

COMPILATION OF APPROVED SPECIFICATIONS

**RHODE ISLAND DEPARTMENT OF TRANSPORTATION
STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION**

**REVISIONS
SUPPLEMENTAL SPECIFICATIONS
SPECIAL PROVISIONS**

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SECTION 206

EROSION, SEDIMENT, AND POLLUTION PREVENTION CONTROLS

206.01 DESCRIPTION. This work consists of the provision of erosion, sediment, and pollution prevention controls in reasonably close conformity with the dimensions and details indicated on the plans or as directed by the Engineer, all in accordance with these Specifications. Erosion, sediment, and pollution prevention controls consist of the following four types. All erosion, sediment, and pollution prevention controls and devices shall be in place prior to the start of excavation when required by the SWPPP/SESC and other contract documents.

206.01.1 Baled Straw Erosion Checks. Baled straw erosion checks shall consist of baled straw, each bale of which is embedded and attached to the ground with wood stakes, constructed as indicated on the Plans. This method is typically only appropriate for short-term and/or emergency applications.

206.01.2 Silt Fence. Silt fencing shall consist of oak fence posts to which are attached industrial support netting and sediment control filter fabric, constructed as indicated on the Plans.

206.01.3 Baled Straw Erosion Check and Silt Fence Combined. Baled straw erosion checks and silt fence combined shall consist of baled straw erosion check installed abutting the filter fabric side of a silt fence, with a minimum of six (6) inches along the bottom edge of the silt fence toed in under the baled straw erosion check as indicated on the Plans.

206.01.4 Compost Filter Sock. Compost filter socks shall consist of a flexible mesh tube filled with composted material and staked to the ground with wooden stakes, constructed as indicated on the plans.

206.02 MATERIALS.

206.02.1 Baled Straw Erosion Checks. Baled straw shall be baled within twelve months of use. Bindings shall be sufficiently strong to act as handles when placing bales in position by hand. The minimum dimension of any bale shall be 18 inches. Wood stakes shall be oak, 1-inch by 1-inch in section, and at least 3 feet in length.

206.02.2 Silt Fence. The filter fabric shall be a material suitable for erosion control applications and shall be one of those included on the Department's Approved Materials List. Wood posts shall be oak, 2-inch by 2-inch in section, and at least 4.5 feet in length. Support netting shall be heavy-duty plastic mesh. For prefabricated silt fences, 1-inch by 1-inch wood posts will be permitted.

206.02.3 Baled Straw Erosion Check and Silt Fence Combined. Baled straw shall conform to the requirements of **Subsection 206.02.1** above. Silt fencing shall conform to the requirements of **Subsection 206.02.2** above.

206.02.4 Compost Filter Sock. Compost filter sock material shall contain composted organic matter in accordance with AASHTO Designation R 51-13. Compost material shall also meet all applicable Federal and State Regulations. For compost filter socks 18 inches or less in diameter, wooden stakes shall be 1 inch by 1 inch, at 10-foot intervals on center, and of a length that shall project into the soil 1 foot leaving 3 inches to 4 inches protruding above the filter sock. For compost filter socks greater than 18 inches in

diameter, wooden stakes shall be 2 inches by 2 inches at 10-foot intervals on center, and of a length that shall project into the soil 1 foot, leaving 3 inches to 4 inches protruding above the filter sock. Filter sock netting materials are also available in biodegradable plastics for areas where removal and disposal are not planned.

206.03 CONSTRUCTION METHODS. Those erosion and pollution controls indicated on the Plans shall be installed by the Contractor and approved by the Engineer before the commencement of any drainage, roadway, bridge construction, or the disturbance of any soils.

206.03.1 Baled Straw Erosion Checks.

a. Installation. Baled straw erosion checks shall be constructed at the locations, and in accordance with the details indicated on the Plans, or as directed by the Engineer. The following stipulations also apply:

1. Bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another.

2. The erosion check shall be entrenched and backfilled. The trench shall be excavated the width of the bale and the length of the check to a minimum depth of 3 inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the check. Backfill shall conform to the ground level on the downhill side and shall be built up to 4 inches against the uphill side.

3. The bales are to be installed so that the bindings are oriented around the sides of the bales rather than along their tops and bottoms.

4. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake in each bale shall be driven toward the previously laid bale to force the bales together.

5. The gaps between bales shall be chinked (filled by wedging) with straw to prevent water from escaping between bales. Loose straw shall be scattered over the area immediately uphill from the bale erosion check to increase efficiency.

6. At approximate intervals of 100 feet, one bale is to be placed against those bales positioned along the limit of clearing. This bale is to be placed at a right angle to the line of the toe of slope.

b. Removal. Before removal, all accumulated sediment and debris on the both sides shall be removed and legally disposed. Erosion controls shall not be removed until the adjacent exposed areas are free from future uncontrolled discharges. All baled straw erosion checks must be removed from the bales at a time designated by the Engineer. The erosion check shall be removed only when the adjacent exposed area has been stabilized, i.e., the area has an established grass or stone cover or has been paved and is free from future uncontrolled discharges. Immediately upon removal of the bales, the remaining exposed areas (under the bales) shall be backfilled with plantable soil, raked, and graded as necessary to match the surrounding grade and then seeded.

206.03.2 Silt Fence.

a. Installation. Silt fences shall be constructed at the locations and in accordance with the details indicated on the Plans, or as directed by the Engineer. The following stipulations shall apply:

1. A 6-inch deep by 1-foot wide minimum trench shall be dug where the fence is to be installed.
2. The fence shall be positioned in the trench with the fence posts set at 8 feet on center (maximum) in wetland areas and 4 feet on center (maximum) in wetland ravine, gully or drop-off areas, as indicated on the plans.
3. The sedimentation control fabric and the industrial netting shall be stapled to each post. When joints are necessary, filter fabric shall be spliced together only at support posts. Splices shall consist of a 6-inch overlap, and shall be securely sealed.
4. Each wood post with industrial support netting and filter fabric attached shall be driven into the undisturbed soil in the trench as indicated on the Plans.
5. The trench shall be backfilled and the soil compacted over the filter fabric.
6. The installed height of the fence shall be 2½ feet (minimum). However, height shall not exceed 36 inches since higher barriers impound volumes of water sufficient to cause failure of the fence structure.

b. Removal. This work includes the removal of the silt fence erosion checks and posts. Silt fences shall not be left in place. Before removal, all accumulated sediment and debris on the upstream side shall be removed and legally disposed. Erosion, sediment, and pollution prevention controls shall not be removed until the adjacent exposed areas are free from future uncontrolled discharges. A silt fence shall be removed only when the adjacent exposed area is stabilized, i.e., the area has an established grass or stone cover or has been paved, and is free from future uncontrolled discharges. Immediately upon removal of the silt fence, the remaining exposed areas shall be finished as specified above in **Para. b of Subsection 206.03.1**.

206.03.3 Baled Straw Erosion Check and Silt Fence Combined.

a. Installation. Baled Straw Erosion Check and Silt Fence Combined shall be installed in accordance with the requirements of **Para. a of Subsections 206.03.1 and 206.03.2**, with the following additional provisions:

1. Silt fencing shall be installed prior to the installation of the baled straw.
2. The trench shall be a minimum of 6-inches deep and a width wide enough to accommodate the baled straw as it abuts the filter fabric side of the silt fence.
3. Prior to backfilling the trench, the baled straw shall be installed tight against the filter fabric side of the silt fence, with a minimum of six (6) inches of the bottom edge of the silt fence toed in under the baled straw within the trench.

b. Removal. This work includes the removal of the combined baled straw erosion check and silt fence in accordance with **Para. b of Subsections 206.03.1 and 206.03.2**, with the exception that the baled straw erosion checks shall not be left to rot in place. Before removal, all accumulated sediment and

debris on the upstream side shall be removed and legally disposed. Erosion, sediment, and pollution prevention controls shall not be removed until the adjacent exposed areas are free from future uncontrolled discharges.

206.03.4 Compost Filter Sock.

a. Installation. Compost filter socks shall be constructed at the locations and in accordance with the details indicated on the plans, or as directed by the Engineer. The following stipulations also apply:

1. Compost filter socks may be either fabricated on-site or delivered to the site.
2. Trenching is not required. Compost filter socks shall be placed over the top of ground, wooden stakes shall be driven in pairs on each side of the filter socks to secure them to the ground. To ensure optimum performance, heavy vegetation shall be cut down or removed, and extremely uneven surfaces shall be graded to ensure that the compost filter sock uniformly contacts the ground surface.
3. Filter socks shall be placed in a continuous line. Where ends intersect, they shall be sleeved to create an interlock with a two (2) foot overlap. After one section is filled and the ends tied off, the next section shall be pulled over the tied-off end of the previous section, to create a 2-foot overlap. The overlap shall be staked. The intersecting overlaps shall be constructed to ensure that stormwater does not break through at these intersection points.
4. Filter sock netting materials are also available in biodegradable plastics for areas where removal and disposal are not planned.

b. Removal. This work shall include the removal of the compost filter sock and stakes. Before removal, all accumulated sediment and debris shall be removed and legally disposed. Erosion, sediment, and pollution prevention controls shall not be removed until the adjacent exposed areas are free from future uncontrolled discharges. The mesh filter sock material shall be cut open and the mesh removed, and the compost material shall be raked out level to surrounding grades, then seeded. Immediately upon removal of the compost filter socks, the remaining exposed areas shall be finished as specified in **Para. b of Subsection 206.03.1**. For biodegradable filter sock netting material, the materials may be left in place.

206.04 METHOD OF MEASUREMENT.

206.04.1 Baled Straw Erosion Checks.

a. Installation. "Baled Straw Erosion Checks" will be measured by the number of linear feet installed in accordance with the Plans and/or as directed by the Engineer.

b. Removal. If required by the Contract, "Removal of Baled Straw Erosion Checks" will be measured by the number of linear feet removed in accordance with the Plans and/or as directed by the Engineer.

206.04.2 Silt Fence. "Silt Fence" erosion checks will be measured by the number of linear feet installed in accordance with the Plans and/or as directed by the Engineer.

206.04.3 Baled Straw Erosion Check and Silt Fence Combined. “Baled Straw Erosion Check and Silt Fence Combined” will be measured by the number of linear feet of combined baled straw erosion check and silt fence installed in accordance with the Plans and/or as directed by the Engineer.

206.04.4 Compost Filter Sock. “Compost Filter Sock” of the various sizes as indicated on the plans will be measured by the number of linear feet of continuous runs of such compost filter sock installed in accordance with the Plans and/or as directed by the Engineer. No payment shall be made for biodegradable filter sock if left in place.

206.05 BASIS OF PAYMENT.

206.05.1 Baled Straw Erosion Checks.

a. Installation. The accepted quantity of "Baled Straw Erosion Checks" will be paid for at the contract unit price per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment, including excavation, bales, stakes, removal of stakes, and all incidentals required to finish the work, complete and accepted by the Engineer.

b. Removal. If required by the Contract, the accepted quantity of "Removal of Baled Straw Erosion Checks" will be paid for at the contract unit price per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment including removal and disposal of entrapped material, removal of straw, grading, raking, and seeding necessary to match the surrounding area, and all incidentals required to finish the work complete and accepted by the Engineer.

206.05.2 Silt Fence. The accepted quantity of "Silt Fence" erosion checks will be paid for at the contract unit price per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment including excavation, filter fabric, industrial netting, posts, removal and disposal of entrapped material, removal of fence, grading, raking and seeding necessary to match the surrounding area, and all incidentals required to finish the work complete and accepted by the Engineer.

206.05.3 Baled Straw Erosion Check and Silt Fence Combined. The accepted quantity of “Baled Straw Erosion Check and Silt Fence Combined” will be paid for at the contract unit price per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment, including excavation; filter fabric, baled straw, stakes, industrial netting, posts, , removal and disposal of entrapped material, removal of baled straw, removal of fence, backfill material, grading, raking and seeding as necessary to match the surrounding area, and all incidentals required to finish the work complete and accepted by the Engineer.

206.05.4 Compost Filter Sock. The accepted quantity of “Compost Filter Sock” will be paid for at the contract unit prices per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials , and equipment, including mesh filter socks, removal of mesh filter socks, compost filter material, stakes, removal of stakes, removal and disposal of entrapped material, grading, raking and seeding as necessary to match the surrounding area, and all incidentals required to finish the work complete and accepted by the Engineer.

206.05.5 Cleaning and Maintenance. The cleaning and maintenance of Baled Straw Erosion Checks, Silt Fence Erosion Checks, Baled Straw Erosion Check and Silt Fence Combined, and Compost Filter

Sock will be paid for under the provisions of **SECTION 212; MAINTENANCE AND CLEANING OF EROSION, SEDIMENT AND POLLUTION PREVENTION CONTROLS.**

SECTION 207

CHECK DAMS

207.01 DESCRIPTION. This work consists of the provision of check dams and dikes in reasonably close conformity with the dimensions and details indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications. All erosion, sediment, and pollution prevention controls and devices shall be in place prior to the start of excavation when required by the SWPPP/SESC and other contract documents. Check dams consist of the following three types:

207.01.1 Sand Bag Erosion Dikes. This work consists of the placement of sandbags across either riprap or earth ditches, thereby forming a dike, to create temporary sediment basins for pollution control, constructed as indicated on the Plans.

207.01.2 Stone Check Dams. This work consists of the placement of stone in ditches or drainage swales, constructed as indicated on the Plans.

207.01.3 Compost Filter Sock Check Dams. Compost filter sock check dams shall consist of a flexible mesh tube filled with composted material and staked to the ground with wooden stakes, constructed as indicated on the plans.

207.02 MATERIALS.

207.02.1 Sand Bag Erosion Dikes. The sand bags and the sand material shall be of a quality acceptable to the Engineer. Dumped stone, when required, shall meet the requirements of **Subsection M.10.03.2** for Modified NSA Class R-4 riprap. The filled sand bags will weigh a minimum of 60 pounds.

207.02.2 Stone Check Dams. The stone shall meet the requirements of **Subsection M.01.09, Table I, Column V** for Filter Stone.

207.02.3 Compost Filter Sock Check Dams. Compost filter sock material shall be in accordance with AASHTO Designation R 51-13. Compost material shall also meet all applicable Federal and State Regulations. For compost filter socks 18 inches or less in diameter, wooden stakes shall be 1 inch by 1 inch, and of a length that shall project into the soil 1 foot leaving 3 inches to 4 inches protruding above the filter sock. For compost filter socks greater than 18 inches in diameter wooden stakes shall be 2-inch by 2-inch and of a length that shall project into the soil 1 foot leaving 3 inches to 4 inches protruding above the filter sock. Stakes shall be placed at the ends and at 5-foot intervals, on center.

207.03 CONSTRUCTION METHODS. Those erosion and pollution controls indicated on the Plans shall be installed by the Contractor and approved by the Engineer before the commencement of any drainage, roadway, bridge construction, or the disturbance of any soils.

207.03.1 Sand Bag Erosion Dikes.

a. Installation. Sand bag erosion dikes shall be constructed as indicated on the Plans. The sand bags will be placed a minimum of four layers high. Over the center of the ditch the top layer of sand bags will have a weir opening equal to one half the bottom ditch width. The sand bags shall be extended such a length that the bottom of the end sand bags are higher in elevation than the top of the lowest middle sand bag.

When the sand bag dike is constructed across an earth ditch, the down-stream side of the dike at the weir opening is to be protected with Modified NSA Class R-4 dumped riprap.

b. Removal. Sand bag erosion dikes shall be removed prior to the completion of the project at a time designated by the Engineer. Before removal, all accumulated sediment and debris on the upstream side shall be removed and legally disposed. Check dams shall not be removed until the adjacent exposed areas are free from future uncontrolled discharges. Immediately upon removal of the sand bag erosion dikes the remaining exposed areas shall be backfilled, raked, and graded as necessary to match the surrounding grade and then seeded.

207.03.2 Stone Check Dams.

a. Installation. Stone check dams shall be constructed as indicated on the Plans. The stone shall be placed across the ditch or swale to achieve complete coverage and shaped to the required configuration using hand tools. The stone shall be sloped from the sides of the ditch/swale towards the center such that the center is 6 inches lower than the stone at the sides of the ditch/swale. The check dam shall have 2 horizontal to 1 vertical side slopes and shall not exceed 2 feet in height.

b. Removal. Stone check dams shall be removed prior to the completion of the project at a time designated by the Engineer. Removal shall not occur until the adjacent exposed areas are free from future uncontrolled discharges. Before removal, all accumulated sediment on the upstream side shall be removed and legally disposed. Immediately upon removal of the Stone Check Dams, the remaining exposed areas shall be backfilled, raked, and graded as necessary to match the surrounding grade and then seeded.

207.03.3 Compost Filter Sock Check Dams.

a. Installation. Compost filter sock check dams shall be constructed at the locations, and in accordance with the details indicated on the plans, or as directed by the Engineer. The following stipulations also apply:

1. Compost filter sock check dams may be either fabricated on site or delivered to the site.
2. Trenching is not required. Compost filter sock check dams shall be placed over the top of ground, wooden stakes shall be driven in pairs on each side of the filter socks to anchor them to the ground. To ensure optimum performance, heavy vegetation shall be cut down or removed, and extremely uneven surfaces should be graded to ensure that the compost filter sock uniformly contacts the ground surface. These may be placed over the top of rolled erosion controls mats or turf re-enforcement mats. These may also be stacked if additional height is needed.
3. Compost filter sock check dams shall be installed perpendicular to flow. The check dams shall extend to such a length that the bottoms of each end are higher in elevation than the lowest middle part or the top of the banks (maximum flow line) are reached.

b. Removal. This work, if required, shall include the removal of the compost filter sock and stakes. Before removal, all accumulated sediment and debris on the upstream side shall be removed and legally disposed. Compost filter sock check dams shall not be removed until the adjacent exposed areas are relatively free from future uncontrolled discharges. Unless biodegradable, the mesh filter sock material shall be cut open and the mesh removed. In general, the compost filter material may be left in place, however the material shall be raked out leveled to surrounding grades, then seeded.

207.04 METHOD OF MEASUREMENT.

207.04.1 Sand Bag Erosion Checks. "Sand Bag Erosion Checks" will be measured by the number of sand bags installed in accordance with the Plans and/or as directed by the Engineer.

207.04.2 Stone Check Dams. "Stone Check Dams" will be measured by the number of cubic feet of stone placed in accordance with the Plans and/or as directed by the Engineer.

207.04.3 Compost Filter Sock Check Dams. "Compost Filter Sock Check Dams" of the various sizes as indicated on the plans will be measured by the number of linear feet of continuous runs of such compost filter sock installed in accordance with the Plans and/or as directed by the Engineer.

207.05 BASIS OF PAYMENT.

207.05.1 Sand Bag Erosion Checks. The accepted quantity of "Sand Bag Erosion Checks" will be paid for at the contract unit price per each bag as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, equipment and materials, including bags, sand, the subsequent removal of sand bags, removal and disposal of entrapped material, and all other incidentals required to finish the work, complete and accepted by the Engineer.

207.05.2 Stone Check Dams. The accepted quantity of "Stone Check Dams" will be paid for at the contract unit price per cubic foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment, the subsequent removal of the stone, removal and disposal of entrapped material, and all incidentals required to finish the work, complete and accepted by the Engineer.

207.05.3 Compost Filter Sock Check Dams. The accepted quantity of "Compost Filter Sock Check Dams" will be paid for at the contract unit prices per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment, including mesh filter socks, removal of mesh filter socks, compost filter material, stakes, removal of stakes, removal and disposal of entrapped material, backfill material, grading, raking and seeding as necessary to match the surrounding area, and all incidentals required to finish the work, complete and accepted by the Engineer.

207.05.4 Cleaning and Maintenance. The cleaning and maintenance of Sand Bag Erosion Checks, Stone Check Dams and Compost Filter Sock Ditch and Erosion checks will be paid for under the provisions of **SECTION 212; MAINTENANCE AND CLEANING OF EROSION, SEDIMENT AND POLLUTION PREVENTION CONTROLS.**

SECTION 208

TEMPORARY DEWATERING BASINS

208.01 DESCRIPTION. This work consists of the provision of temporary dewatering basins for the purpose of avoiding water pollution caused by sediment-laden discharge from excavation sites. The basins shall be constructed in reasonably close conformity with the dimensions and details indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications. All erosion, sediment, and pollution prevention controls and devices shall be in place prior to the start of excavation when required by the SWPPP/SESC and other contract documents. Traditional temporary dewatering basins consist of the following two types:

208.01.1 Dewatering Basin. The basin consists of a rectangular concrete barrier enclosure, the bottom and sides of which are lined with filter fabric. The bottom fabric is stabilized with filter stone. The basin is divided into the required number of 12-foot sections by stone berms approximately 18 inches high. The entire unit is constructed as indicated on the Plans.

