Systems.
      b. Euclid Chemical Company (The); an RPM company.
      c. FORTA Corporation.
      d. GCP Applied Technologies Inc. (formerly Grace Construction Products).
      e. Nycon, Inc.
      f. Propex Operating Company, LLC.
      g. Sika Corporation.
2.7 VAPOR RETARDERS
   A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer’s recommended adhesive or pressure-sensitive tape.

2.8 CURING MATERIALS
   A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
   B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
   C. Water: Potable.
   D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
      1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
         a. AWRC Corporation.
         b. BASF Corporation; Construction Systems.
         c. ChemMasters, Inc.
         d. Dayton Superior.
         e. Euclid Chemical Company (The); an RPM company.
         f. L&M Construction Chemicals, Inc.
         g. Lambert Corporation.
         h. Metalcrete Industries.
         i. Nox-Crete Products Group.
         j. SpecChem, LLC.
         k. Vexcon Chemicals Inc.
         l. W. R. Meadows, Inc.

2.9 RELATED MATERIALS
   B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 according to ASTM D 2240.
   C. Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types I and II, nonload bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.10 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than [4100 psi] \[\text{Insert strength}\] at 28 days when tested according to ASTM C 109/C 109M.

2.11 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Slag Cement: 50 percent.
3. Combined Fly Ash or Pozzolan and Slag Cement: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Normal-weight concrete.
   1. Minimum Compressive Strength: 3500 psi at 28 days.
   3. Slump Limit: 4 inches, for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
   4. Air Content: To be determined in accordance with ASTM C173/C 173M.

   1. Minimum Compressive Strength: 3500 psi at 28 days.
   3. Slump Limit: 4 inches, for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
   4. Air Content: To be determined in accordance with ASTM C173/C 173M.

C. Slabs-on-Grade: Normal-weight concrete.
   1. Minimum Compressive Strength: 3500 psi at 28 days.
   3. Slump Limit: 4 inches, plus or minus 1 inch.
   4. Air Content: To be determined in accordance with ASTM C173/C 173M.
   5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
   6. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 1.5 lb/cu. yd.

2.13 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.14 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.
   1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
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PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
   1. Class B, 1/4 inch for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
   1. Install keyways, reglets, recesses, and the like, for easy removal.
   2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR-RETARDER INSTALLATION

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.5 STEEL REINFORCEMENT INSTALLATION

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

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

3.7 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Screen slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.8 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
   a. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and of levelness, F(L) 15.
3. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.

C. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosen forms. If removing forms before end of curing period, continue curing for remainder of curing period.

C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.

2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
   a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

3.10 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least [one] [six] month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.
3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
6. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

D. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

E. Repair materials and installation not specified above may be used, subject to Architect's approval.

END OF SECTION 033000
SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. Section Includes:
      1. Wood roof trusses.

1.3 DEFINITIONS
   A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.4 QUALITY ASSURANCE
   A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
      1. Manufacturer’s responsibilities include providing professional engineering services needed to assume engineering responsibility.
      2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
   B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction and is certified for chain of custody by an FSC-accredited certification body.
   C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.
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1.5 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
3. Provide for air circulation around stacks and under coverings.

B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.

B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.

1. Design Loads: As indicated.
2. Maximum Deflection under Design Loads:

C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.


2.2 DIMENSION LUMBER

A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Provide dressed lumber, S4S.
3. Provide dry lumber with 15 percent maximum moisture content at time of dressing.

B. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."
2.3 METAL CONNECTOR PLATES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alpine Engineered Products, Inc.; a division of ITW Building Components Group, Inc.
2. Cherokee Metal Products, Inc.; Masengill Machinery Company.
3. CompuTrus, Inc.
4. Eagle Metal Products.
5. Jager Building Systems, Inc.
6. MiTek Industries, Inc.
7. Robbins Engineering, Inc.
8. Truswal Systems Corporation.

B. General: Fabricate connector plates to comply with TPI 1.

C. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.

1. Use for interior locations unless otherwise indicated.

D. Stainless-Steel Sheet: ASTM A 666, Type 304, and not less than 0.035 inch thick.

1. Use for exterior locations and where indicated.

2.4 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cleveland Steel Specialty Co.
2. KC Metals Products, Inc.
3. Phoenix Metal Products, Inc.
4. Simpson Strong-Tie Co., Inc.
5. USP Structural Connectors.
B. Allowable design loads, as published by manufacturer, shall comply with or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

   1. Use for interior locations unless otherwise indicated.

D. Stainless-Steel Sheet: ASTM A 666, Type 304.
   1. Use for exterior locations and where indicated.

E. Truss Tie-Downs: Bent strap tie for fastening roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick. Tie fastens to one side of truss, top plates, and side of stud below.

F. Truss Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fitting over top of truss and fastens to both sides of truss, top plates, and one side of stud below.

G. Truss Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening roof trusses to wall studs below, 2-1/2 inches wide by 0.062 inch thick. Tie fitting over top of truss and fastens to both sides of truss, inside face of top plates, and both sides of stud below.

H. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches wide by 0.050 inch thick. Clip is fastened to truss through slotted holes to allow for truss deflection.

I. Roof Truss Bracing/Spacers: U-shaped channels, 1-1/2 inches wide by 1 inch deep by 0.040 inch thick, made to fit between two adjacent trusses and accurately space them apart, and with tabs having metal teeth for fastening to trusses.

J. Drag Strut Connectors: Angle clip with one leg extended for fastening to the side of girder truss.
   1. Angle clip is 3 by 3 by 0.179 by 8 inches with extended leg 8 inches long. Connector has galvanized finish.
   2. Angle clip is 3 by 3 by 0.239 by 10-1/2 inches with extended leg 10-1/2 inches long. Connector has painted finish.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 92 percent zinc dust by weight.

2.7 FABRICATION

A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.

B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to TPI recommendations and as indicated.

E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

F. Space trusses 24 inches o.c.; adjust and align trusses in location before permanently fastening.

G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.

H. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

   1. Install bracing to comply with Section 061000 "Rough Carpentry."

I. Install wood trusses within installation tolerances in TPI 1.

J. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.

K. Replace wood trusses that are damaged or do not comply with requirements.

   1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.
3.2 REPAIRS AND PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

C. Repair damaged galvanized coatings on exposed surfaces according to ASTM A 780/A 780M and manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections to verify that temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package.