208.01.2 Filter Fabric Retention Basin. The basin consists of a rectangular enclosure formed by a 2-foot high chain link fence. Both the fence and the bottom of the enclosure are lined with filter fabric which is stabilized by a layer of rock riprap. The entire unit is constructed as indicated on the Plans.

208.02 MATERIALS.

208.02.1 Dewatering Basins. Precast concrete barrier units shall conform to details indicated on the Plans and to the applicable requirements of **SECTION 909** of these Specifications. Filter fabric shall conform to the applicable requirements of **Subsection 206.02.2; Silt Fence**, of these Specifications. Filter stone shall conform to the requirements of **Subsection M.01.09, Table I, Column V** of these Specifications. Sand bags shall be of a quality acceptable to the Engineer. Straw bales and wood stakes shall conform to the requirements of **Subsection 206.02.1** of these Specifications.

208.02.2 Filter Fabric Retention Basins. The fence shall conform to the requirements for Type I Chain Link Fence as set forth in **SECTION 903** of these Specifications. Wood posts shall be 2-inch by 2-inch oak and at least 3 feet in length. Filter fabric shall conform to the requirements for same as set forth in **Subsection 206.02.2** of these Specifications. The layer of stone over the bottom of the basin shall meet the requirements of **Subsection M.10.03.2** for Modified NSA Class R-4 riprap.

208.03 CONSTRUCTION METHODS. Those erosion and pollution controls indicated on the Plans shall be installed by the Contractor and approved by the Engineer before the commencement of any drainage, roadway, bridge construction, or the disturbance of any soils.

208.03.1 Dewatering Basin.

a. Installation. Dewatering basins shall be constructed at the locations, and in accordance with the details indicated on the Plans, or as directed by the Engineer. The following stipulations shall also apply:

1. The precast concrete barrier units shall be placed on level, or nearly level ground.
2. Filter fabric shall be placed on the bottom of the entire area enclosed by the concrete barrier units. If more than one sheet of fabric is required, the adjacent section shall be overlapped a minimum of 12 inches to insure full coverage. Filter fabric shall be turned up along the inside face of the concrete barriers to the top of same, there to be folded across the top of the barriers. The fabric will be maintained in position by the placement of sand bags, end-to-end, along the top of the concrete barrier enclosure.
3. A minimum layer of 6 inches of filter stone shall be spread over the bottom of the basin. Stone berms shall be constructed at 12-foot intervals along the length of the basin.

b. Removal. The dewatering basin will not be removed until all dewatering operations are complete. Prior to such removal, however, all accumulated sediment within the basin shall be removed and legally disposed of in accordance with the applicable requirements of **SECTION 212** of these Specifications. The area covered by the basin shall be seeded and mulched immediately after the basin is removed.

208.03.2 Filter Fabric Retention Basin.

a. Installation. Filter fabric retention basins shall be constructed at the locations, and in accordance with the details indicated on the Plans, or as directed by the Engineer. The following stipulations shall also apply:

1. The filter fabric retention basin shall be placed on stabilized, and level or nearly level ground to prevent erosion by water exiting the basin.
2. A 6-inch by 6-inch minimum trench shall be dug where the basin is to be constructed.
3. The filter fabric and wire backing shall be 3 feet wide (minimum) positioned in the trench and secured to metal posts positioned 4 feet on center (maximum).
4. The metal posts shall be driven into undisturbed soil next to the trench to a minimum depth of 12 inches.
5. Place fill material in the trench and compact.
6. The installed height of the fence shall be 2 feet (minimum).
7. A minimum layer of 6 inches of filter stone (Modified NSA Class R-4 riprap) shall be spread evenly over the bottom of the basin.

b. Removal requirements for the filter fabric retention basin are the same as set forth for the dewatering basin in **Para. b** of **Subsection 208.03.1**.

208.04 METHOD OF MEASUREMENT. "Dewatering Basins" and "Filter Fabric Retention Basins" will be measured by the number of square feet of each such basin constructed in accordance with the Plans and/or as directed by the Engineer. Area will be computed based on the outside dimensions of the basin enclosures.

208.05 BASIS OF PAYMENT. The accepted quantities of "Dewatering Basins" and "Filter Fabric Retention Basins" will be paid for at their respective contract unit prices per square foot as listed in the Proposal. The prices so-stated constitute full and complete compensation for all labor, materials, and equipment, including installation, subsequent removal, and restoration of basin areas, and all incidentals required to finish the work, complete and accepted by the Engineer.

208.05.1 Cleaning and Maintenance. The cleaning and maintenance of Dewatering Basins and Filter Fabric Retention Basins will be paid for under the provisions of **SECTION 212; MAINTENANCE AND CLEANING OF EROSION, SEDIMENT AND POLLUTION PREVENTION CONTROLS.**

SECTION 209

STORM DRAIN INLET PROTECTION

209.01 DESCRIPTION. This work consists of the provision of temporary storm drain inlet protection facilities constructed in reasonably close conformity with the dimensions and details indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications. All erosion, sediment, and pollution prevention controls and devices shall be in place prior to the start of excavation when required by the SWPPP/SESC and other contract documents. Storm drain inlet protection facilities consist of the following three types:

209.01.1 Silt Fence Inlet Protection. This work consists of placing a temporary filter fabric fence around inlet grates. Silt fence inlet protection shall be constructed as indicated on the Plans.

209.01.2 Baled Straw Inlet Protection. This work consists of placing baled straw around storm drain inlets. Baled straw inlet protection shall be constructed as indicated on the Plans.

209.01.3 Sack Insert Inlet Protection and High Flow Sack Insert Inlet Protection. This work consists of placing a reusable geotextile sack to be installed in drainage structures for the protection of wetlands and other resource areas and the prevention of silt and sediment from the construction site from entering the storm water collection system. Sack insert inlet protection and high flow sack insert inlet protection shall be constructed as indicated on the Plans.

209.02 MATERIALS.

209.02.1 Silt Fence Inlet Protection. The filter fabric shall be a material suitable for sediment control applications and shall be one of those included on the Department's Approved Materials List. Wood posts shall be oak, 2-inch by 2-inch in section, and at least 4½ feet in length. Support netting shall be heavy-duty plastic mesh. For prefabricated silt fence, 1-inch by 1-inch wood posts will be permitted.

209.02.2 Baled Straw Inlet Protection. Baled straw and wood stakes shall conform to the requirements of **Subsection 206.02.1** of these Specifications.

209.02.3 Sack Insert Inlet Protection. Shall be made of a permeable geotextile that allows water to pass but prevents silt, sediment and trash from passing. Sacks shall be woven polypropylene geotextile and sewn by a double needle machine using high strength nylon. Sacks shall include overflow holes to make the silt sack effective even in the most extreme weather events.

1. Sacks must meet the following:
 - a. Minimum Puncture Strength, ASTM D4533 of 130 lbs.
 - b. Minimum sieve size of 20
 - c. Minimum flow rate, ASTM D4491 of 100 gpm/ ft²

209.03 CONSTRUCTION METHODS. Those erosion and pollution controls indicated on the Plans shall be installed by the Contractor and approved by the Engineer before the commencement of any drainage, roadway, bridge construction, or the disturbance of any soils.

209.03.1 Silt Fence Inlet Protection.

a. Installation. The silt fence inlet protection shall be constructed as indicated on the Plans. The following stipulations shall also apply:

1. Posts shall extend at least 1 foot below grade.
2. The filter fabric shall extend to a height at least 12 inches above the top of the inlet grate but shall not exceed 3 feet in height.
3. The support netting shall extend to the full height of the filter fabric.
4. A trench shall be excavated approximately 6 inches wide and 6 inches deep around the outside perimeter of the stakes. The filter fabric and support netting shall extend at least 6 inches into the trench. After the fabric and support netting are fastened to the stakes the trench should be backfilled and compacted to original grade.
5. The filter fabric and support netting fence shall be securely fastened to the stakes using heavy duty wire staples at least 1-inch long. Ends of the filter fabric must meet at a stake, be overlapped, folded and stapled to the stake.

b. Removal. The silt fence inlet protection shall be removed, and the area prepared for pavement construction once the contributing drainage area is free from future uncontrolled discharges. Prior to such removal, however, all silt, mud, and debris entrapped by the silt fence shall be removed and the area properly cleaned in accordance with the applicable provisions of **SECTION 212** of these Specifications.

209.03.2 Baled Straw Inlet Protection.

a. Installation. The baled straw inlet protection shall be constructed as indicated on the Plans. The following stipulations shall also apply:

1. The bales shall be entrenched and backfilled. The trench shall be excavated the width of the bale and the length of the check to a minimum depth of 3 inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the check. Backfill shall conform to the ground level on the inside and shall be built up to 4 inches around the outside.
2. The bales are to be installed so that the bindings are oriented around the sides of the bales rather than along their tops and bottoms.
3. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake in each bale should be driven toward the previously laid bale to force the bales together.

4. The gaps between bales shall be chinked (filled by wedging) with straw to prevent water from escaping between bales.

b. Removal. The baled straw inlet protection shall be removed, and the area prepared for pavement construction the contributing drainage area is free from future uncontrolled discharges. Prior to such removal, however, all silt, mud, and debris entrapped by the baled straw shall be removed and the area cleaned up in accordance with the applicable provisions of **SECTION 212** of these Specifications.

209.03.3 Sack Insert Inlet Protection.

a. Installation. The insert sack shall be constructed as indicated on the Plans and as required by the Engineer. The device shall be manufactured to fit the opening of the drainage structure and shall be mounted under the grate. The insert sack shall be secured from the surface such that the grate can be removed without the insert discharging or falling into the drainage structure. All curb inlets shall be blocked to prevent stormwater from bypassing the device. The sack (geosynthetic filter material) shall be installed and maintained in accordance with the manufacturer's written literature and as directed by the Engineer.

b. Removal. The insert sack shall be removed when surface borne sediment has been stabilized upon completion of final pavement and sidewalk placement, and the adjacent grade areas have become permanently stabilized by vegetative growth. When emptying the sack, the Contractor shall take all due care to prevent the captured material from entering the structure. Silt, sediment, and other debris found in the drainage system at the end of construction shall be removed at the Contractor's expense. The silt and sediment from the sack shall be legally disposed of offsite. Under no condition shall silt and sediment from the insert be deposited on site or used in construction. Prior to such removal, however, all silt, mud, and debris entrapped by the sack shall be removed and the area cleaned up in accordance with the applicable provisions of **SECTION 212** of these Specifications.

209.04 METHOD OF MEASUREMENT.

209.04.1 Silt Fence Inlet Protection. "Silt Fence Inlet Protection" will be measured by the number of linear feet of such protection installed in accordance with the Plans and/or as directed by the Engineer.

209.04.2 Baled Straw Inlet Protection. "Baled Straw Inlet Protection" will be measured by the number of linear feet of straw bales installed in accordance with the Plans and/or as directed by the Engineer.

209.04.3 Sack Insert Inlet Protection. "Sack Insert Inlet Protection " will be measured by the number of inlets protected with sacks in accordance with the Plans and/or as directed by the Engineer.

209.05 BASIS OF PAYMENT.

209.05.1 Silt Fence Inlet Protection. The accepted quantity of "Silt Fence Inlet Protection" will be paid for at the contract unit price per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment, including excavation, stakes, support netting, filter fabric, backfill, the subsequent removal of the entire temporary facility, removal and

disposal of entrapped material, and all incidentals required to finish the work, complete and accepted by the Engineer.

209.05.2 Baled Straw Inlet Protection. The accepted quantity of "Baled Straw Inlet Protection" will be paid for at the contract unit price per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment, including excavation, straw bales, stakes, backfill, the subsequent removal of the entire temporary facility, removal and disposal of entrapped material, and all incidentals required to finish the work, complete and accepted by the Engineer.

209.05.3 Sack Insert Inlet Protection and High Flow Sack Insert Inlet Protection . The accepted quantity of "Sack Insert Inlet Protection" and "High Flow Sack Insert Inlet Protection" will be paid for at the contract unit price per EACH as listed in the Proposal. The price so-stated constitutes full and complete compensation for all materials, including sacks, labor, equipment, and all incidentals required to complete the work, including final removal of inlet protection device and removal and disposal of entrapped material.

209.05.4 Cleaning and Maintenance. The cleaning and maintenance of Silt Fence Inlet Protection, Baled Straw Inlet Protection and Sack Insert Inlet Protection will be provided and paid for under the provisions of **SECTION 212; MAINTENANCE AND CLEANING OF EROSION, SEDIMENT AND POLLUTION PREVENTION CONTROLS.**

SECTION 210

TEMPORARY SEDIMENT BASIN

210.01 DESCRIPTION. This work consists of the provision of temporary sediment basin for water pollution prevention in reasonably close conformity with the dimensions and details indicated on the Plans, or as directed by the Engineer, all in accordance with these Specifications. All erosion, sediment, and pollution prevention controls and devices shall be in place prior to the start of excavation when required by the SWPPP/SESC and other contract documents.

210.02 MATERIALS. The various materials required for the construction of temporary sediment basin will be indicated on the Plans.

210.03 CONSTRUCTION METHODS. The temporary sediment basin will be constructed in such a manner to allow any material, which may cause a natural water course or the surrounding environment to be damaged, to be retained in the basin. If the basin is temporary, the Contractor will be required to restore the area in which the basin was located to either its original condition or to the requirements of the Contract.

Excavation for temporary sediment basin is to take place from the downstream end of the basin and to proceed upstream. Prior to the start of excavation, temporary baled straw ditch erosion checks and/or straw log check dams are to be constructed immediately beyond the downstream end of the basin. When the work requiring the temporary basin is complete the control measures are to be removed.

210.04 METHOD OF MEASUREMENT. "Temporary Sediment Basin" will not be measured by a single unit of measurement usually associated with a specific Proposal item. Rather, each individual item of work required to provide such basins will be measured by their respective units of measurement for the quantity provided in accordance with the Plans and/or as directed by the Engineer.

210.05 BASIS OF PAYMENT. "Temporary Sediment Basin" will not be paid for as completed facilities. Rather, such basins will be paid for at the contract unit prices listed in the Proposal for those various items of work required to construct the facility, and in the case of temporary basins, those items of work necessary to remove the basin and restore the area to its original or proposed condition, and all incidentals required to finish the work, complete and accepted by the Engineer.

210.05.1 Cleaning and Maintenance. The cleaning and maintenance of "Temporary Sediment Basin" will be paid for under the provisions of **SECTION 212; MAINTENANCE AND CLEANING OF EROSION, SEDIMENT AND POLLUTION PREVENTION CONTROLS.**

**SECTION 211
CONSTRUCTION ACCESSES**

211.01 DESCRIPTION. This work consists of the provision of stabilized stone pads located at points of vehicular and equipment ingress and egress—to and from construction sites to prevent track out of sediment. All erosion, sediment, and pollution prevention controls and devices shall be in place prior to the start of excavation when required by the SWPPP/SESC and other contract documents.

211.01.1 Planning Considerations. Public roads adjacent to a construction site shall be clean of any sediment and debris at the end of each day. This **SECTION 211** provides for an area where sediment can be removed from the tires or tracks of construction vehicles and equipment before such vehicles and equipment enter a public road. Construction accesses shall be used in conjunction with the stabilization of construction roads to reduce the amount of sediment tracked out by construction vehicles and equipment.

211.02 MATERIALS. Crushed stone shall conform to the requirements of **Subsection M.01.09, Table I, Column II** of these Specifications. Geosynthetic materials shall conform to the requirements for same as set forth in **Subsection 206.02.2** of these Specifications.

211.03 CONSTRUCTION METHODS. Stabilized stone pads employed as construction entrances shall be constructed as indicated on the Plans.

211.03.1 Dimensions.

- a. Thickness.** The thickness of the stabilized stone pad shall be a minimum of 5 inches.
- b. Width.** The width shall not be less than the full width of the respective points of ingress or egress.
- c. Length.** The length of construction accesses shall be at least 50 feet where the soils are sands or gravels, except where the traveled length is less than 50 feet. Where soils are clays or silts, the length of construction accesses shall be at least 100 feet except where the traveled length is less than 100 feet.

211.03.2 Installation Requirements. The area of the construction accesses shall be cleared of all vegetation, roots, stumps, or other objectionable material. The area shall then be excavated to subgrade and graded. Appropriate geosynthetic material shall be placed on the prepared subgrade prior to the placement of the stone pad. The stone shall be placed according to the specified dimensions.

211.04 METHOD OF MEASUREMENT. "Construction Accesses" will be measured by the number of square yards of stabilized stone pads installed for this purpose in accordance with the Plans and/or as directed by the Engineer.

211.05 BASIS OF PAYMENT. The accepted quantity of "Construction Accesses" will be paid for at the contract unit price per square yard as listed in the Proposal. The price so stated constitutes full and

complete compensation for all labor, material, and equipment, including excavating, geosynthetic materials, stabilized stone pad, and subsequent removal of same, and all incidentals required to finish the work complete and accepted by the Engineer.

211.05.1 Cleaning and Maintenance. The cleaning and maintenance of Construction Accesses will be paid for under the provisions of **SECTION 212 MAINTENANCE AND CLEANING OF EROSION, SEDIMENT AND POLLUTION PREVENTION CONTROLS.**

SECTION 212

MAINTENANCE AND CLEANING OF EROSION, SEDIMENT, AND POLLUTION PREVENTION CONTROLS

212.01 DESCRIPTION. This work consists of the maintenance and cleaning of erosion, sediment, and pollution prevention control items as well as performing inspection and documentation of RIDOT Small Site Stormwater Pollution Prevention Plan (SWPPP) and/or RIDOT Soil Erosion and Sediment Control (SESC) reports year-round in accordance with these Specifications and as directed by the Engineer and the Office of Stormwater Management. All erosion, sediment, and pollution prevention controls and devices shall be in place prior to the start of excavation when required by the SWPPP/SESC and other contract documents. There is no winter shutdown period associated with this **SECTION 212.**

212.01.1 Applicable Controls. The specific erosion, sediment, and pollution prevention controls to be cleaned and maintained under this Section consist of the following:

- a. Erosion, Sediment, and Pollution Prevention Controls.**
 - 1. Baled Straw Erosion Checks; Subsection 206.01.1
 - 2. Silt Fence; Subsection 206.01.2
 - 3. Baled Straw Erosion Checks and Silt Fence Combined; Subsection 206.01.3
 - 4. Compost Filter Sock Subsection 206.01.4

- b. Check Dams.**
 - 1. Sand Bag Erosion Dikes; Subsection 207.01.1
 - 2. Stone Check Dams; Subsection 207.01.2
 - 3. Compost Filter Sock Check Dams Subsection 207.01.3

- c. Temporary Dewatering Basins.**
 - 1. Dewatering Basins; Subsection 208.01.1
 - 2. Filter Fabric Retention Basins; Subsection 208.01.2

- d. Storm Drain Inlet Protection.**
 - 1. Silt Fence Inlet Protection; Subsection 209.01.1
 - 2. Baled Straw Inlet Protection; Subsection 209.01.2
 - 3. Sack Insert Inlet Protection Subsection 209.01.3

- e. Temporary Sediment Basin** Subsection 210.01

- f. Construction Accesses.** Subsection 211.01

212.01.2 Definitions.

- a. Cleaning.** Cleaning consists of removing debris and accumulated sediment-laden

deposits from the upstream side of perimeter controls, check dams, storm drain inlet protection, construction accesses, and from the bottom of temporary dewatering basins and sediment basins. All material so-removed shall be legally disposed of.

b. Maintenance. Maintenance consists of the restoration and repair of damage sustained by erosion and pollution controls from “normal” rainfall events and the work necessary to prepare for forecasted events (Abnormal weather events are defined in **Subsection 212.03.4; Failure of Erosion, Sediment, and Pollution Controls due to Abnormal Weather**).

c. Inspection. Inspection consists of the required environmental permit inspections plans, reports, and procedures including but not limited to the SWPPP and/or SESC plan.

- d. Corrective Action Log.** A Corrective Action Log shall be completed by the Contractor to:
1. Document, within 24 hours of identification, the specific condition and the datetime is/was identified;
 2. Document, within 24 hours of completing the action, the action taken to address the condition;
 3. Is kept at the site or at an easily accessible location.

212.02 MATERIALS. Materials required to repair and restore damaged erosion, sediment, and pollution prevention controls shall meet the applicable requirements of **Subsections 206.02; 207.02; 208.02; 209.02; 210.02; and 211.02 for Erosion, Sediment, and Pollution Prevention Controls, Check Dams, Temporary Dewatering Basins, Storm Drain Inlet Protection, and Temporary Sediment Basins, and Construction Accesses**, respectively, of these Specifications.

212.03 CONSTRUCTION METHODS. Erosion, sediment, and pollution prevention controls shall be maintained by the Contractor to the satisfaction of the Engineer and the Office of Stormwater Management. Erosion, sediment, and pollution prevention controls must be able to prevent, under normal weather conditions, both the movement of soil materials and the intrusion of sediment-laden discharges into environmentally sensitive areas.

Construction shall not commence or continue until all specified erosion, sediment, and pollution controls are in place, properly installed, and accepted by the Engineer and the Office of Stormwater Management.

Erosion, sediment, and pollution prevention controls shall be routinely inspected by the Contractor’s certified inspector in accordance with the SWPPP or SESC. These inspections shall occur at a minimum of every seven (7) calendar days, within 24 hours of corrective actions occurring, and within 24 hours of the site receiving 0.25 inches of rainfall from an individual storm event. After each inspection, the Contractor shall take corrective actions and perform all necessary cleaning, maintenance, and repairs whenever maintenance of the erosion, sediment, and pollution controls is required. The Contractor shall commence with the requisite cleaning, maintenance, and repairs no later than the next consecutive calendar day after the SWPPP or SESC inspection was conducted and shall aggressively and expeditiously perform such cleaning, maintenance, and repair work until the original issue is remedied to the complete satisfaction of the Engineer and/or Office of Stormwater Management. In the event of a holiday or weekend storm event, the Contractor must have resources available to restore and, if necessary, to replace any damaged erosion controls.

SWPPP or SESC inspections shall be performed until the following criteria are met:

- a) All disturbed areas are permanently stabilized, including storage/laydown areas;
- b) All project specific regulatory permits requirements have been met.

212.03.1 Threshold for Cleaning Erosion, Sediment, and Pollution Prevention Controls. Erosion, sediment, and pollution controls shall be cleaned when directed by the Engineer and/or Office of Stormwater Management; after a rainstorm; or when sediment deposits reach the heights indicated in the following table:

Control Type	Threshold for Cleaning (Minimal)
a. Erosion, Sediment, and Pollution Prevention Controls.	
1. Baled Straw Erosion Checks	½ Bale Height
2. Silt Fence	6 inches
3. Baled Straw Erosion Checks and Silt Fence Combined	½ Bale Height
4. Compost Filter Sock	½ Sock Height
b. Check Dams	
1. Sand Bag Erosion Dike	½ Dike Height
2. Stone Check Dam	½ Dam Height
3. Compost Filter Sock Check Dam	½ Sock Height
c. Temporary Dewatering Basins	
1. Dewatering Basins	½ Original Basin Height
2. Filter Fabric Retention Basin	½ Original Basin Height
d. Storm Drain Inlet Protection	
1. Silt Fence Inlet Protection	6 inches
2. Baled Straw Inlet Protection	½ Bale Height
3. Sack Insert Inlet Protection	⅓ Sack Height or per manufacturer's requirements
e. Temporary Sediment Basin	½ Depth Below Outlet Elevation
f. Construction Accesses	When track out is occurring

212.03.2 Other Requirements.

a. **Certifications.** The Contractor shall provide a certified SWPPP/SESC inspector at the Contractor's own expense to perform and report on SWPPP/SESC inspections. A certified SWPPP/SESC inspector shall be an individual that is a Certified Professional in Erosion and Sediment Control (CPESC), a Certified Professional in Stormwater Quality (CPSWQ), or RI Registered Professional Engineer.

1. A Certified Professional in Erosion and Sediment Control (CPESC) and/or Certified Professional in Stormwater Quality (CPSWQ) is intended to ensure inspectors meet the Federal requirements including the US Environmental Protection Agency's National Pollutant Discharge Elimination System definition of "Qualified Personnel" and also ensure that the projects they oversee meet the requirements of all contract permits and State/Local regulations.

2. A Professional Engineer may be considered certified to perform and report on SWPPP/SESC inspections if the Professional Engineer is claiming competency equal to a CPESC or CPSWQ.

3. Certified Inspectors shall include their valid, applicable certification number and type of certification on each report. Professional Engineers must seal (stamp) and sign each report.

4. Certifications and Professional Engineer registrations may be rejected by the Engineer or the Office of Stormwater Management if:

(a) SWPPP/SESC reports from the inspector are incomplete/inaccurate as determined by the Engineer or the Office of Stormwater Management more than twice in a calendar year.

(b) It is determined by the Office of Stormwater Management that the certifying agency/organization does not meet the requirements in **Subsection 212.03.2.a.1**.

(c) A SWPPP/SESC report is intentionally incorrect, inaccurate or missing important information of any kind as determined by the Engineer or the Office of Stormwater Management.

5. If the Office of Stormwater Management rejects a Certification or Professional Engineers registration, the Office of Stormwater Management, at its' discretion may contact the certifying agency/organization to inform them of the reason for the Department's rejection of the certificate.

6. If a Certification or Professional Engineers registration is rejected, due to sections 4(a) or 4(b) above, the inspector will be required to submit a new certification. There is no time restriction.

7. If a Certification or Professional Engineers registration is rejected, due to section (c) above, the inspector will be required to submit a new certification after a period no sooner than 3 months after rejection of certification. In extreme cases the Office of Stormwater Management will forward the falsified documentation to RIDEM and/or EPA under RIDOT Consent Decree reporting requirements.

b. Erosion, Sediment, and Pollution Prevention Controls, Check Dams, Temporary Dewatering Basins, Storm Drain Inlet Protection, Temporary Sediment Basin, and Construction Accesses. The following requirements apply:

1. Non-compliant, damaged, and/or controls requiring maintenance as identified in a SWPPP or SESC plan report shall be cleaned, repaired or replaced within 24 hours of identification. The Contractor shall designate a qualified person, experienced in stormwater management and erosion to be available on site throughout the duration of the project. This person shall have the authority to direct Contractor's personnel and/or subcontractor's personnel in carrying out corrective actions as needed. The Contractor's designated SWPPP or SESC contact person will be responsible to perform inspection of erosion and pollution controls in accordance with RIDOT special provisions and environmental permits of the Contract. Documentation of the inspections shall be submitted by the Contractor in the form of signed SWPPP or SESC plan report, in accordance with RIDOT's templates, or as provided in the Contract to RIDOT's Project Manager, Resident Engineer, and Office of Stormwater Management. Templates can be found on RIDOT website.

2. The Engineer and the Office of Stormwater Management each have the authority to verify, enforce, and to specify maintenance activities and to ensure that erosion, sediment, and pollution prevention controls have been properly maintained.

c. Temporary Dewatering Basins and Temporary Sediment Basin. The following requirements apply:

1. The basins will be periodically inspected for signs of erosion around the basin and downslope area.

2. Repairs will be promptly carried out as directed by the Engineer.

3. The Engineer and the Office of Stormwater Management has the authority to verify, enforce, and to specify maintenance activities and to ensure that controls have been properly maintained.

212.03.3 Failure to Maintain Erosion, Sediment, and Pollution Prevention Controls. If the Engineer and/or the Office of Stormwater Management decides on any given day that those erosion, sediment, and pollution controls specified in the Contract, SWPPP, and/or SESC Plan are not in place or have not been adequately maintained as specified in this Section or per permit requirements, the daily charge will be deducted from monies due the Contractor as a charge for failure to comply set forth below and/or as revised in **Special Provision Code 212.1000**. The stated daily charge per incident will continue each consecutive calendar day thereafter until the deficiencies noted have been corrected to the complete satisfaction of the Engineer and/or the Office of Stormwater Management. Failure to comply charges are independent of other charges assessed by other agencies and/or entities.

a. General Permit Violation. A General Permit Violation shall be considered issues such as, but not limited to:

- (1) Failure by the Contractor to ensure that all stormwater controls are maintained and remain in effective operating condition;
- (2) Working without a permit;
- (3) Land disturbance, permit non-compliance, performing work without proper sediment, erosion, and pollution controls in place;
- (4) Nonperformance of or falsification of SWPPP/SESC inspection or

- documentation; and/or,
(5) Non-installed BMP or unmaintained BMP.

b. **Erosion, Sediment, and Pollution Prevention Controls Violation.** The Contractor shall ensure that all stormwater and non-stormwater pollution prevention controls are maintained and remain in effective operating condition. A Stormwater or Non-Stormwater Pollution Prevention Controls Violation shall be considered issues such as, but not limited to:

- (1) Failure to comply with any specific maintenance requirements listed in the Contract, SWPPP, or SESC Plan and/or recommended by the manufacturer;
- (2) Failure to prevent non-authorized discharges from leaving the site;
- (3) Failure to install sediment controls along all perimeter areas of the site that will receive pollutant discharges (or, for linear construction sites where such controls are infeasible, to implement other appropriate practices);
- (4) Failure to minimize sediment track-out in accordance with the Contract Documents, SWPPP and/or SESC;
- (5) Failure to properly manage stockpiles or land clearing debris piles composed of sediment and/or soil;
- (6) Failure to minimize dust through appropriate application of water or other dust suppression techniques;
- (7) Failure to minimize soil compaction in areas where final vegetative stabilization will occur or where infiltration practices will be installed;
- (8) Failure to protect storm drain inlets by installing inlet protection measures that remove sediment from discharges prior to entry into a storm drain inlet;
- (9) Failure to use erosion controls and velocity dissipation devices within and along the length of any stormwater conveyance channel and at any outlets to slow down runoff to minimize erosion;
- (10) Failure to initiate and complete stabilization measures within the required deadlines;
- (11) Other necessary control measures not properly selected or installed;
- (12) Failure to provide effective controls for equipment and vehicle fueling and maintenance activities;
- (13) Failure to effectively minimize the discharge of pollutants from equipment and vehicle washing;
- (14) Failure to implement appropriate controls to prevent/minimize the discharge of pollutants from any of the following: building materials/products; landscaping chemicals and materials; petroleum products and other chemicals; hazardous and toxic waste; construction and domestic wastes; and/or sanitary wastes;
- (15) Failure to provide effective controls for concrete washout;
- (16) Failure to provide effective control for washing applicators/containers for stucco, paint, form release oils, curing compounds or other materials;
- (17) Failure to comply with requirements for construction dewatering in order to minimize the discharge of pollutants

c. **Improper Documentation Violation.**

- (1) Failure to complete an Inspection or Corrective Action Log when required;

- (2) Failure to properly sign/certify an Inspection or Corrective Action Logs;
- (3) False Corrective Action Logs
- (4) All required inspections were not conducted and timely documented;
- (5) Inspections not conducted by qualified personnel;
- (6) Failure to inspect all required areas;
- (7) Failure to include all required information;

d. Adjustment for Repeat Violations. A Repeat Violator is an operator of a construction site (Contractor) who has been assessed for Failure to Maintain Erosion and Pollution Controls previously on the same project. This includes any of the violations stated previously in Section 212 or otherwise identified in previously filed SWPPP and/or SESC reports. Prior formal enforcement actions also include both EPA and state actions against the Contractor on the same project. An escalation factor of 25% shall be applied the second time Failure to Comply Charges are assessed; an escalation factor of 50% shall be applied the third or subsequent time a Failure to Comply Charge is assessed.

Stormwater violation schedule for Construction and Maintenance activities:

Blue Book Section		Failure to Comply Charge		Schedule
		Minor Violation	Major Violation	
212.03.3.a	General Permit Violation	\$500.00	\$5,000.00	Per day per non-conformance and/or per violation
212.03.3.b	Failure to ensure that all stormwater controls are properly maintained and remain in effective operating condition and all pollution prevention requirements have been met	\$500.00	\$5,000.00	
212.03.3.c	Improper documentation	\$500.00	\$1,000.00	
212.03.3.d	Adjustment for Repeat Violation	25%	50%	

212.03.4 Failure of Erosion and Pollution Controls due to Abnormal Weather. Maintenance and Cleaning of Erosion and Pollution Controls for normal weather is based on the concept that erosion, sediment, and pollution controls will essentially remain intact under normal weather related events and that any damage sustained by said controls under normal weather related events shall be repaired under the applicable provisions of **SECTIONS 212**.

a. However, under abnormal weather events it is possible that erosion, sediment, and pollution controls may be damaged to the extent that the Engineer may direct that they be replaced in part or their entirety. Under such abnormal weather conditions, the Contractor shall replace the controls and be compensated for same under the applicable provisions of **SECTIONS 206, 207, 208, 209 and 210** of these Specifications if the current SWPPP/SESC

inspection indicates the control was in place and maintained in a good state of repair and the Contractor can exhibit that all reasonable preventative measures to protect the site were made to the satisfaction of the Engineer and/or Office of Stormwater Management.

b. For the purpose of this **Subsection 212.03.4**, an abnormal weather event is defined as follows:

- (1) Rainfall equal to or greater than one (1.0) inch within 1-hour;
- (2) Rainfall equal to or greater than two and one half (2.5) inches within 12-hours;
- (3) Rainfall equal to or greater than three (3.0) inches within 24-hours;
- (4) Extreme weather-related events as defined in **Subsection 104.14**.

The claim of abnormal weather events shall be supported by data records from the National Weather Service.

212.04 METHOD OF MEASUREMENT. This work does not require a measurement for payment.

212.05 BASIS OF PAYMENT. Maintenance and Cleaning of Erosion, Sediment, and Pollution Prevention Controls will be paid for at the contract lump sum price as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, equipment, cleaning, maintenance, disposal, replacement and incidentals to **Subsections 206, 207, 208, 209, 210, and 211; for Erosion, Sediment, and Pollution Prevention Controls, Check Dams, Temporary Dewatering Basins, Storm Drain Inlet Protection, Temporary Sediment Basins, and Construction Accesses**, respectively, of these Specifications, including the inspection and development of SWPPP and SESC reports.

Monthly progress payments under this item will be made at a rate determined by dividing the contract lump sum price by the number of months allocated for completion of the contract plus three (3) or $[LS/(months + 3)]$. Said number of months shall be equal to the difference between the contract completion date and the date of the Notice to Proceed.

At the discretion of the Engineer, payment for authorized contract time extensions will be made at either the calculated monthly rate as defined above or on a Force Account basis in accordance with **Subsection 109.04**; of these specifications.

If the contract is completed prior to the authorized completion date, the final monthly payment will be authorized after completion of the punch list and will consist of the remaining balance of the contract lump sum price.

No payment will be made for unauthorized contract time extensions.

Remove **Subsection 501, Portland Cement Concrete Pavement and Base**, pages 5-1 to 5-12 of the RI Standard Specifications for Road and Bridge Construction and replace it with the following.

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Remove **Subsection 505, Portland Cement Concrete Base Course w/Crack Control 8-Inch Extra Strength**, pages 5-19 to 5-20 of the RI Standard Specifications for Road and Bridge Construction and replace it with the following.

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SECTION 824

STRUCTURAL STEEL CONSTRUCTION

824.01 DESCRIPTION. This work consists of furnishing, fabricating, and erecting all structural steel at the locations and to the details indicated on the Plans, or as directed by the Engineer, all in accordance with these Specifications. Structural steel includes, but is not limited to, carbon, special alloy steels, steel forgings, steel and iron castings and weldments.

824.01.1 Surface Preparation for Weathering Steel. This work also includes the cleaning and protection of weathering structural steel during both fabrication and after erection.

824.01.2 Applicable Specifications. In addition to this Specification, all structural steel work shall conform to the applicable requirements of the respective current editions of the AASHTO Standard Specifications for Highway Bridges and the AWS D1.5 Bridge Welding Code.

824.01.3 Related Items of Work Covered Elsewhere. Related items of work covered in other Sections of these Specifications include the following:

- a. **SECTION 825; PAINTING STRUCTURAL STEEL**
- b. **SECTION 827; THERMAL SPRAYED ZINC COATING for NEW STRUCTURAL STEEL**

824.01.4 Shear Connectors. This work shall consist of the provision of stud shear connectors welded to the flanges of steel beams or girders at the locations indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications.

a. General Requirements. Shear connector studs shall be of a design suitable for end-welding to steel beams and girders with automatically timed stud welding equipment. The type, size or diameter, and length of stud shall be as shown, specified or ordered.

Finished studs shall be of uniform quality and condition, free from injurious laps, fins, seams, cracks, twists, bends, or other injurious defects. Finish shall be as produced by cold drawing, cold rolling, or machining.

Before placing orders for studs, the Contractor shall submit to the Engineer for approval the following information on the studs to be purchased.

1. The name of the manufacturer.
2. A detailed description of the stud and arc shield to be furnished.
3. A certification from the manufacturer that the stud to be furnished is qualified in accordance with the latest AASHTO Standard Specifications for Highway Bridges.

4. If requested by the Engineer, a copy of the qualification test report as certified by the testing laboratory.

824.02 MATERIALS.

824.02.1 Structural Steels shall conform to the requirements of **Subsection M.05.04.1** of these Specifications.

824.02.2 Steel Bars and Forgings shall conform to the requirements of **Subsection M.05.04.2** of these Specifications.

824.02.3 Structural Tubing shall conform to the requirements of **Subsection M.05.04.3** of these Specifications.

824.02.4 Bolts shall conform to the requirements of **Subsection M.05.04.4** of these Specifications.

824.02.5 Weld Metal shall conform to the requirements of **Subsection M.05.04.5** of these Specifications.

824.02.6 Shear Connectors shall conform to the requirements of **Subsection M.05.04.6** of these Specifications.

824.02.7 Low Alloy Nickel Copper Steel Pipe shall conform to the requirements of **Subsection M.05.04.7** of these Specifications.

824.02.8 Steel Forging and Shafting shall conform to the requirements of **Subsection M.05.04.8** of these Specifications.

824.04.9 Steel and Iron Castings shall conform to the requirements of **Subsection M.05.04.9** of these Specifications.

824.03 CONSTRUCTION METHODS.

824.03.1 Shop Drawings. The Contractor shall prepare all shop drawings, erection diagrams, camber diagrams, and list of field rivets and bolts, from plans furnished by the State. Shop drawings and erection diagrams shall be submitted by the Contractor and reviewed by the Engineer in accordance with the requirements of **Subsection 105.02** of these Specifications.

824.03.2 Inspection and Testing.

a. Mill. The State shall be furnished complete copies of mill orders in quadruplicate. No material shall be rolled, or work done, before the Engineer has been notified where the orders have been placed so that he may arrange for the inspection.

The manufacturer shall furnish all facilities for inspecting and testing the weight and quality of all material at the mill where it is manufactured. Suitable testing equipment, properly calibrated, shall be furnished. The pieces shall be prepared for the testing machine, at no cost to the State.

Where no mill inspection is made, the Contractor shall furnish the Engineer with four copies of the mill report of chemical and physical tests prior to starting work. No markings shall be cut off until the inspector has established the heat and designation and determined the method of continued identity. Inspection and testing shall conform the **SECTION 106; CONTROL OF MATERIAL**, of these Specifications.

b. Shop. The Engineer shall be notified well in advance of the start of the work in the shop, in order that an inspector shall be on hand to inspect material and workmanship.

The fabricator shall furnish all facilities for inspecting and testing the weight and quality of workmanship at the shop where the material is fabricated. Suitable testing equipment, properly calibrated, shall be provided.

When an inspector is furnished by the State to inspect materials at the mills or at the shops, full access shall be provided at all times and to all parts of the mills or shops where the material is being manufactured or fabricated.

The inspector shall have the authority to reject any material or work which does not meet the requirements of these Specifications. In case of dispute the Contractor may appeal to the Engineer, whose decision shall be final.

The acceptance of any material or finished members by the inspectors shall not be a bar to their subsequent rejection, if subsequently found defective. Rejected material and workmanship shall be replaced promptly and made good by the Contractor.

c. Site. The Engineer may waive shop inspection and may make inspection of all fabricated material when the same is delivered at the site of the work.

The Contractor shall furnish the Engineer with a minimum of four copies of shipping statements.

The weights of the individual members shall be shown on the statement.

The Contractor shall furnish the Engineer with a Certificate of Identification as defined in Subsection 11.4.1 of the AASHTO Standard Specifications for Highway Bridges (15th Edition).

d. Delegation of Authority. The State may delegate inspection and testing to an independent laboratory or testing company. This agency shall have all the prerogatives as previously mentioned for the Engineer except that in the event of a disagreement of substance the Contractor may appeal a decision to the Engineer whose decision shall be final.

824.03.3 Fabrication.

a. Quality of Workmanship. Workmanship and finish shall be equal to the best general practice of modern bridge shops.

b. Shop Storage of Materials. Structural material, either plain or fabricated, shall be stored at the bridge shop above the ground upon platforms, skids, or other supports. It shall be kept free from dirt, grease and other foreign matter, and shall be protected as far as practicable from corrosion.

c. Holes for High-Strength Bolts and Unfinished Bolts.

1. General. All holes for bolts shall be either punched or drilled. Material forming parts of a member composed of not more than five thicknesses of metal may be punched 1/16-inch larger than the nominal diameter of the bolts whenever the thickness of the material is not greater than 3/4-inch for structural steel, 5/8-inch for high-strength steel or 1/2-inch for quenched and tempered alloy steel.

When there are more than five thicknesses or when any of the main material is thicker than 3/4-inch for structural steel, 5/8-inch for high-strength steel, or 1/2-inch for quenched and tempered alloy steel, all holes shall either be subdrilled and reamed or drilled full size.

When required, all holes shall be either subpunched or subdrilled (subdrilled if thickness limitation governs) 3/16-inch smaller and, after assembling, reamed 1/16-inch larger or drilled full size to 1/16-inch larger than the nominal diameter of the bolts.

When shown on the Plans, enlarged or slotted holes are allowed with high-strength bolts.

2. Punched Holes. The diameter of the die shall not exceed the diameter of the punch by more than 1/16-inch. If any holes must be enlarged to admit the bolts, such holes shall be reamed. Holes must be clean cut without torn or ragged edges.

3. Reamed or Drilled Holes. Reamed or drilled holes shall be cylindrical, perpendicular to the member, and shall comply with the requirements of **Para. c.1**, above, as to size. Where practical, reamers shall be directed by mechanical means. Burrs on the outside surfaces shall be removed. Reaming and drilling shall be done with twist drills, twist reamers or rotobroach cutters. Connecting parts requiring reamed or drilled holes shall be assembled and securely held while being reamed or drilled and shall be match marked before disassembling.

4. Accuracy of Holes. Holes not more than 1/32-inch larger in diameter than the true decimal equivalent of the nominal diameter that may result from a drill or reamer of the nominal diameter are considered acceptable, the slightly conical hole that naturally results from punching operations is considered acceptable. The width of slotted holes which are produced by flame cutting or a combination of drilling or punching and flame cutting shall generally be not more than 1/32-inch greater than the nominal width. The flame cut surface shall be ground smooth.

d. Accuracy of Hole Group.

1. Accuracy Before Reaming. All holes punched full size, subpunched, or subdrilled shall be so accurately punched that after assembling (before any reaming is done) a cylindrical pin 1/8-inch smaller in diameter than the nominal size of the punched hole may be entered perpendicular to the face of the member, without drifting, in at least 75 percent of the contiguous holes in the same plane. If the requirement is not fulfilled, the badly punched pieces will be rejected. If any hole will not pass a pin 3/16-inch smaller in diameter than the nominal size of the punched hole, this will be cause for rejection.

2. Accuracy After Reaming. When holes are reamed or drilled, 85 percent of the holes in any contiguous group shall, after reaming or drilling, show no offset greater than 1/32-inch between adjacent thicknesses of metal.

All steel templates shall have hardened steel bushings in holes accurately dimensioned from the centerlines of the connection as inscribed on the template. The centerlines shall be used in locating accurately the template from the milled or scribed ends of the members.

e. Holes for Ribbed Bolts, Turned Bolts, or Other Approved Bearing-Type Bolts. All holes for ribbed bolts, turned bolts, or other approved bearing-type bolts shall be subpunched or subdrilled 3/16-inch smaller than the nominal diameter of the bolt and reamed when assembled, or drilled to a steel template or, after assembling, drilled from the solid at the option of the fabricator. In any case the finished holes shall provide a driving fit as specified on the Plans or in the Special Provisions.

f. Preparation of Field Connections. Holes in all field connections and field splices of main members of trusses, arches, continuous beam spans, bents, towers (each face), plate girders, and rigid frames shall be subpunched or subdrilled and subsequently reamed while assembled or drilled full size to a steel template. Holes for field splices of rolled beam stringers continuous over floor beams or cross frames may be drilled full size unassembled to a steel template. All holes for floor beams or cross frames may be drilled full size unassembled to a steel template. All holes for floor beam and stringer field end connections shall be subpunched and reamed while assembled or drilled full size to a steel template. Reaming or drilling full size of field connection holes through a steel template shall be done after the template has been located with utmost care as to position and angle and firmly bolted in place. Templates used for reaming matching members, or the opposite faces of a single member, shall be exact duplicates. Templates used for connections on like parts or members shall be so accurately located that the parts or members are duplicates and require no match-marking.

For any connection, in lieu of subpunching and reaming or subdrilling and reaming, the fabricator may, at his option, drill holes full size with all thicknesses or material assembled in proper position.

824.03.4 Bolts and Bolted Connections Using Unfinished, Turned and Ribbed Bolts.

a. General. Bolts shall be unfinished, turned or an approved form of ribbed bolts as designed. Bolts shall have hexagonal heads and nuts and shall be of such length that they will extend entirely through the nut but not more than 1/4-inch beyond.

Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis. Bolts shall have single self-locking nuts or double nuts.

b. Unfinished Bolts. Bolts in shear shall have not more than one thread within the grip. The diameter of the unfinished bolt shall be not more than 1/16-inch smaller than the diameter of the hole.

c. Turned Bolts. Holes for turned bolts shall be carefully reamed and the bolts turned to a light driving fit, with threads entirely outside of holes, and a washer shall be used. One-quarter inch nut locks shall be used on all turned bolts unless otherwise specified on the Plans.

d. Ribbed Bolts. Special types of ribbed bolts, with drive fit, may be used if approved by the Engineer in writing, for special purposes or for field rivets in locations where, in the opinion of the Engineer, it is impractical to drive rivets. In the event that the bolt twists before drawing tight, it shall be removed, the hole rereamed and an oversize bolt used in replacement.

824.03.5 Connections Using High Strength Bolts.

a. General. This Subsection covers the assembly of structural joints using ASTM F3125 Grade A325 high strength carbon steel bolts or equivalent fasteners, tightened to a high tension. The bolts are used in holes conforming to the requirements of **Subsection 824.03.3** of this Section.

b. Bolts, Nuts and Washers. Bolts, nuts and washers shall conform to the requirements of **Subsection M.05.04.4; Fasteners**, of these Specifications.

c. Bolted Parts. The slope of surfaces of bolted parts in contact with the bolt head and nut shall not exceed 1:20 with respect to a plane normal to the bolt axis. Bolted parts shall fit solidly together when assembled and shall not be separated by gaskets or any other interposed compressible material.

When assembled, all joint surfaces, including those adjacent to the bolt heads, nuts or washers, shall be free of scale, except tight mill scale, and shall also be free of dirt, loose scale, burrs, other foreign material and other defects that would prevent solid seating of the parts.

Contact surfaces within friction-type joints shall be free of oil, paint, lacquer, rust inhibitor or galvanizing.

d. Installation. Each fastener shall be tightened to provide, when all fasteners in the joint are tight, at least the minimum bolt tension shown on the Bolt Tension Table in **Para. g** of this Subsection.

Threaded bolts shall be tightened with properly calibrated wrenches or by the turn-of-the nut method. If required because of bolt entering and wrench operation clearances, tightening by either procedure may be done by turning the bolt while the nut is prevented from rotating.

Impact wrenches, if used, shall be of adequate capacity and sufficiently supplied with air (minimum 100 psi at tool for 7/8-inch bolts) to perform the required tightening of each bolt in approximately ten seconds.

e. Washers. All fasteners shall have a hardened washer under the element (nut or bolt head) turned in tightening.

Where an outer face of the bolted parts has a slope of more than 1:20 with respect to a plane normal to the bolt axis, a smooth beveled washer shall be used to compensate for the lack of parallelism.

On diaphragm connections using oversized holes, a washer must be used over every oversized hole regardless of part turned in tightening.

f. Calibrated Wrench Tightening. Calibrated wrench tightening may be used only when installation procedures are calibrated on a daily basis and when a hardened washer is used under the element turned in tightening. Standard torques determined from tables or from formulas which are assumed to relate torque to tension are not acceptable.

When calibrated wrenches are used for installation they shall be set to provide a tension not less than 5 percent in excess of the minimum tension specified in the Bolt Tension Table in **Para. g** of this Subsection. The installation procedures shall be calibrated by verification testing at least once each

working day for each bolt diameter, length and grade using fastener assemblies that are being installed in the work. This verification testing shall be accomplished in a device capable of indicating actual bolt tension by tightening three typical bolts of each diameter, length and grade from the bolts being installed and with a hardened washer from the washers being used in the work under the element turned in tightening. Wrenches shall be recalibrated when significant difference is noted in the surface condition of the bolts, threads, nuts or washers. It shall be verified during actual installation in the assembled steel work that the wrench adjustment selected by the calibration does not produce a nut or bolt head rotation from snug tight greater than that permitted in the Nut Rotation Table in **Para. g** of this Section. If manual torque wrenches are used, nuts shall be turned in the tightening direction when torque is measured.

When calibrated wrenches are used to install and tension bolts in a connection, bolts shall be installed with hardened washers under the element turned in tightening bolts in all holes of the connection and brought to a snug tight condition. Following this initial tightening operation, the connection shall be tightened using the calibrated wrench. Tightening shall progress systematically from the most rigid part of the joint to its free edges. The wrench shall be returned to "touch up" previously tightened bolts which may have been relaxed as a result of the subsequent tightening of adjacent bolts until all bolts are tightened to the prescribed amount.

g. Turn-of-Nut Tightening. Verification testing using a representative sample of not less than three bolt and nut assemblies of each diameter, length and grade to be used in the work shall be performed at the start of work in a device capable of indicating bolt tension. This verification test shall demonstrate that the method for estimating the snug tight condition and controlling the turns from snug tight to be used by the bolting crew develops a tension not less than 5 percent greater than the tension required by the Bolt Tension Table. Periodic retesting shall be performed when ordered by the Engineer.

After snug tightening fasteners and fully compacting the connection, all bolts in the connection shall be tightened further by the applicable amount of rotation specified in the Nut Rotation Table. During the tightening operation, there shall be no rotation of the part not turned by the wrench. Tightening shall progress systematically from the most rigid part of the joint to its free edges.

Bolt Tension Table
Minimum Bolt Tension in Pounds*

Bolt Size, in Inches	A325 Bolts
½	12000
5/8	19000
¾	28000
7/8	39000
1	51000
1 1/8	56000
1 ¼	71000
1 3/8	85000
1 ½	103000

*Equal to 70 percent of specified minimum tensile strength of bolts (as specified in ASTM Specifications for tests of full-size A325 bolts with UNC threads loaded in axial tension) rounded to the nearest kip.

Nut Rotation Table

**Nut Rotation from the Snug-Tight
 Condition^{a,b} Geometry of Outer Faces of Bolted Parts**

Bolt length measured from underside of head to end of bolt	Both faces normal to bolt axis	One face normal to bolt axis and other face sloped not more than 1:20. Bevel washer not used	Both faces sloped not more than 1:20 from normal to bolt axis. Bevel washers not used.
Up to and including 4 diameters	1/3 turn	½ turn	2/3 turn
Over 4 diameters but not exceeding 8 diameters	½ turn	2/3 turn	5/6 turn
Over 8 diameters but not exceeding 12 diameters ^c	2/3 turn	5/6 turn	1 turn

Notes:

- a Nut rotation is relative to bolt, regardless of the element (nut or bolt) being turned. For bolts installed by ½ turn and less, the tolerance should be plus or minus 30 degrees; for bolts installed by 2/3 turn and more, the tolerance should be plus or minus 45 degrees.
- b Applicable only to connections in which all material within grip of the bolt is steel.
- c No research work has been performed by the Research Council Riveted and Bolted Structural Joints to establish the turn-of-nut procedure when bolt lengths exceed 12 diameters. Therefore, the required rotation must be determined by actual tests in a suitable tension device simulating the actual conditions.

h. Inspection. The Engineer will determine that all requirements of this Specification are satisfied.

The Engineer will approve the procedure for calibration of wrenches and installation of bolts and will further observe the field installation to determine that these procedures are followed.

Spot checks will be made with a manual torque wrench that has been calibrated as previously specified.

i. Load Indicator Devices. Load indicating devices may be used in conjunction with bolts, nuts and washers specified in **Subsection M.05.04.4**. Load indicating devices shall conform to the requirements of ASTM Specification for Compressible-Washer Type Direct Tension Indicators for Use with Structural Fasteners, ASTM F959, except as provided in the following paragraph.

Subject to the approval of the Engineer, alternate design direct tension indicating devices may be used provided they satisfy the requirements detailed in specifications provided by the manufacturer.

824.03.6 Welding.

a. General. Unless specified otherwise herein, all welding, welder qualifications, prequalification of weld details and inspection of welds shall conform to the requirements of the current ANSI/AASHTO/AWS D1.5 Bridge Welding Code.

Brackets, clips, shipping devices or other material not required by the Plans or Special Provisions shall not be welded or tacked to any member unless shown on the shop drawings and approved by the Engineer.

b. Qualification of Welders. All work shall be in accordance with the best modern practice using qualified welding operators. The same type of equipment as required for the execution of the actual construction work shall be used in qualifying welders and welding operators.

If the Contractor prequalifies his metal-arc welding operators according to the standard qualification procedure of the American Welding Society and certifies to the Engineer that an operator working on the structure has been prequalified previously, the Engineer may consider such operator qualified. This certificate shall state that such operator has been doing satisfactory welding of the required type within the 3-month period previous to the subject work. A certification shall be submitted for each operator and for each project, stating the name of the operator, the name and title of the person who conducted the examination, the kind of specimens, the positions of welds, the results of the test, the date of the examination and the identifying steel stamp symbol assigned. Such a certification of prequalification may also be accepted as proof that an operator of field welding is qualified, if the Contractor who submits it is properly staffed and equipped to conduct such an examination, or if the examining and testing is done by a recognized agency which is staffed and equipped for such purpose. The qualification of a welder shall not prohibit his subsequent removal from the job for poor workmanship in execution of welds.

The welder shall place his identification stamp near the welds that he has made.

Shop welding shall be done in areas sheltered from wind and weather with an ambient minimum temperature of 50°F, unless otherwise permitted by the Engineer.

c. Qualification of Welding Procedure. The Contractor shall submit a complete welding procedure specification for welding all primary members and other members on which welds are subject to calculated stress prior to proceeding with fabrication.

d. Procedures for Manual Shielded Metal-Arc Welding. The work shall be positioned for flat position welding whenever practicable.

824.03.7 Inspection of Welds.

a. General. All welding, both shop and field, shall be subject to inspection by the Engineer, in accordance with ANSI/AASHTO/AWS D1.5 Bridge Welding Code, as amended herein. The principal method of inspection shall be non-destructive testing, which may be carried out by radiographic, magnetic

particle, dye penetrant or ultrasonic methods, or any other methods designated by the Engineer. A minimum routine inspection program is outlined in **Table 1**. However, inspection shall in no way be construed to be limited to the program described.

A routine inspection program shall be established to which all welding shall be subject. This program shall involve two types of inspection.

b. Visual Inspection of Welds and Welding Operations. The Engineer shall have unlimited access to the site of welding operations, and shall be free to observe the procedure and techniques used by the Contractor on all welds. The program of visual inspection will be adapted to job conditions. The cost of visual inspection shall be borne by the State.

c. Non-destructive Testing. A routine program of non-destructive testing will be carried out on all welds (shop and field) carrying calculated stress as indicated in **Table 1** of this section.

All non-destructive testing will be performed by the State, except that the Contractor shall, at his own expense, radiograph and furnish the State one set of films of shop butt welds above specified and shall furnish all equipment and an operator at his own expense for the making of magnetic particle tests of shop fillet welds as above specified. All other costs of non-destructive inspection shall be borne by the State except that the Contractor shall furnish all labor and equipment required to move and position the various members for inspection. No additional compensation shall be granted to the Contractor for moving, handling, rehandling or positioning the members to facilitate testing.

824.03.8 Machining.

a. Edge Planing. Sheared edges of plates more than 5/8-inch in thickness and carrying calculated stress shall be planed to a depth of 1/4-inch. Re-entrant cuts shall be filleted before cutting.

b. Oxygen Cutting. Steel and weld metal may be oxygen cut, provided a smooth and regular surface free from cracks and notches is secured, and provided that an accurate profile is secured by the use of a mechanical guide. Hand cutting shall be done only where approved by the Engineer.

Mill scale and extraneous material shall be removed from the torch side of A514/A517 steel plates along the lines to be flame cut, when necessary to obviate excessive notches.

All oxygen cutting shall be in accordance with AWS D.1.5, except that occasional notches or gouges in edges of A514/A517 steel shall not be repaired by welding except under the following conditions:

1. Cutting defects not more than 3/16-inch deep in plate edges which will form the faces of a groove weld joint and which will subsequently be completely fused with the weld may be repaired by welding. Nonmetallic stringers or pipes opening to these edges shall be removed to a depth of 1/4-inch below the surface by grinding or chipping and the gouge repaired by welding. Laminations opening to these edges shall be removed to a depth of 1/2-inch below the surface by grinding and chipping and the gouge repaired by welding.

2. Cutting defects not more than 3/16-inch deep in plate edges which will form a fillet-welded corner joint shall be repaired by welding only on the part of the edge which will become the facing

surface for the joint and the fusion zone of the fillet weld. The part of the defect outside the toe of the completed fillet weld shall be removed by machining or grinding, and faired with the surface of the cut on a bevel of 1 to 6 or less.

3. All welding for these repairs shall be made by suitably preparing the defect, welding with low hydrogen electrodes not exceeding 5/32-inch in diameter, and grinding the completed weld smooth and flush with the adjacent surface to produce a workmanlike finish.

Oxygen cut edges of ASTM A440 steel and ½-inch or greater in thickness⁽¹⁾ shall be removed to a depth of at least 1/8-inch by machining or grinding except that machine flame cut edges may be used without such removal if the edges are softened after cutting; (a) by heating the cut edge uniformly and progressively to a red heat, visible in ordinary shop light (1,150 to 1,250°F) to a depth of at least 1/16-inch; or (b) by means of a post heating torch attached to and following the cutting torch with the tips, gas pressure, speed or travel, and the distance of the post heating torch from the kerf regulated to the thickness of the steel. Bend test specimens 1½-inches wide and of the full thickness of the material or with thickness reduced to 3/4-inch in accordance with Para. 6.8 of ASTM A6 and having edges flame cut and flame softened in accordance with this article shall meet the bend test requirements specified in ASTM A440 for the thickness of material under consideration.

Oxygen cut surfaces of members carrying calculated stress shall have their corners rounded to 1/16-inch radius by grinding after cutting.

Note ⁽¹⁾: ASTM A242 steel not approved for welded construction requires this treatment of oxygen cut edges in all thicknesses and with bend tests, as applicable, conforming to ASTM A242 for the thickness of material under consideration.

c. Facing of Bearing Surfaces. The top and bottom surfaces of steel slabs and base plates and cap plates of columns and pedestals shall be straight and true to provide full bearing between contact areas.

Sole plates of beams and girders shall have full contact with the flanges. Cast pedestals shall be machined on surfaces to be in contact with steel and shall be rough finished on surfaces to be in contact with masonry.

Surfaces of bronze bearing plates intended for sliding contact shall be finished. The surface of expansion bearings shall be machined in the direction of the major expansion.

The surface finish of bearing and base plates and other bearing surfaces that are to come in contact with each other or with concrete shall meet the ANSI surface roughness requirements as defined in ANSI B46.1, Surface Roughness, Waviness and Lay, Part I:

Bearing Surfaces	Roughness Requirements
Steel slabs	ANSI 2,000
Heavy plates in contact in shoes to be welded	ANSI 1,000
Milled ends of compression members, milled or ground ends of stiffeners and fillers	ANSI 500

Bridge rollers and rockers	ANSI	250
Pins and pin holes	ANSI	125
Sliding bearings	ANSI	125

d. Abutting Joints. Abutting joints in compression members and girder flanges, and in tension members where so specified on the drawings, shall be faced and brought to an even bearing. Where joints are not faced, the opening shall not exceed 3/8-inch.

e. End Connection Angles. Floor beams, stringers and girders having end connection angles shall be built to exact length back to back of connection angles. If end connections are faced, the finished thickness of the angles shall not be less than that shown on the detail drawings.

f. Pins and Rollers. Pins and rollers shall be accurately turned to the dimensions shown on the drawings and shall be straight, smooth and free from flaws. The final surface shall be produced by a fine finishing cut as specified. Pin holes shall be bored true to the specified diameter, smooth and straight, at right angles with the axis of the completed member. The distance outside to outside of holes in tension members and inside to inside of holes in compression members shall not vary from that specified more than 1/32-inch. Boring of holes in built-up members shall be done after the riveting and welding is completed. The diameter of the pin hole shall not exceed that of the pin by more than 1/50-inch for pins 5 inches or less in diameter, or 1/32-inch for pins of larger size.

Threads for all bolts and pins for structural steel construction shall conform to the American National Coarse Thread Series, Class 2, free fit, except that the pin ends having a diameter of 1-inches or more shall be threaded six threads to the inch.

Finished members shall be true to line and free from twists, bends and open joints. Shearing and chipping shall be done carefully and accurately.

g. Fit of Stiffeners. End stiffeners, stiffeners over intermediate supports of girders, and stiffener angles intended as supports for concentrated loads shall be milled or ground to secure an even bearing against the flange. Intermediate stiffeners shall fit sufficiently tight to exclude water after being painted. Fillers under stiffeners shall fit within 1/4-inch at each end.

h. Annealing and Stress Relieving. Structural members which are indicated in the Contract to be annealed or normalized shall have finished machining, boring, and straightening done subsequent to heat treatment. Normalizing and annealing (full annealing) shall be as specified in ASTM E44. The temperatures shall be maintained uniformly throughout the furnace during the heating and cooling so that the temperature at no two points on the member will differ by more than 100°F at any one time.

Members of AASHTO M270 (ASTM A709) Grades 100/100W or Grade 70W steels shall not be annealed or normalized and shall be stress relieved only with the approval of the Engineer.

A record of each furnace charge shall identify the pieces in the charge and show the temperatures and schedule actually used. Proper instruments, including recording pyrometers, shall be provided for determining at any time the temperatures of members in the furnace. The records of the treatment operation shall be available to and meet the approval of the Engineer. The holding temperature for stress relieving Grades 100/100W and Grade 70W steels shall not exceed 1100°F and 1050°F, respectively.

Members, such as bridge shoes, pedestals, or other parts which are built up by the welding sections of plate together shall be stress-relieved in accordance with the procedure of the American Welding Society Section 4.4 of the current ANSI/AASHTO/AWS D1.5 Bridge Welding Code when required by the Plans or Specifications.

824.03.9 Marking, Shipping, Delivering and Handling. Each member shall be painted or marked with an erection mark for identification and an erection diagram showing these marks shall be furnished to the Engineer.

The Contractor shall furnish to the Engineer as many copies of material orders, shipping statements, and erection diagrams as the Engineer may direct. The weights of the individual members shall be shown on the statements. Members weighing more than 3 tons shall have the weights marked thereon. Structural members shall be loaded on trucks or cars in such a manner that they may be transported and unloaded at their destination without being excessively stressed, deformed, or otherwise damaged.

Bolts, nuts and washers (where required) from each rotational-capacity lot shall be shipped in the same container. If there is only one production lot number for each size of nut and washer, the nuts and washers may be shipped in separate containers. Pins, small parts and packages of bolts, washers, and nuts shall be shipped in boxes, crates, kegs, or barrels, but the gross weight of any package shall not exceed 300 pounds. A list and description of the contained materials shall be plainly marked on the outside of each shipping container.

The loading and delivery of the structural material shall be conducted so that the metal will be kept clean and free from injury. Girders and beams shall be kept upright and shored. Long members shall be supported on skids spaced to prevent injury from deflection.

824.03.10 Erection.

a. General. The Contractor shall provide the falsework and all tools, machinery and appliances, including drift pins and fitting bolts necessary for the expeditious handling of the work. Before starting work, the Contractor shall inform the Engineer fully as to the method of erection he proposes to follow, and the amount and character of equipment he proposes to use, all of which shall be subject to the approval of the Engineer. The approval of the Engineer shall not be considered as relieving the Contractor of the responsibility for the safety of his method or equipment or from carrying out the work in full accordance with the Plans and these Specifications.

b. Transportation of Materials. The Contractor shall make the necessary arrangements for the unloading and the transporting and bear all charges for such unloading and hauling of the steel from the designated place of delivery to the point of placement. The Contractor shall unload promptly upon delivery any material delivered on railroad cars which he is required to unload, and shall be responsible for demurrage charges.

c. Storage of Materials at Site. Material to be stored shall be placed on skids above the ground. It shall be kept clean and properly drained. Girders and beams shall be placed upright and shored. Long members, such as columns and chords, shall be supported on skids placed near enough together to prevent injury from deflection. If the contract is for erection only, the Contractor shall check the material turned over to him against the shipping lists and report promptly in writing any shortage or injury discovered.

The Contractor shall be responsible for the loss of any material while in his care, or for any damage caused to it after being received by him.

d. Falsework. The falsework shall be properly designed and substantially constructed and maintained for the loads which will come upon it. The Contractor shall prepare and submit to the Engineer for approval, plans for falsework or for changes in an existing structure necessary for maintaining traffic. Approval of the Contractor's plans shall not be considered as relieving the Contractor of his primary responsibility for the adequacy of the design.

e. Straightening Bent Material (Field). The straightening of plates, angles, other shapes, and built-up members, when permitted by the Engineer, shall be done by methods that will not produce fracture or other injury to the metal. Distorted members shall be straightened by mechanical means or, if approved by the Engineer, by carefully planned procedures and supervised application of a limited amount of localized heat, except that heat straightening of AASHTO M270 (ASTM A709) Grades 70W, 100 and 100W steel members shall be done only under rigidly controlled procedures, with each application subject to the approval of the Engineer. In no case shall the maximum temperature exceed values in the following table.

Grade	Max. Temp.
Grade 70W > 6" from weld	1050°F
Grade 70W < 6" from weld	900°F
Grade 100 or 100W > 6" from weld	1100°F
Grade 100 or 100W < 6" from weld	950°F

In all other steels, the temperature of the heated area shall not exceed 1,200°F as controlled by temperature indicating crayons, liquids, or bimetal thermometers. Heating in excess of the limits shown shall be cause for rejection, unless the Engineer allows testing to verify material integrity.

Parts to be heat straightened shall be substantially free of stress and from external forces, except stresses resulting from mechanical means used in conjunction with the application of heat.

Evidence of fracture following straightening of a bend or buckle will be cause for rejection of the damaged piece.

f. Assembling Steel. The parts shall be accurately assembled as shown on the Plans and any match-marks shall be followed. The materials shall be carefully handled so that no parts will be bent, broken or otherwise damaged. Hammering which will injure or distort the members shall not be done. Bearing surfaces and surfaces to be in permanent contact shall be cleaned before the members are assembled. Splices and field connections shall have one-half of the holes filled with bolts and cylindrical pins (half bolts and half pins) before riveting.

Fitting-up bolts shall be of the same nominal diameter as the rivets, and cylindrical erection pins shall be 1/32-inch larger.

g. Bolted Connections. Surfaces of metal in contact shall be cleaned before assembling. The parts of a member shall be assembled, well pinned, and firmly drawn together before drilling, reaming, or bolting is commenced. Assembled pieces shall be taken apart, if necessary, for the removal of burrs and shavings produced by the operation. The member shall be free from twists, bends, and other deformation.

The drifting done during assembling shall be only such as to bring the parts into position and not sufficient to enlarge the holes or distort the metal.

For high-strength bolted connections, see **Subsection 824.03.5** of this Section.

h. Field Welding. When field welding is specified, it shall be performed by the electric arc process and shall conform to the same requirements as noted under **Subsection 824.03.6** with the following modifications:

Unless approved by the Engineer, welding shall not be undertaken when the ambient temperature is lower than 32°F, when surfaces are wet or exposed to rain, snow or high wind nor when the welders would be exposed to inclement conditions.

i. Misfits. The correction of minor misfits involving non-harmful amounts of reaming, cutting and chipping will be considered a legitimate part of the erection. However, any error in the shop fabrication or deformation resulting from handling and transportation which prevents the proper assembling and fitting up of parts by the moderate use of drift pins or by a moderate amount of reaming and slight chipping or cutting, shall be reported immediately to the Inspector and his approval of the method of correction obtained. The correction shall be made in his presence. The Contractor shall be responsible for all misfits, errors and injuries and shall make all the necessary corrections and replacements.

j. Removal of Falsework. Upon completion of the erection and before final acceptance, the Contractor shall remove all falsework, excavated or useless materials, rubbish and temporary buildings and restore in an acceptable manner all property, both public and private which may have been damaged during the prosecution of this work, and shall leave the bridge site and adjacent highway in a neat and presentable condition satisfactory to the Engineer.

824.03.11 Surface Preparation for Weathering Steel.

a. Cleaning After Fabrication. After completion of fabrication operations all steel surfaces shall be blast cleaned in accordance with the requirements of Steel Structures Painting Council Surface Preparation Specification No. 6 - "Commercial Blast Cleaning," SSPC-SP 6. Particular attention shall be given to all exposed surfaces including the outside face and bottom side of fascia girders and all exposed fascia welds.

b. Handling. All cleaned steel is to be handled carefully to keep it clean. The steel is to be treated with the care and concern that is required for any finished architectural product. Exposed steel shall be kept free and clean of all foreign material such as grease, oil, concrete spatter, chalk marks, crayon marks, dirt, etc. Natural oxidation of the steel shall not be considered foreign matter.

c. Final Cleaning. After the deck is in place and all formwork has been removed, the steel surfaces will be inspected for stains, discoloration, and any other deleterious materials which may affect

the weathering of the steel in a uniform manner. Stains, discoloration, and any other deleterious materials on exterior surfaces of fascia girders shall be removed by high pressure (5000-10,000 psi) water cleaning. It may be necessary to add a chemical cleaning agent, with the approval of the Engineer, to the high-pressure cleaning to remove staining. If high pressure water cleaning does not remove the stains, the Contractor shall propose an alternate cleaning method, subject to the approval of the Engineer. Once the final cleaning is accomplished no further use of the structural steel for attachment or support will be allowed.

824.03.12 Shear Connectors.

a. Welding. Stud shear connectors shall be end-welded to steel beams or girders (on axes parallel to the transverse reinforcement) with automatically timed stud welding equipment connected to a suitable power source.

If two or more stud welding guns are to be operated from the same power source, they shall be interlocked so that only one gun can operate at a time and so that the power source has fully recovered from making one weld before another weld is started.

At the time of welding, the studs and beams shall be free from moisture, rust, rust pits, scale, oil or other deleterious matter which would adversely affect the welding operation.

Welding shall not be done when the ambient temperature is below 32°F, or when the surface is wet or exposed to rain or snow.

While in operation, the welding gun shall be held in position without movement until the weld metal has solidified.

Longitudinal and lateral spacings of studs with respect to each other and to edges of beam or girder flanges shall not vary more than one-half inch from the dimensions shown on the Plans, except that a diagonal variation of 1 inch will be permitted where required to avoid obstruction with other attachments on the beam or where a new stud is being welded to replace a defective one. The minimum distance from the edge of a stud to the edge of a beam shall be 1 inch, but preferably not less than 1½-inches.

The first two studs welded on each beam or girder, after being allowed to cool, shall be bent 45° by striking the stud with a hammer. If failure occurs in the weld of either stud, the procedure shall be corrected and two successive studs successfully welded and tested before any more studs are welded to the beam or girder. The Engineer shall be promptly informed of any changes in the welding procedure at any time during construction.

If the reduction in the height of studs as they are welded becomes less than normal, welding shall be stopped immediately and not resumed until the cause has been corrected.

Before welding a new stud where a defective one has been removed, the area shall be ground smooth and flush, or in the case of a pullout of metal, the pocket shall be filled with weld metal using the shielded metal-arc process with low-hydrogen welding electrodes and then ground flush. In compression areas of flanges, a new stud may be welded adjacent to the defective area in lieu of repair and replacement on the existing weld area.

b. Inspection. If visual inspection reveals any stud which does not show a full 360- degree weld, any stud which has been repaired by welding, or any stud in which the reduction in height due to welding is less than normal, such stud shall be struck with a hammer and bent 15 degrees off the vertical. For studs showing less than 360-degree weld, the direction of bending shall be opposite to the lack of weld. Studs that crack either in the weld or the shank shall be replaced.

The Engineer may select additional studs to be subjected to the bend test specified above.

The studs tested that show no sign of failure may be left in the bent position.

If, during the progress of the work, inspection and testing indicate in the judgment of the Engineer, that the shear connectors being obtained are not satisfactory, the Contractor will be required at his expense to make such changes in welding procedure, welding equipment and type of shear connector as necessary to secure satisfactory results.

At the option of the Engineer, the manufacturer of the studs may be required at any time to submit requalification test data in accordance with the procedure as set forth in AASHTO Standard Specifications for Highway Bridges.

824.04 METHOD OF MEASUREMENT.

824.04.1 General. "Structural Steel" of the various types and configurations described in this Section will be measured by the number of pounds of each such type and configuration actually provided in accordance with the Plans and/or as directed by the Engineer.

For the purpose of measurement, such items as castings, forgings, wrought iron, special alloy steels, weld metal and special shapes for expansion joints, shear connectors, drainage fixtures, or railing shall, unless otherwise covered by Special Provisions, be considered as structural steel even when made of other materials.

824.04.2 Unit Weights. The weight of metal shall be computed on the basis of the following unit weights expressed in pounds per cubic foot:

Metal	Unit Weights
Aluminum, cast or rolled	173.0
Bronze or copper alloy	536.0
Copper, sheet	558.0
Iron, cast	445.0
Iron, wrought	487.0
Iron, malleable	470.0
Lead, sheet	707.0
Steel, cast or rolled, including alloys, copper bearing and stainless	490.0
Zinc	450.0

a. Estimated Overrun. The weights of steel shapes and plates shall be computed on the basis of their nominal weights and dimensions as shown on the approved shop drawings and after deducting for open holes. To the nominal theoretical weight of all universal mill and sheared plates and slabs, there shall be added an estimated overrun computed as one-half the "Permissible Variation in Thickness and Weight" as tabulated in ASTM A6.

b. High Strength Bolts. The weight of high strength bolt heads and nuts shall be included on the basis of the following weights:

Diameter of Bolt in Inches	Weight per 100 Bolts in Pounds
½	19.7
5/8	31.7
¾	52.4
7/8	80.4
1	116.7
1 1/8	165.1
1 ¼	212.0
1 3/8	280.0
1 ½	340.0

c. Weld Metal. The weight of weld metal to the net length called for on the drawings shall be included based on the following table:

Size of Fillet in Inches	Weight in Pounds per Foot of Weld
3/16	.08
1/4	.14
5/16	.22
3/8	.30
½	.55
5/8	.80
¾	1.10
7/8	1.50
1	2.00

If the Contract does not include erection by the fabricator, field welds shall not be included.

The weight of temporary erection bolts, shop and field paint, galvanizing and material used for shipping and erection shall not be included.

d. Castings. The weight of castings shall be computed from the dimensions shown on the approved shop drawings, deducting for open holes. To the weight will be added a 5 percent allowance for

fillets and overrun. Scale weights may be substituted for computed weights in the case of castings or of small complex parts for which accurate computation of weights would be difficult.

824.04.3 Surface Preparation for Weathering Steel. This work will not be measured separately for payment.

824.04.4 Shear Connectors. "Welded Stud Shear Connectors" will be measured by the number of each such piece actually welded to steel flanges in accordance with the Plans and/or as directed by the Engineer.

824.05 BASIS OF PAYMENT.

824.05.1 Structural Steel; Furnish, Fabricate and Erect. The accepted quantity of "Structural Steel; Furnish, Fabricate and Erect" will be paid for at the contract unit price per pound as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment, including fabricating, delivering, erecting, shop and field painting unless specified otherwise, and all incidentals required to finish the work, complete and accepted by the Engineer.

824.05.2 Structural Steel; Furnish and Fabricate. The accepted quantity of "Structural Steel; Furnish and Fabricate" will be paid for at the contract unit price per pound as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, including fabricating, delivering, and all incidentals required to finish the work, complete and accepted by the Engineer.

824.05.3 Structural Steel; Erect. The accepted quantity of "Structural Steel; Erect" will be paid for at the contract unit price per pound as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, including erection and all incidentals required to finish the work, complete and accepted by the Engineer.

824.05.4 Surface Preparation for Weathering Steel. No separate payment will be made for this work. Rather, payment will be included with the payment, and at the contract unit price per pound as listed in the Proposal, for "Structural Steel; Weathering."

824.05.5 Shear Connectors. The accepted quantity of "Welded Stud Shear Connectors" will be paid for at the contract unit price as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials, and equipment, and all incidentals required to finish the work, complete, in place and accepted by the Engineer.

SECTION 926

ANCHORED AND UNANCHORED BARRIER FOR TEMPORARY TRAFFIC CONTROL

926.01 DESCRIPTION. This work consists of providing anchored or unanchored barrier for temporary traffic control at the locations shown on the Plans or as directed by the Engineer, all in accordance with these Specifications.

Anchored barrier on bridge decks shall meet or exceed the test level as indicated on the Plans.

926.02 MATERIALS.

926.02.1 Anchored and Unanchored Barrier Units. Portland cement concrete and reinforcing shall conform to the requirements of **Subsection 909.02.1** of these Specifications. Barrier units comprising of other materials, such as steel, plastic, etc., may also be used upon approval of the Engineer.

926.02.2 Delineators. Delineators shall have a minimum of 9 square inches of reflective surface area. The unit shall be capable of being mounted on the side of barrier by use of an adhesive or other method approved by the manufacturer. Such delineators may be one of those products which appear on the Department's Approved Materials List.

926.02.3 High Strength Non-Shrink Grout. High Strength Non-Shrink Grout shall conform to the requirements of **Subsection 819.02.2** of these specifications.

926.02.4 Anchorage System. For new or existing bridge decks, the anchorage system shall meet or exceed the specific test level as specified on the Plans. Anchors shall be installed per manufacturer's recommendations.

For new bridge decks and existing bridge decks to remain, only adhesive, embedded or expansion anchors shall be used. For existing bridge decks not to remain, through-bolts may be used in lieu of adhesive or expansion anchors.

All anchors shall conform to ASTM F3125 Grade A325, all nuts shall conform to ASTM A563 and all washers shall conform to ASTM F436. All hardware shall be galvanized according to AASHTO M232. All bolts, anchors, nuts, and washers shall conform to the applicable requirements of **Subsection M.05.04.4** of these Specifications except as modified by the Plans.

926.03 CONSTRUCTION METHODS.

926.03.1 Plant Requirements. Plant requirements shall conform to the applicable provisions of **Subsection 909.03.1** of these Specifications.

926.03.2 Delineators. White delineators shall be installed on the right side of the travel way and amber delineators on the left side of the travel way. The delineators shall be installed at 50-foot intervals and they shall be located 3 inches from the top of the concrete barriers.

926.03.3 Placement. Precast concrete barrier used for temporary traffic control shall be placed on the pavement at locations indicated on the Plans or as directed by the Engineer.

Care shall be exercised during transporting, storing, hoisting and handling of the units to prevent cracking or damage. No damaged units or units that have markings painted on them from previous work-sites shall be installed. Units showing defects or damage shall be removed and replaced or repaired by the Contractor, and at no additional cost to the State if due to the Contractor's operations or negligence.

Unanchored barrier shall be carefully removed from their initial locations and transported to alternate locations where they shall be placed on the pavement as directed by the Engineer.

Anchored barrier units shall be firmly secured to the bridge deck surface. Traffic shall not be allowed near the barrier until units are firmly anchored and highway approach transitions are in place. The Contractor shall be responsible for developing details for transitioning its chosen temporary barrier system to any existing highway or bridge barrier systems.

Anchors shall be placed on the traffic side of the barrier and located such that interference with the longitudinal deck reinforcement is minimized. Prior to barrier placement, deck reinforcement shall be located and marked using a pachometer. The position of the barrier shall then be adjusted to minimize interference between the anchors and deck reinforcement.

The barrier units shall be placed in such a manner as not to leave exposed blunt ends of said units.

926.03.4 Removal. Upon completion of the work the Contractor shall completely remove and legally dispose of said barrier units from the project site. For anchored barrier, the remaining holes in the new deck shall be patched with high strength non-shrink grout.

926.03.5 Submittals. For anchored and unanchored barrier on bridge decks, the Contractor shall submit its chosen temporary barrier system, including the FHWA test level approval level and any details for transitional areas to any existing barrier systems, to the Engineer for approval.

926.04 METHOD OF MEASUREMENT.

926.04.1 Unanchored Barrier Units. "Unanchored Barrier for Temporary Traffic Control" will be measured in linear feet of continuous runs of those units actually placed in accordance with the Plans and/or as directed by the Engineer. The measured length includes all 3-inch joints between the units.

926.04.2 Anchored Barrier Units. "Anchored Barrier for Temporary Traffic Control" will be measured in linear feet of continuous runs of those units actually placed in accordance with the Plans and/or as directed by the Engineer. The measured length includes all 3-inch joints between the units.

926.04.3 Delineators. "Reflective Delineators" will be measured by the number of said units provided and installed in accordance with the Plans and/or as directed by the Engineer.

926.05 BASIS OF PAYMENT.

926.05.1 Unanchored Barrier Units. The accepted quantity of "Unanchored Barrier for Temporary Traffic Control" will be paid for at the contract unit price per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, tools, materials, equipment, initial placement of the units in accordance with the Plans, furnishing, hauling, handling, any new parts required to secure the units to the pavement or to adjacent units, subsequent removal of said units and for all incidentals required to finish the work, complete and accepted by the Engineer.

The Contractor will not be compensated for any work necessary to realign barrier units if they are disturbed or damaged as a result of the Contractor's operations.

The Contractor will be paid 90 percent of the contract unit price when the barrier units are in place. The remaining 10 percent of the contract unit price will be paid when the barrier units have been removed from the project.

926.05.2 Anchored Barrier Units. The accepted quantity of "Anchored Barrier for Temporary Traffic Control" will be paid for at the contract unit price per linear foot as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, tools, materials, equipment, initial placement of the units in accordance with the Plans, anchoring, furnishing, hauling, handling, any new parts required to secure the units to the bridge deck or transitioning to adjacent new and existing units, subsequent removal of said units, grouting and for all incidentals required to finish the work, complete and accepted by the Engineer.

The Contractor will not be compensated for any work necessary to realign barrier units if they are disturbed or damaged as a result of the Contractor's operations.

The Contractor will be paid 90 percent of the contract unit price when the barrier units are in place. The remaining 10 percent of the contract unit price will be paid when the barrier units have been removed from the project.

926.05.3 Delineators. The accepted quantity of "Reflective Delineators" for anchored and unanchored barrier units will be paid for at the contract unit price per each as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, including surface preparation and adhesives, and all incidentals required to finish the work, complete and accepted by the Engineer.

Remove **Section 929 Field Offices**, pages 9-55 to 9-62 of the RI Standard Specifications for Road and Bridge Construction and **Job-Specific Code 929.1000, Field Office Requirements**, pages AC-130 to AC-131 of the September 2018 Compilation of Approved Specifications in their entirety and replace it with the following.

SECTION 929

FIELD OFFICES

929.01 DESCRIPTION. This work consists of providing and maintaining an adequate weatherproof and ADA compliant field office for the exclusive use of the Engineer and his staff during both the contract period and approximately 180 days thereafter, all in accordance with these Specifications.

929.02 GENERAL REQUIREMENTS.

929.02.1 Location. The field office shall be located on a site that is both satisfactory to the Engineer and convenient to the project site with dedicated parking facilities.

929.02.2 Minimum Spatial Requirements. Unless specified otherwise in the Special Provisions of the Contract, the Engineer's field office or materials laboratory each shall contain a minimum of 550 square feet of floor area, at least 3 rooms, and 7 feet minimum of headroom for Small Sized Projects (contract value < \$10,000,000). For projects with a contract value \geq \$10,000,000, the Engineer's field office or materials laboratory each shall contain a minimum of 1000 square feet of floor area, at least 5 rooms, and 7 feet minimum of headroom. It shall contain a sufficient number of windows to provide at least 27 square feet of natural light.

Existing building structures meeting the above minimum requirements are considered acceptable.

929.02.3 Other Requirements.

a. The Contractor shall be responsible for arranging and complying with all necessary local and State regulatory permits and inspections, including all costs associated therewith.

b. The Engineer's field office shall be fully equipped, operational and ready for occupancy at least two (2) weeks prior to the start of actual construction operations.

c. The Contractor shall protect the field office against fire, flooding, and theft throughout the 24 hours of every day the unit is in service. The Contractor shall be responsible for the loss of any property belonging to the State that is housed therein due to theft, fire, or natural causes.

d. At the time either the field office is made available to the State, the Contractor shall furnish evidence to the Engineer that adequate insurance has been obtained which protects

the State against loss of property from theft, fire, or natural causes.

In the event of fire, theft, or equipment breakdown, all equipment involved shall be repaired or replaced by the Contractor as soon as possible. In the event the field office is destroyed or rendered untenable for any reason, it shall be replaced by the Contractor within two weeks, or as directed.

929.02.3 ADA Considerations. The Department is committed to providing equal access and opportunity for all persons in conjunction with Federal Law under Title I of the American's with Disabilities Act (ADA).

The United States Access Board defines a reasonable accommodation as; "a modification or adjustment to a job, an employment practice, or the work environment that makes it possible for a qualified individual with a disability to enjoy an equal employment opportunity."

In keeping with these directives, the Department will ensure that construction field offices will be accessible to anyone with a disability, and will also ensure that reasonable accommodation in a manner consistent with the ADA will be made to allow Department employees to be productive and efficient members of the Department's workforce.

Personnel may contact the Department's Human Resources Office with any reasonable accommodation requests.

929.03 SPECIFIC REQUIREMENTS. The field office shall be provided for as follows:

929.03.1 Outside Utilities.

a. **Electrical Power.** The Contractor shall arrange for electrical service for the field office and provide the necessary meter connections, fuse box and switches as required by the power company, all in accordance with State and local building codes. The power supply shall be 115-volt, 60-cycle current of sufficient amperage to provide for heat, interior and exterior lighting, operating office equipment and air conditioning.

b. **Sanitary Sewer Outfall.** The Contractor shall provide an adequate temporary outfall into either the municipal sanitary sewer system or an individual sewage disposal system that has been approved by the R.I. Department of Environmental Management. Disposal of sanitary wastes must conform to the applicable requirements of both the R.I. Department of Environmental Management and municipal regulations.

c. **Security.** All office trailer units shall be enclosed within a 6-foot chain link fence with adequate gates and locks. Outside area floodlighting, together with appropriate timers, shall be provided on all four sides of trailers.

929.03.1 Interior Utility Services.

a. **Lighting.** Lighting fixtures required to provide a minimum illumination of 70 foot-candles in all areas.

b. Electrical receptacles. Duplex electrical receptacles shall be provided as required in the State Building Code and as directed by the Engineer. At least $\frac{1}{3}$ of these receptacles shall be 20- amp capacity.

c. Heating and Air Conditioning. Heating and cooling equipment capable of maintaining a year round temperature between 68°F and 78°F shall be provided.

d. Sanitary Facilities. A water closet, lavatory, slop sink, vent fan, and a hot water heater of a minimum 5-gallon capacity shall be provided.

e. Network Internet Service. The Contractor shall provide and install a secure high-speed internet service capable of interconnecting and networking a combination of 8 computers, printers, copiers, and scanners, compatible with the equipment specified in **929.03.5c**. The Contractor provided high speed internet service shall have a minimum upload and download speed of 50 Mbps.

929.03.3 Doors and Windows. Doors shall be stock sizes and shall have a key-in-knob lock of an approved manufacturer. All doors shall be keyed alike. All windows shall be operative except for picture windows. Operative windows shall be either double hung or casement type equipped with adequate locks. All windows shall be provided with either shades or venetian blinds. All window openings shall be adequately screened. Windows in sanitary areas shall have frosted glass.

929.03.4 Furnishings and Equipment. Both the field office and materials laboratory shall be provided with the following and shall be new or approved by the Engineer when received by the Rhode Island Department of Transportation:

a. Furnishings.

1. One work table, 30 inches high, with a minimum of 24 square feet of work area.
2. One drafting stool.
3. Two folding-type chairs.
4. One fire resistant drawer-type safe, legal size, with combination or key lock.
5. One four-drawer legal size metal filing cabinet equipped with lock.
6. Two two-drawer (14½" x 16") metal filing cabinets.
7. Two round wastebaskets.
8. One plan rack of an approved design to be equipped with 10 rods.

b. Equipment.

1. A 5-pound CO₂ fire extinguisher of approved manufacture shall be furnished for each

200 square feet of floor area.

2. A 115-volt, 60-cycle rotating fan.
3. One First-Aid Kit.
4. One electric sanitary water cooler with refrigerated storage compartment; supply with paper cups.
5. Toilet paper holders, paper towel dispensers and soap dispensers in the toilet rooms.

929.03.5 Special Requirements for Field Office. The field office shall also be provided with the following which shall be new or approved by the Engineer when received by the Rhode Island Department of Transportation:

a. Furnishings.

1. Three office type desks, minimum top dimensions 32" x 60", with two or more drawers on each side.
2. Three swivel desk chairs.
3. Ten (10) folding-type chairs with cushioned seating area.
4. One (1) conference/meetings table, minimum top dimensions 42" x 96".

b. Equipment.

1. Two fully automatic electronic calculators with tape.
2. One (1) business grade, multi-function (Copy, Print, Scan, Fax) high volume stand-alone color/black printer. The print quality shall be 1200 by 1200 dpi minimum resolution for black and white printing and 1200 X 1200 optimized dpi for color printing. It shall be capable of printing 35 ppm (black and white) and 35 ppm (color). It shall be capable of scanning 20 ppm in PDF format @ 600 dpi, stapling and three hole punching. The printer will have wireless capability and will be able to generate a maximum size printed document of 11" x 17". The printer shall be Apple AirPrint compatible.
3. One pencil sharpener.

b. Computer Equipment. The items of computer equipment and software to be furnished, installed, tested, made operational and maintained as follows:

Tier I: Small Sized Projects (contract value < \$10,000,000)

1. Two (2) new Microsoft Surface Pro (newest version) tablet computers with an i7 processor (minimum); 256GB Solid State Drive (SSD) (minimum); 12.3" touch screen display 2736 x 1824 (267 PPI) (minimum); 16GB of RAM (minimum); Intel® Iris™ graphics;

IEEE 802.11a/b/g/n compatible; one (1) AC/DC power adaptors; and carrying bag. Installed software shall include the minimum of: Microsoft Windows 10 Pro with the latest service packs and security updates, Microsoft Office Professional (2019 or newer version) with latest service packs, Bluebeam Revu Extreme (newest version) with maintenance for the duration of the contract, and Symantec Endpoint Protection 12.1.6 (or RIDOT Approved equivalent) with subscription support for the life of the project. All software shall be purchased in the name of RIDOT, installation CDs, perpetual licenses, registration codes and user manuals/documentation shall be provided to the Engineer.

Each tablet will include a compatible Microsoft Surface Pro type cover, North American Layout (color to be determined by the engineer), a surface pen, compatible Ethernet adapters and compatible DVI, VGA, HDMI adapters. Each tablet shall be equipped with a screen protector to resist scratches made of tempered glass that does not adversely affect touch sensitivity of the tablet. Each tablet shall also be equipped with a protective case that meets military drop-test standards (MIL STD 810G 516.6) when used with Microsoft Type Cover keyboard, is Compatible with Microsoft Type Cover Keyboard, with built in Surface Pen storage, 360 degree rotating hand strap, kickstand and shoulder strap.

2. Three (3) Microsoft Surface Docks (compatible with the provided Surface Pros) with a minimum of the following: 1 Gigabit Ethernet port, 4 USB 3.0 ports, 2 Mini Display Ports, and External power supply. Each dock will include a wireless 101 key enhanced keyboards, a wireless optical mouse with scroll wheel, 8x External USB DVD±RW/CD-RW Drive, two (2) 24" (minimum) wide screen flat panel LED Monitor with 1920 x 1080 (minimum) resolution (including any required adapters) and a dual monitor stand. All necessary power cords, internet cables, electrical wires, and surge protectors shall be provided by the contractor at the direction of the Engineer.

3. The computer equipment, software, and licenses will become the property of the State at contract completion. The contractor is responsible for proper maintenance of computers and all office equipment for the life of the project which includes but is not limited to network support, computer support and peripheral support. Supplies for the project shall be provided by the contractor for both new and existing equipment which includes but is not limited to flash drives, DVDs, toner, binders, folders, paper, dry erase boards, etc. All supplies shall be provided with the delivery and set-up of the office equipment and as required by the Engineer.

4. On delivery of computer equipment to a field office, the Resident Engineer must contact the (DoIT) service desk to arrange for State inventorying. The Resident Engineer must provide the detail spec of the computer equipment, location of the field office and the completion date of the project. The Resident Engineer must also contact the service desk at the end of the project to take the computer equipment into DOT State inventory or the computer equipment needs to move from one location to another.

Tier II: Large Sized Projects (\$10,000,000 ≤ Contract value) In additional to tier I

1. Three (3) new Microsoft Surface Pro (newest version) tablet computers with an i7 processor (minimum); 256GB Solid State Drive (SSD) (minimum); 12.3" touch screen display 2736 x 1824 (267 PPI) (minimum); 16GB of RAM (minimum); Intel® Iris™ graphics; IEEE 802.11a/b/g/n compatible; one (1) AC/DC power adaptors; and carrying bag.

Installed software shall include the minimum of: Microsoft Windows 10 Pro with the latest service packs and security updates, Microsoft Office Professional (2019 or newer version) with latest service packs, Bluebeam Revu Extreme (newest version) with maintenance for the duration of the contract, and Symantec Endpoint Protection 12.1.6 (or RIDOT Approved equivalent) with subscription support for the life of the project. All software shall be purchased in the name of RIDOT, installation CDs, perpetual licenses, registration codes and user manuals/documentation shall be provided to the Engineer.

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- Each tablet will include a compatible Microsoft Surface Pro type cover, North American Layout (color to be determined by the engineer), a surface pen, compatible Ethernet adapters and compatible DVI, VGA, HDMI adapters. Each tablet shall be equipped with a screen protector to resist scratches made of tempered glass that does not adversely affect touch sensitivity of the tablet. Each tablet shall also be equipped with a protective case that meets military drop-test standards (MIL STD 810G 516.6) when used with Microsoft Type Cover keyboard, is Compatible with Microsoft Type Cover Keyboard, with built in Surface Pen storage, 360 degree rotating hand strap, kickstand and shoulder strap.
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- 2. Four (4) Microsoft Surface Docks (compatible with the provided Surface Pros) with a minimum of the following: 1 Gigabit Ethernet port, 4 USB 3.0 ports, 2 Mini Display Ports, and External power supply. Each dock will include a wireless 101 key enhanced keyboards, a wireless optical mouse with scroll wheel, 8x External USB DVD±RW/CD-RW Drive, two (2) 24" (minimum) wide screen flat panel LED Monitor with 1920 x 1080 (minimum) resolution (including any required adapters) and a dual monitor stand. All necessary power cords, internet cables, electrical wires, and surge protectors shall be provided by the contractor at the direction of the Engineer.
- 3. The computer equipment, software, and licenses will become the property of the State at contract completion. The contractor is responsible for proper maintenance of computers and all office equipment for the life of the project which includes but is not limited to network support, computer support and peripheral support. Supplies for the project shall be provided by the contractor for both new and existing equipment which includes but is not limited to flash drives, DVDs, toner, binders, folders, paper, dry erase boards, etc. All supplies shall be provided with the delivery and set-up of the office equipment and as required by the Engineer.
- 4. On delivery of computer equipment to a field office, the Resident Engineer must contact the (DoIT) service desk to arrange for State inventorying. The Resident Engineer must provide the detail spec of the computer equipment, location of the field office and the completion date of the project. The Resident Engineer must also contact the service desk at the end of the project to take the computer equipment into DOT State inventory or the computer equipment needs to move from one location to another.
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- 5. One (1) 50" (minimum) conference room monitor with 3840x2160 (minimum) resolution with video conferencing camera (minimum 1080P resolution).

Failure to furnish, install, make operational and maintain the field office equipment and peripheral equipment/accessories specified under **Subsection 929.03.5**, will result in delay to the processing of progress payments.

929.03.6 Maintenance and Custodial Service. The Contractor shall provide the following maintenance and custodial services.

a. Maintenance. All necessary repairs of damaged, defective, or vandalized parts of the field office and their associated furnishings and equipment. Maintenance operations shall continue as long as the field office is occupied by the Engineer.

b. Custodial.

1. Weekly trash removal.
2. Bi-weekly floor cleaning.
3. Bi-monthly window cleaning.
4. Snow plowing, sanding and removal of snow at parking areas and walks.
5. Replacement of supplies as required to maintain office equipment and sanitary facilities.

929.03.7 Project Sign. The field office shall be equipped with a sign for the purpose of identifying the use of the structure and providing notice against trespassing. The Field Office Identification Sign is detailed in the RI Standard Details.

929.04 METHOD OF MEASUREMENT. "Field Office" will be measured by the number of calendar months said facilities are used under the Contract.

a. Computer Equipment. The "Computer Equipment" as noted in 929.03.5c will not be measured separately for payment.

929.05 BASIS OF PAYMENT. "Field Office" will be paid for at the respective contract unit prices per month as listed in the Proposal. The prices so-stated constitute full and complete compensation for furnishing, maintaining, and subsequently removing the field office, together with all associated costs of equipment and peripherals and supplies, including all costs associated with electrical utility, heating, lighting, air conditioning, water, sewer and telecommunication connections, permits, identification sign, maintenance, custodial services and supplies, and all incidentals required to provide this service, complete and accepted by the Engineer.

a. Computer Equipment. The "Computer Equipment" as noted in 929.03.5c will not be paid for separately, but shall be considered a subsidiary obligation of the Contractor. The timely provision of field offices and/or computer equipment for use by the State is required prior to initial payment to the Contractor for any and all work performed.

CODE 929.0300

CONTRACT COMPLIANCE MANAGEMENT SYSTEM (CCMS)

DESCRIPTION. The Rhode Island Department of Transportation (RIDOT or the Department) is utilizing a computerized web-based contract compliance management system (CCMS) that will enable RIDOT to more effectively and efficiently monitor compliance of prompt payments to all subcontractors and/or civil rights requirements including, but not limited to, conformity with Rhode Island and Federal affirmative action, Disadvantaged Business Enterprise (DBE), and Minority Business Enterprise (MBE) laws and regulations. The current CCMS is known as “Prism” and will enable contractors and consultants, subcontractors and subconsultants, to more easily and accurately demonstrate compliance with prompt payments, DBE and MBE participation and utilization, On-The-Job Training (OJT), wage determinations, employment utilization and other contract compliance requirements. This program is in support of Executive Order 11246, FHWA 1273 Training Special Provision (TSP), and Special Provisions Disadvantaged Business Enterprise (DBE) contained within this contract. The Department reserves the right to designate which CCMS will be used at any time.

At minimum, the Department will require the input of payroll files for both the Prime Contractor/Consultant and all approved Sub-Contractors/Sub-Consultants with contracts in excess of \$10,000, along with invoices **that include the work item numbers (that are on the Engineer’s Estimate) which are to be entered into the comments section of the CCMS and/or Prism Invoice**. RIDOT’s CCMS Coordinator will provide the Contractor/Consultant, and Sub-Contractor/Sub-Consultant with assistance, as needed, during the term of this contract (**For more information, contact the RIDOT CCMS Coordinator as identified in the Post Qualification Letter**).

EQUIPMENT. As this is a web-based system, virtually all systems should be compatible with the CCMS as long as there is access to the internet. It is recommended that users have at a minimum Microsoft Office 2003. For any issues, contact the RIDOT CCMS Coordinator.

METHODS. After award of contract the CCMS Coordinator will set up the Prime Contractor/Consultant (Prime) and any Sub-Contractors/Sub-Consultants (Subs) that are assigned to the contract. If there are any Subs that have not used CCMS before, the CCMS Coordinator will request the necessary information so that the Sub can be set up in CCMS. The CCMS Coordinator will then contact the Sub with the necessary log-in information. For the duration of the contract, the Contractor will be required to keep CCMS updated with their weekly certified payrolls and to make sure that their Subs enter their invoices as necessary. Also, the Primes will need to show payments against the Subs’ invoices and the Sub will need to approve the payments in Prism. This requirement does not preclude the Contractor/Consultant from the obligation to maintain records as a backup to this program. The Contractor/Consultant will be subject to a review of back-up records by the Department and/or the Office of Civil Rights units (e.g. the DBE Program unit, when applicable), as deemed necessary by that office. The

Contractor/Consultant will be required to notify the RIDOT CCMS Coordinator of any errors or "bugs" which are discovered in the use of the CCMS. It is the Prime's responsibility to include these requirements in all subcontract/subconsultant agreements, and to make sure that their Subs are entering their necessary information into the CCMS.

NON-COMPLIANCE. Failure to comply with the above will lead to a notice of non-compliance and may result in delay of progress payments and/or any other sanctions deemed appropriate by RIDOT. Continued violations will lead to RIDOT determining whether to take additional actions including, but not limited to, initiating debarment or suspension proceedings.

METHOD OF MEASUREMENT. This item does not require a measurement for payment.

BASIS OF PAYMENT. Contractors/Consultants are responsible for all expenses associated with their use of the Prism System including, but not limited to, computer equipment, training, maintenance fees, updating the database, submitting the appropriate reports to the Department, and maintaining records as a backup.

Remove **Job-Specific Code 943.0200, On-the-Job Training**, pages AC-135 to AC-138 of the September 2018 Compilation of Approved Specifications in its entirety and replace it with the following.

JOB-SPECIFIC

CODE 943.0200

ON-THE-JOB TRAINING

CONTRACT TRAINING SPECIAL PROVISION (TSP)

OJT HOURS GOAL _____

NUMBER OF TRAINEES _____

This On-the-Job Contract Training Special Provision (TSP) conforms to the requirements of 23U.S.C. 140(a). Training and upgrading of minorities, women and disadvantaged individuals toward journey worker status is a primary objective of this TSP.

Minority Groups (23 CFR 230.305(2)(c)): Individuals that appear to belong or are regarded in the community as belonging to a minority group. As defined by U.S. Federal agencies for employment purposes, minority group persons in the U.S are identified as Blacks (not of Hispanic origin), Hispanics, Asian or Pacific Islanders, and American Indians or Alaskan Natives.

(a) *Minority groups (23 CFR 230.305(2)(d)).* An employee may be included in the minority group to which he or she appears to belong or is regarded in the community as belonging. As defined by U.S. Federal agencies for employment purposes, minority group persons in the U.S. are identified as Blacks (not of Hispanic origin), Hispanics, Asian or Pacific Islanders, and American Indians or Alaskan Natives. (d) *Racial/ethnic identification.* For the purpose of this regulation and any accompanying report requirements, an employee may be included in the group to which he or she appears to belong, identifies with, or is regarded in the community as belonging. However, no person should be counted in more than one racial/ethnic category. The following group categories will be used: (1) The category *White (not of Hispanic origin):* All persons having origins in any of the original peoples of Europe, North Africa, the Middle East, or the Indian Subcontinent. (2) The category *Black (not of Hispanic origin):* All persons having origins in any of the Black racial groups. (3) The category *Hispanic:* All persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race. (4) The category *Asian or Pacific Islanders:* All persons having origins in any of the original peoples of the Far East, Southeast Asia, or the Pacific Islands. This area includes, for example, China, Japan, Korea, the Philippine Islands, and Samoa. (5) The category *American Indian or Alaskan Native:* All persons having origins in any of the original peoples of North America. (e) *State* means any of the 50 States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, and the Virgin Islands.

Disadvantaged Individuals: Refer to veterans and/or individuals currently

participating of any government assistance program, for low income individuals, administered by the RI Department of Human Services.

As part of the contractor's equal employment opportunity and affirmative action programs, training shall be provided as follows:

A. The contractor shall provide on-the-job training aimed at developing full journey worker status in the type of trade or job classification involved.

B. The number of training hours assigned to this contract per this TSP will be ~~xxx~~ hours. The number of trainees to be trained under this TSP will be ___ trainees.

C. In the event that a contractor subcontracts a portion of the contract work, he/she shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided, however, that the contractor shall retain the primary responsibility for meeting the training requirements of this TSP. The contractor shall also ensure that this TSP is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

D. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journey workers in the various classifications within a reasonable area of recruitment. Prior to commencing construction, at the preconstruction meeting, the contractor shall submit to RIDOT for approval a Contractor Training Proposal (TR1 form) stating the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the contractor shall specify the anticipated starting time for training in each of the classifications. The contractor will be credited for each trainee employed by him/her on the contract work that is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter. All trainees, participating in the On-the-Job-Training (OJT) program, must be registered (TR2 form) with the Office of Civil Rights (OCR) and approved prior to starting work onsite. Unregistered trainees will not be eligible for training credit and/or training reimbursement.

GOOD FAITH EFFORTS

The contractor shall make every effort to enroll minority, women, and disadvantaged trainees (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority, women and disadvantaged trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor must furnish evidence of his/her systematic and direct recruitment efforts to the satisfaction of RIDOT prior to a determination as to whether a contractor is in compliance with the contract's TSP. These efforts are required regardless of whether the contractor is union or non-union. A contractor is not considered to have met this OJT requirement if he/she selects job classifications in the unskilled or semi-skilled positions (e.g. flaggers, laborers). This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not. Nonetheless, the contractor must

provide to the Office of Civil Rights all documented Good Faith Efforts (GFEs) prior to hiring outside the OJT program's primary objective.

No employee shall be employed as a trainee in any classification in which he/she has successfully completed a training course leading to journey worker status, or in which he/she has been employed as a journey worker. The contractor may satisfy this requirement by including appropriate questions in the employee application, or by other suitable means. Regardless of the method used, the contractor's records shall document the findings in each case.

ACCEPTABLE TRAINING

The minimum length and type of training for each classification shall be as established in the training program selected by the contractor and approved by RIDOT and the Federal Highway Administration. RIDOT and the Federal Highway Administration will approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the trainee(s) for journey worker status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with the Rhode Island apprenticeship agency recognized by the Bureau, and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, and Bureau of Apprenticeship are acceptable for the purposes of this TSP.

Training will be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from RIDOT prior to commencing work on the classification covered by the program. It is the intention of this TSP that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and is approved by the division office of the FHWA. Training at other RIDOT projects is permissible as long as the training is an integral part of an approved training program. Training verification (TR3 form) from all RIDOT projects must be submitted to OCR once a month with corresponding Monthly OJT Training reports (TR5 form). Forms listed below.

OJT TRAINING REPORTING REQUIREMENTS

NOTE: RIDOT reserves the right to revise and/or rename the reporting process and forms that it requires contractors to submit to enable RIDOT to monitor OJT compliance. Contractors agree to follow the process and use the forms that RIDOT requires.

(TR0 Form) On-the-Job-Training (OJT) Acknowledgment and Statement of Intent
Compliance (TR1 Form) Contractor Training Proposal
(TR2 Form) New Trainee
Registration (TR3 Form)
Trainee Weekly Verification
(TR5 Form) Monthly OJT
Hours Report (TR6 Form)
Trainee Status Change

(TR7 Form) Certificate of
Training
(TR9 Form) Training Goal Reconsideration Request

Forms available to print at http://www.dot.ri.gov/about/who/civil_rights.php

TRAINEES

RIDOT's On-the-Job-Training program is a hybrid of both Project-Specific and Contractor-Based FHWA programs.

Project-Specific: OJT goals are assigned to specific federal-aid contracts. Goals are to be met by the project's substantial completion date. Trainees must be enrolled under the specific project to meet its contract's TSP requirement. All training hours attained by the trainee will be applied toward the project's OJT goal.

Contractor-Based: Registered and approved OJT trainees are permitted to work among multiple RIDOT projects when necessary. However, all worked training hours will be applied toward meeting the specific project's OJT goal in which the trainee was enrolled.

REIMBURSEMENT

Except as otherwise noted below, the contractor will be reimbursed at a rate of \$6.00 per hour of onsite training provided to each trainee in accordance with an approved training program. This reimbursement will be made even if the contractor receives additional training program funds from other sources, provided such other does not specifically prohibit the contractor from receiving other reimbursement. Therefore, it is contractors' responsibility to determine if it is permissible to accept training reimbursement concurrently from other sources.

Reimbursement for offsite training will not be made to the contractor.

No reimbursement under this TSP will be made to the contractor if the failure to provide the required training, is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this TSP. Training invoices must be submitted to the Resident Engineer (RE) along with *proof* of OJT compliance (e.g. copy of the Certificate of OJT Goal Attainment (COA1), approved TR5s etc.). Contractors that failed to comply with the contract's TSP requirements will be required to contact OCR to request an OJT Good Faith Efforts Assessment (TR12 form) in order to obtain an OJT compliance determination. Contractors with a *satisfactory* compliance determination will be eligible for training reimbursement. Contractors with an *unsatisfactory* compliance determination will not be eligible for training reimbursement and may be subject to sanctions (please refer to the noncompliance procedures and sanctions section below for details).

It is normally expected that a trainee will begin training on the project as soon as feasible after start of work, utilizing the skill(s) involved, and remain on the project as long as training opportunities exist in the work classification or until the trainee has completed the training program. It is not required that all trainees be employed as such for the entire length of the contract. A contractor will have fulfilled his/her responsibilities under this TSP if he/she has provided acceptable training and number of training hours to the number of

trainees specified therein. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid the appropriate rates approved by the Departments of Labor or Transportation.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees from an approved existing program (e.g. unions' apprenticeship programs) are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification covered by this TSP.

The contractor shall furnish the trainee a copy of the program he/she will follow in providing the training. The contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed.

The contractor will provide for the maintenance of records and furnish periodic reports documenting his/her performance under this TSP.

TRAINING GOAL RECONSIDERATION REQUEST

Contractors that have evidence of implemented Good Faith Efforts (GFE), exerted to comply with the contract's TSP requirements, and that are having difficulty meeting the contract's OJT goal may submit a Training Goal Reconsideration Request (TR9 Form) requesting OCR to reassess the contract's OJT goal considering the provided GFE. The form must be submitted at least 30 days before the project's substantial completion date but not after the project's employment peak season. Documented GFE must accompany the TR9 form including a letter justifying therequest.

Contractors who fail to submit an OJT Goal Reconsideration Request and who fail to meet the OJT goal by the project's substantial completion date will be given an opportunity to submit a Corrective Action Plan (CAP) to reallocate the unmet OJT goal hours onto another RIDOT project; however, such training will not be eligible for reimbursement. Contractors that fail to comply with the CAP will be deemed non-compliant.

NON-COMPLIANCE PROCEDURES AND SANCTIONS:

A. Non-compliance with Contract's Training Special Provisions (TSP):

Flagrant disregard in meeting the contract's TSP requirements and/or fulfilling the approved Corrective Action Plan (CAP) and/or making a GFE may result in an *unsatisfactory* performance claim being submitted to the department in charge of RIDOT's bidding process and contract awards.

B. Non-compliance with EEO Provisions:

The RIDOT will impose contract sanctions and initiate appropriate legal proceedings under applicable State and Federal law, if necessary, to achieve Equal Employment Opportunity on all Federal-aid highway projects.

In the event of a contractor's noncompliance with the nondiscrimination provisions stated in the contract (TSP requirements and/or EEO regulations) and after allowing a reasonable time (15 days) for corrective action to be taken, the RIDOT may, at its own discretion, impose contract sanctions including, but not limited to, the following:

- Withholding of payments to the contractor under the contract until the contractor complies;
- Cancellation, termination, or suspension of the contract, in whole or in part
- The denial of bidding privileges and the initiation of debarment proceedings in accordance with State Procedures.
- The implementation of such sanctions shall not prevent the State of Rhode Island from entering into litigation to protect its interests and rights under the following applicable laws: Civil Right Act of 1964 as amended, Federal-aid Highway Act of 1968, 1970; Americans with Disabilities Act of 1990

CONTRACTORS' PROCEDURES

Pre-award:

A. Before contract award of any federal aid project, the contractor must have his/her Affirmative Action Plan (AAP) in place and on file with the Department of Administration/EEO Office. Contractor must also submit its AAP directly to RIDOT, if RIDOT requests.

B. Prior to any award, the Lowest Bidder/Contractor must submit a completed and signed On-the-Job-Training (OJT) Acknowledgment and Statement of Intent Compliance (TR0 form) to RIDOT's Office of Procurement during post-qualification for review by the OJT Compliance Officer of the Civil Rights (OCR).and

C. The contractor must either use a US or RI DOL approved program or an approved training program of a recognized labor organization or trades council.

Post-award:

A. Proposed On-the-Job trainees are to be listed on the Trainee Registration enrollment form for each trainee to be employed and submitted to OCR's OJT Compliance Officer for approval. Trainees hours may not be reimbursed until the Contractor Training Proposal (TR1 form) and the New Trainee Registration (TR2 form) are reviewed and approved by RIDOT.

B. The contractor orients the training foreman, superintendent and the On-the-Job Training trainee(s) to their respective responsibilities in the program and provides copies of the training guidelines for the training job classification being used.

C. The contractor shall provide a certified payroll weekly to the Resident Engineer. This payroll should distinguish clearly the trainee's training hours from regular hours worked for each On-the-Job trainee. Certified payrolls are required to be uploaded to PRISM also.

D. The contractor will monitor and submit monthly reports (TR5 & TR3 forms) for all trainees in the program, for progress, any problems or training issues to the OJT Compliance Officer.

E. The contractor must notify the Resident Engineer and the OJT Compliance Officer in writing within 5 working days of any trainee status change such as: terminations, layoffs, resignations, etc. The contractor must also submit the status change form/documentation (TR6 form) to the OJT Compliance Officer within 10 working days after the event. Subsequent to any trainee's termination or resignation, the OJT Compliance Officer will make a good faith effort determination (regarding the contractor's best efforts to replace the trainee as to whether this training position needs to be filled).

F. Contractors who assign training position(s) to subcontractors must ensure the subcontractor submits a Contractor Training Proposal (TR1 form) to the OCR. The Prime Contractor shall retain the responsibility for full compliance with OJT training requirements of the project.

G. The contractor shall furnish the trainee a copy of the program he/she will follow in providing the training. The contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed (TR7 form).

H. Once a trainee has been registered and approved by the Office of Civil Rights, the contractor, in advance, will email the Resident Engineer notifying that a specific trainee will be on the project. As part of the weekly verification of trainee hours, the contractor will be responsible to complete and submit with their certified payrolls the Trainee Weekly Verification (TR3 form) for each Trainee. The Resident Engineer will review the form, against the submitted certified payrolls and the training provided onsite and reply to the contractor's trainee officer with the signed form. On a monthly basis, the contractor must submit to the Office of Civil Rights the Monthly OJT Hours Report (TR5 form) accompanied with the completed and signed Trainee Weekly Verification forms. The OCR's OJT Compliance Officer will review the submission and document compliance. All approved documentation received from the OCR will be necessary to receive the corresponding training reimbursement.

I. Contractors will be responsible for invoicing RIDOT for the OJT training provided, and invoices must be submitted in accordance with 109.06 along with *proof* of OJT compliance (e.g., copy of the Certificate of OJT Goal Attainment (COA1), approved TR5s etc.). Contractors that failed to comply with the contract's TSP requirements will be required to contact OCR to request an OJT Good Faith Efforts Assessment (TR12 form) in order to obtain an OJT compliance determination. Contractors with a *satisfactory* compliance determination will be eligible for training reimbursement. Contractors with an *unsatisfactory* compliance determination will not be eligible for training reimbursement and may be subject to sanctions (please refer to the noncompliance procedures and sanctions section above for details).

Helpful links:

RIDOT Contract Compliance and OJT Manual
http://www.dot.ri.gov/business/contractor_compliance.php

**SECTION M.01
BORROW AND AGGREGATES**

M.01.01 COMMON BORROW. Common Borrow shall be gravelly in nature and shall conform to the minimum test data as specified below.

1. Boulders (retained on a 3-inch sieve) up to 9 inches in diameter and not exceeding threequarters of the thickness of horizontal layers placed after compaction, as specified in Subsection 202.03.2, Para. C, are included for use in construction. However, these sizes are not included in the analysis for gradation.

2. The material shall contain no more than 17 percent by weight passing the No. 200 sieve.

Common Borrow shall conform to all applicable specification requirements prior to its final placement on the project. The practice of culling deleterious or out of specification material after placement and/or grading in-place will not be allowed.

M.01.02 GRAVEL BORROW. Gravel Borrow shall consist of bank run sand and gravel or plant processed, crushed or uncrushed gravel with fine aggregate added as filler. Alternatively, Gravel Borrow may consist of selected materials which have been reclaimed from within project limits, are proportioned and processed to produce granular material for reuse as Gravel Borrow within the source project limits. Gravel Borrow, whether consisting of bank run or plant processed sand and gravel, or reclaimed and processed granular material, shall consist of sound, durable particles free from loam, clay, organic soil, vegetative matter, soft and elongate particles.

Gravel Borrow shall conform to all applicable specification requirements prior to its final placement on the project. The practice of culling deleterious or out of specification material after placement and/or grading in-place will not be allowed.

M.01.02.1 Bank Run or Plant-Processed Sand and Gravel. Bank run or plant-processed sand and gravel proposed for Gravel Borrow shall be well-graded and meet the gradation requirements specified in Column I(a), Table I in **Subsection M.01.09**. In addition, the maximum particle size shall not exceed 9 inches or three-fourths of the loose lift thickness, whichever is smaller.

M.01.02.2 Reclaimed and Processed Granular Material. Gravel Borrow may be produced by reclamation of selected materials available within project limits, or other sources as approved by the Engineer, which are suitably proportioned and processed to produce a mixture of granular particles meeting the gradation requirements specified herein. Suitable materials may include: natural granular soils, boulders, or rock; roadway subbase, base and asphalt or concrete pavement; and other concrete, stone, brick, or cinder block, recovered from existing foundations, buildings, or selected utilities.

Materials not allowed for reclamation shall include but are not limited to: rubber, plastic, glass, wood, reinforcing steel or other metallic materials; building materials which may be sources of lead or asbestos; components of septic, leaching bed, and sanitary sewer systems

including soils, pipes, and structural concrete; soils or other materials contaminated by synthetic organic or inorganic compounds, metals, or petroleum hydrocarbon products.

Processing shall crush or pulverize and break down asphalt concrete conglomerations such that only bituminous coatings remain on aggregates. All materials suitable for reuse shall be broken down such that the processed mixture shall meet the gradation requirements specified in Column Ib, Table I in Subsection M.01.09.

Reclaimed and Processed Granular Material shall conform to all applicable specification requirements prior to its final placement on the project. The practice of culling deleterious or out of specification material after placement and/or grading in-place will not be allowed.

M.01.03 PERVIOUS FILL. Pervious fill shall be clean, naturally occurring granular, bank run or plant processed soil materials. Pervious fill shall meet the gradation requirements of Column IV, Table I in **Subsection M.01.09**. The minimum permeability coefficient (k) of pervious fill shall be 1×10^{-4} c.p.s. as determined by a constant head permeometer (AASHTO T215).

M.01.04 BEDDING MATERIAL. Except as otherwise provided for in the Special Provisions and/or on the Plans, bedding material shall consist of gravel borrow, or crushed stone, or crushed or screened gravel.

Gravel borrow bedding material shall conform to the gradation requirements of Column I, Table I in **Subsection M.01.09**, except that 100 percent by weight shall pass the 1½-inch sieve.

Crushed stone and crushed or screened gravel bedding shall consist of the following gradation: 100 percent shall pass the 1½-inch sieve and zero-to-5 percent shall pass the #4 sieve.

M.01.05 COARSE AGGREGATE FOR BITUMINOUS CONCRETE AND PORTLAND CEMENT CONCRETE.

M.01.05.1 General Requirements. Aggregates accepted for State project use shall meet the applicable requirements of AASHTO M43, M80 except where amended or noted herein.

Crushed quarry rock and processed (crushed and/or screened) gravel aggregates shall be durable and shall not be weathered such that they degrade with handling and working, and shall be kept free of deleterious or organic matter.

Coarse aggregates shall meet the particular Los Angeles Abrasion and Crushing criteria specified in Table II **Subsection M.01.10** for use in asphalt or Portland cement concrete, and shall meet the criteria for soundness in **Subsection M.01.11** as measured by Sodium Sulfate loss. Aggregates shall be resistant to degradation by freeze and thaw and resistant to acid attack.

If lithology or physical character indicate that aggregates may be susceptible to degradation by freeze-thaw or acid attack, or potentially adversely reactive with Portland cement,

the Department may require additional appropriate laboratory testing be performed to demonstrate that the aggregate is suitable for the intended use.

At least once a year, the Department will test and evaluate each single-source aggregate to be provided by all producers supplying State contracts.

M.01.05.2 Single-Source Requirements and Blending Policy. Each aggregate supply submitted for use in bituminous or Portland cement concrete mixes shall have been produced from either quarry rock or natural gravel, obtained from one distinct quarry source or natural gravel source whose location and boundaries are defined.

Blends of gravel aggregates from more than one source, blends of crushed quarry rock from more than one source, or blends of gravel with crushed rock which are produced by mixing these materials at the crusher feed, shall not be acceptable for use on State projects.

Controlled blending of approved aggregates at the asphalt or concrete production plants, of different aggregate types and/or aggregates from different sources, will be allowed, provided that each aggregate type from each separate source is stockpiled in a separate bin at the production plant; and, the Los Angeles abrasion and soundness values of each aggregate type from each source meets the criteria established for that type and for the intended asphalt pavement application or concrete use. The Department would require submittal of a separate mix design for each proposed coarse aggregate blend for review prior to approval.

M.01.05.3 Definitions of Quarry Rock and Gravel Sources.

a. Quarry Rock Source. A quarry rock source shall mean a distinct, stated location at which extensive, intact, consolidated bedrock of igneous, metamorphic, or sedimentary type, is or may be exposed by clearing and removal of overlying soil and boulder cover material, and from which exposed bedrock is then extracted by blasting or other mechanical means from a "working face," bench, or floor level, and reduced in size for final crushing and processing for the production of crushed quarry rock aggregates.

b. Gravel Source. A gravel source shall mean a distinct, stated location at which clay to boulder-sized materials, which may occur as mixed-size or stratified natural deposits, are or may be exposed by clearing, stripping, and removal of vegetation, topsoil, and organic soils, and are then excavated using conventional mechanical excavating equipment, for the production of crushed and/or screened gravel aggregates.

M.01.05.4 Definitions of Aggregate Types. Coarse aggregate shall be classified as "Crushed Quarry Rock" or "Processed Gravel" as defined below.

a. Crushed Quarry Rock. Crushed quarry rock shall be coarse aggregate consisting of 100 percent crushed bedrock, produced by crushing bedrock extracted from a single-source quarry location. Crushed quarry rock aggregate shall be processed separately from overburden soil deposits, shall not contain crushed or uncrushed gravel, and shall be free of deleterious material or soft, friable particles.

b. Processed Gravel. Processed gravel shall be coarse aggregate produced by crushing and/or screening naturally occurring boulder, cobble, and gravel-sized materials extracted from a single source location. Processed gravel shall be free of deleterious material or soft, friable particles.

M.01.06 KEYSTONE. Keystone or chipstone used for keying bases and pavements and cover stone for seal coats shall consist of crushed quarry rock or crushed gravel and shall conform to the gradation requirements of either Column III or VI, Table I, **Subsection M.01.09; Gradation of Aggregates.** Abrasion and soundness shall conform to the applicable requirements of **Subsections M.01.10 and M.01.11,** respectively. Keystone shall consist of at least 90 percent crushed particles; cover stone shall consist of 100 percent crushed particles.

M.01.07 FILTER STONE. Filter stone for underdrains shall conform to the gradation requirements of Column V, Table I, Subsection M.01.09. Soundness shall conform to the applicable requirements of Subsection

M.01.11. M.01.08 FINE AGGREGATE. Fine aggregate used for asphalt or Portland cement concrete shall meet the general requirements of **Subsections M.02.02 and M.03.02.2, Para. b** of these Specifications, and shall conform to the requirements for single-source origin, production and blending as described above in **Subsection M.01.05.2.**

Fine aggregate used for filler or seal coat cover shall consist of clean, hard, durable particles that meet the requirements of AASHTO M6.

M.01.09 GRADATION OF AGGREGATES. Aggregates for use in base and subbase courses and other applications shall conform to the gradation requirements indicated in the following Table I.

Table I
Gradation - Percent Passing

Sieve Size	I		II Crushed Stone or Crushed Gravel	III	IV	V	VI
	Gravel Borrow						
	la Bank Run Proc Sand/Gravel	lb Reclaimed Processed Material	Keystone	Pervious Fill	Filter Stone	Cover Stone	
3"	60-100	100			100		
2 ¼"							
2"			100				
1 ½"		70-100	90-100				
1 ¼"							
1"			30-55	100		100	
¾"		50-85	0-25	90-100		70-85	100
½"	50-85		0-10	20-55		10-40	90-100
3/8"	45-80			0-20		0-20	30-60
#4	40-75	30-55		0-5	30-100	0-5	0-15
#8							0-5
#40	0-45						
#50		8-25					
#100			0-1				
#200	0-10	2-10			0-8		

M.01.10 ABRASION AND CRUSHING REQUIREMENTS FOR COARSE

AGGREGATES. Coarse aggregate to be used for asphalt or Portland cement concrete may be either crushed quarry rock or processed gravel meeting the abrasion and crushed particle/fracture face criteria in Table II on the following page. Abrasion resistance shall be determined by Los Angeles Abrasion Test AASHTO T96.

Table II - Los Angeles Abrasion Criteria

Portland Cement Concrete Applications:

Crushed Quarry Rock 45% max. loss
 Processed Gravel 45% max. loss
 (Crushing not required)

Bituminous Applications:

Aggregate Type	Bituminous Base/Binder Courses	Bituminous Surface & Friction Courses	Seal Coats: Keystone & Cover Stone
Quarry Rock	50% max.loss	40% max.loss	30% max.loss
Processed Gravel (Notes 1, 2, 3)	50% max.loss	40% max.loss	30% max.loss

Notes: Crushing Requirements for Processed Gravel for Asphalt

- 1) Base and binder courses: 75 percent by weight particles with one or more fracture faces.
- 2) Surface and friction courses: 95 percent by weight particles with at least one fracture face, and 75 percent by weight, particles with at least two fracture faces.
- 3) Keystone: 90 percent crushed particles; Cover stone: 100 percent crushed particles.

M.01.11 SOUNDNESS, SODIUM SULFATE. Aggregate materials shall have a maximum percentage loss of 12 percent as determined by the Sodium Sulfate Test, AASHTO T104.

Remove **Subsection M.04.02.10, Pipe Joints, b. Rubber Gaskets**, page M-22 of the RI Standard Specifications for Road and Bridge Construction and replace it with the following.

Section M.04

Drainage

M.04.02 Metal Pipe

M.04.02.10 Pipe Joints

b. Rubber Gaskets. The ring gaskets shall conform to the requirements of ASTM C443.

SECTION M.05

METALS

Mill Test Reports. The Contractor shall furnish certified copies in quadruplicate of mill test reports of metals used in the work. The finished metal products shall be properly marked and identified for easy correlation with the mill test reports. The chemical and physical properties of each heat of steel used shall conform to all the requirements of the relevant AASHTO or ASTM Specifications.

M.05.01 BAR REINFORCEMENT. All reinforcement shall be furnished as indicated on the Plans. Reinforcing bars shall be deformed and be fabricated from new billet steel and shall conform to AASHTO M31 (ASTM A615) or ASTM A706. The grade shall be 60 unless otherwise shown on the Plans.

M.05.02 WIRE REINFORCEMENT.

M.05.02.1 Wire Fabric. All steel wire fabric shall conform to either AASHTO M55 (ASTM A185) or AASHTO M221 (ASTM A497) for plain and deformed wire fabric, respectively.

M.05.02.2. Spiral Wire. Spiral wire reinforcement shall conform to AASHTO M32 (ASTM A82).

M.05.03 PRESTRESSING STEEL. Prestressing steel shall be high-strength steel wire, high-strength, seven-wire strand or high-strength alloy bars of the grade and type called for on the Plans or in the Special Provisions.

M.05.03.1 Products.

a. Wire shall be high-strength stress relieved uncoated steel wire conforming to AASHTO M204 (ASTM A421).

b. Strand shall be high-strength seven-wire low relaxation uncoated strand conforming to the requirements of AASHTO M203 (ASTM A416).

c. Bars shall be high-strength uncoated alloy bars conforming to AASHTO M275 (ASTM A722).

M.05.04 STRUCTURAL STEEL. All steels for use in main load carrying member components subject to tensile stress shall conform to the applicable Charpy V-Notch Impact Test requirements of AASHTO M270 (ASTM A709).

M.05.04.1 Products.

a. Carbon Steel and Foundation Pilings shall conform to AASHTO M270 (ASTM A709) Grade 36.

b. High-Strength Low-Alloy Steel shall conform to AASHTO M270 (ASTM A709) Grade 50 or Grade 50W.

c. High-Strength Low-Alloy Structural Steel Plate Quenched and Tempered shall conform to AASHTO M270 (ASTM A709) Grade 70W.

d. High-Yield Strength, Quenched and Tempered, Low-Alloy Steel Plate shall conform to AASHTO M270 (ASTM A709) Grades 100 or 100W.

M.05.04.2 Steels for Pins, Rollers, and Expansion Rockers.

a. Steel Bars, Carbon Cold Finished Standard Quality shall conform to AASHTO M169 (ASTM A108) Grades 1016 to 1030 inclusive for sizes 4 inches in diameter or less.

b. Steel Forgings, Carbon and Alloy for General Industrial Use shall conform to AASHTO M102 (ASTM A668) Class F for sizes to 10 inches in diameter and classes C, D, and G for sizes to 20 inches in diameter.

M.05.04.3 Structural Tubing shall be either cold formed welded or seamless tubing conforming to ASTM A500 Grade B or hot-formed welded or seamless tubing conform to ASTM A501.

M.05.04.4 Fasteners -Bolts.

NOTE: Where AASHTO M164 (ASTM A325) or ASTM A490 bolts are specified in the Standard Details, the Bridge Standard Details or elsewhere, the reference shall be taken to mean ASTM F3125 Grade A325 or Grade A490, respectively. Where AASHTO M293 washers are specified in the Standard Details, the Bridge Standard Details or elsewhere, the reference shall be taken to mean ASTM F436.

a. Carbon-Steel Bolts shall conform to ASTM A307.

b. High Strength Bolts for structural steel joints shall conform to either ASTM F3125 Grade A325 (or Grade A490). When high strength bolts are used with unpainted weathering grades of steel, the bolts shall be Type 3.

The supplier shall provide a lot number appearing on the shipping package and a certification noting when and where all testing was done, including rotational capacity tests, and zinc thickness when galvanized bolts and nuts are used.

The maximum hardness for ASTM F3125 Grade A325 bolts 1 inch or less in diameter shall be 33 HRC.

1. Proof Load Tests (ASTM F606 Method 1) are required for the bolts. Wedge tests of full size bolts are required in accordance with Section 8.3 of ASTM F3125 Grade A325. Galvanized bolts shall be wedge tested after galvanizing. Proof load tests Date:3/10/2020Page 3 of 10 (AASHTO M291) are required for the nuts. The proof load tests for nuts to be used with galvanized bolts shall be performed after galvanizing, over-tapping and lubricating.

Except as noted below, nuts for ASTM F3125 A325 bolts shall conform to ASTM A563 Grades DH, DH3, C, C3 and D or AASHTO M292 (ASTM A194) Grades 2 and 2H. Nuts for ASTM F3125 Grade A490 bolts shall conform to the requirements of ASTM A563 Grades DH and DH3 or AASHTO M292 (ASTM A194) Grade 2H.

Nuts to be galvanized (hot-dip or mechanically galvanized) shall be heat treated Grade 2H, DH or DH3.

Plain (ungalvanized) nuts shall have a minimum hardness of 89 HRB.

Nuts to be used with ASTM F3125 Grade A325 Type 3 bolts shall be of Grade C3 or DH3. Nuts to be used with ASTM F3125 Grade A490 bolts shall be of Grade DH3.

All galvanized nuts shall be lubricated with a lubricant containing a visible dye. Black bolts must be oily to touch when delivered and installed.

Washers shall be hardened steel washers conforming to the requirements of ASTM F436.

2. Identifying Marks. ASTM F3125 Grade AASHTO M164 (ASTM A325) for bolts and the specifications referenced therein for nuts require that bolts and nuts manufactured to the specification be identified by specific markings on the top of the bolt head and on one face of the nut. Head markings must identify the grade by the symbol "A 325," the manufacturer and the type, if Type 2 or 3. Nut markings must identify the grade, the manufacturer and if Type 3, the type. Markings on direct tension indicators must identify the manufacturer and Type "325." Other washer markings must identify the manufacturer and if Type 3, the type.

ASTM F3125 Grade A490 for bolts and the specifications referenced therein for nuts require that bolts and nuts manufactured to the specifications be identified by specific markings on the top of the bolt head and on one face of the nut. Head markings must identify the grade by the symbol "A 490," the manufacturer and the type, if Type 2 or 3. Nut markings must identify the grade, the manufacturer and if Type 3, the type. Markings on direct tension indicators must identify the manufacturer and Type "490." Other washer markings must identify the manufacturer and if Type 3, the type.

3. Dimensions. Bolt and nut dimensions shall conform to the requirements for Heavy Hexagon Structural Bolts and for Heavy Semi-Finished Hexagon Nuts given in ANSI Standard B18.2.1 and B18.2.2, respectively.

c. **Galvanized High-Strength Fasteners.** When fasteners are galvanized, they shall be specified to be hot-dip galvanized in accordance with AASHTO M 232 (ASTM A153) Class C or, mechanically galvanized in accordance with AASHTO M298 (ASTM B695) Class 50. Bolts to be galvanized shall be either ASTM F3125 Grade A325 Type 1 or Type 2 except that Type 2 bolts shall only be mechanically galvanized. Galvanized bolts shall be tension tested after galvanizing. Washers, nuts and bolts of any assembly shall be galvanized by the same process. The nuts should be over-tapped to the minimum amount required for the fastener assembly, and shall be lubricated with a lubricant containing a visible dye so a visual check can be made for the lubricant at the time of field installation. ASTM F3125 Grade A490 bolts shall not be galvanized.

d. **Alternative Fasteners.** Other fasteners or fastener assemblies which meet the materials, manufacturing, and chemical composition requirements of ASTM F3125 Grade A325 or Grade A490, and which meet the mechanical property requirements of the same specification in full-size tests, and which have body diameter and bearing areas under the head and nut, or their equivalent, not less than those provided by a bolt and nut of the same nominal dimensions prescribed in **Para. b.3** of this **Subsection M.05.04.4** may be used, subject to the approval of the Engineer. Such alternate fasteners may differ in other dimensions from those of the specified bolts and nuts.

Subject to the approval of the Engineer, high-strength steel lock-pin and collar fasteners may be used as an alternate for high strength bolts as shown on the Plans. The shank and head of high-strength steel lock-pin and collar fasteners shall meet the requirements of **Para. b.3** of this **Subsection M.05.04.4**.

Each fastener shall provide a solid shank body of sufficient diameter to provide tensile and shear strength equivalent to or greater than that of the bolt specified, shall have a cold forged head on one end, of type and dimensions as approved by the Engineer, a shank length suitable for material thickness fastened, locking grooves, breakneck groove and pull grooves (all annular grooves) on the opposite end. Each fastener shall provide a steel locking collar of proper size for shank diameter used which, by means of suitable installation tools, is cold swaged into the locking grooves forming head for the grooved end of the fastener after the pull groove section has been removed. The steel locking collar shall be a standard product of an established manufacturer of lockpin and collar fasteners, as approved by the Engineer.

M.05.04.5 Weld Metal shall conform to the current requirements of the ANSI/AASHTO/AWS D1.5 Bridge Welding Code.

M.05.04.6 Shear Connectors. Shear connector studs shall conform to the requirements of the Specification for Cold Finished Carbon Steel Bars and Shafting, AASHTO M169 (ASTM A108) cold-drawn bar, Grade 1018 or Grade 1020, either semi-or fully-killed. If flux-retaining caps are used, the steel for the caps shall be of a low carbon grade suitable for welding and shall comply with Cold-Rolled Carbon Steel Strip, ASTM A109.

Tensile properties as determined by tests of bar stock after drawing or of finished studs shall conform to the following requirements:

Tensile Strength (min.)	60,000 psi
Yield Strength*(min.)	50,000 psi
Elongation (min.)	20 percent in 2 inches
Reduction of area (min.)	50 percent

*As determined by a 0.2 percent offset method.

Tensile properties shall be determined in accordance with the applicable sections of ASTM A370, Mechanical Testing of Steel Products. Tensile tests of finished studs shall be made on studs welded to test plates using a test fixture similar to that shown in Figure 7.2 of the current ANSI/AASHTO/AWS D1.5 Bridge Welding Code. If fracture occurs outside of the middle half of the gauge length, the test shall be repeated.

Finished studs shall be of uniform quality and condition, free from injurious laps, fins seams, cracks, twists, bends, or other defects. Finish shall be as produced by cold drawing, cold rolling, or machining.

a. Certification. The manufacturer shall certify that the studs, as delivered, are in accordance with the material requirements of this Section. Certified copies of in-plant quality control test reports shall be furnished to the Engineer upon request.

b. Acceptance Samples. The Engineer may select at the Contractor's expense, studs of each type and size used under the Contract, as necessary for checking the requirements of this Section.

M.05.04.7 Low Alloy Nickel Copper Steel Pipe (Corrosion Resistant). This pipe shall be manufactured subject to the requirements of ASTM A53; “Welded and Seamless Steel Pipe” with the following modifications:

Carbon	0.20% maximum
Manganese	1.06% maximum
Phosphorous	0.08% maximum
Sulphur	0.05% maximum
Copper	0.75 to 1.25%
Nickel	1.60 to 2.20%

M.05.04.8 Steel Forging and Steel Shafting.

a. Steel Forgings shall conform to the Specification for Steel Forgings, carbon and alloy, for General Use, AASHTO M102 (ASTM A668, Class C, D, F, or G).

b. Cold Finished Carbon Steel Shafting shall conform to AASHTO M169 (ASTM A108) Grade 10160-10300 inclusive unless otherwise specified.

M.05.04.9 Steel Castings and Iron Castings.

a. Steel Castings for use in highway bridge components shall conform to AASHTO M192 (ASTM A486). Carbon-Steel Castings for general applications shall conform to AASHTO M103 (ASTM A27), Class 70 or Grade 70-36 steel, respectively, unless otherwise designated.

b. Chromium Alloy-Steel Castings shall conform to the Specification for Corrosion-Resistant Iron Chromium, Iron-Chromium-Nickel and Nickel-Based Alloy Castings for General Applications, AASHTO M163 (ASTM A743) Grade CA 15, unless otherwise specified.

c. Gray-Iron Castings shall conform to the Specification for Gray-Iron Castings, AASHTO M105 Class No. 30, unless specified otherwise.

d. Ductile Iron Castings for scupper grates shall conform to the requirements of ASTM A536.

e. Malleable Iron Castings shall conform to the Specification for Malleable Iron Castings, AASHTO M 06. The grade to be furnished shall be number 32510, unless otherwise specified.

f. Iron Castings shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blow holes, and other defects in position affecting their strength and value for the service intended. Castings shall be boldly filleted at angles and the arrises shall be sharp and perfect.

g. All Castings must be blast-cleaned or otherwise effectively cleaned of scale and sand so as to present a smooth, clean, and uniform surface.

M.05.04.10 Bronze or Copper-Alloy.

a. Bronze Castings shall conform to the requirements of AASHTO M107 (ASTM B22).

b. Copper-Alloys 913 or 911, or Copper-Alloy Plates shall conform to the requirements of AASHTO M108 (ASTM B100).

M.05.04.11 Aluminum Materials. Aluminum materials for structures, signs, sign and signal supports, lighting, hardware and welding materials shall conform to the specifications listed as follows:

a. Sheet and Plate Aluminum shall conform to ASTM B209, Alloy 5456-M116 for thicknesses from 0.188 inch to 1.25 inches.

b. Plate Aluminum shall conform to ASTM B209 Alloy 5086-M116 for thicknesses from 0.250 inch to 2.000 inches.

c. Extruded Aluminum Bars, Rods, Shapes and Tubes for all thicknesses shall conform to ASTM B221.

d. Aluminum Bars, Rods, and Wire for Pins, Rollers, and Expansion Rockers. When aluminum is used for pins, rollers or expansion rockers, it shall conform to the requirements of ASTM B211 Alloy 6061-T6.

e. Fasteners, Rivets and Bolts. Fasteners for aluminum connectors may be coated carbon steel bolts, ASTM A307; power driven aluminum rivets ASTM B316 Alloy 6061-T6
Date: 3/10/2020 Page 7 of 10 conforming to the requirements of MIL-R-1150F; coated high strength steel bolts ASTM F3125 325, or stainless-steel bolts ASTM F593 Group 1, 2, or 3.

f. Weld Metal. Weld metal shall conform to the requirements of American Welding Society's AWS D 1.2 Structural Welding Code -Aluminum.

g. Aluminum Castings. Aluminum permanent mold castings shall conform to the requirements of ASTM B108 Alloy A 4440-T4. Sand castings shall conform to ASTM B26.

h. Aluminum Forgings. Aluminum forgings and forging stock shall conform to the requirements of ASTM B247 Alloy 6061-T6.

i. Seamless Pipe and Seamless Extruded Tube shall conform to the requirements of ASTM B241.

j. Aluminum for Standard Structural Shapes shall conform to the requirements of ASTM B308.

k. Extruded Structural Pipe and Tubing shall conform to the requirements of ASTM B429.

M.05.04.12 Structural Materials for Corrugated Metal Structures. Materials shall conform to the following specifications:

a. Corrugated Metal Pipe and Pipe Arches shall conform to the requirements of AASHTO M36 (ASTM A760); AASHTO M245 (ASTM A762) or AASHTO M190 for steel and AASHTO M196 (ASTM B745) for aluminum.

b. Spiral Rib Metal Pipe shall conform to the same requirements as corrugated metal pipe.

c. Structural Plate Pipe. Structural plate pipe, pipe arches, and arch structures or culverts shall conform to the requirements of AASHTO M167 (ASTM A761) for steel and AASHTO M219 (ASTM B746) for aluminum.

M.05.04.13 Hardware for Timber Construction. The term hardware shall include all metal fastenings required for timber connections or for connecting timber to concrete or steel work. The following items will be considered as Hardware: bolts, tie rods, turnbuckles, washers, nuts, drift bolts, steel dowels, nails, spikes and lag screws for timber connections; steel plates used as washers; metal timber connectors of various designs; metal shear developers for composite timber and concrete structures; and anchor plates or clips for plank floors and sidewalks.

a. Steel Components. Rods, plates, eyebars, and shapes shall conform to the requirements of AASHTO M270; Structural Steel for Bridges, Grade 36 unless otherwise specified in the Special Provisions.

b. Hardware. Bolts, nuts, drift bolts, dowels, and washers may be fabricated of mild carbon steel unless otherwise specified in the Special Provisions. Washers may be cast iron or malleable iron castings.

c. Timber Connectors. Split rings as manufactured in 2½-inch and 4-inch diameters shall be fabricated of hot-rolled carbon steel that conforms to the requirements of Society of Automotive Engineers Specification SAE-1010.

Shear plates shall be fabricated of hot-rolled carbon steel that conforms to the requirements of SAE-1010 for 2 -inch diameter plates. Shear plates shall be fabricated of malleable cast iron; Grade 32510, in accordance with ASTM A47 for 4-inch diameter plates.

Spike grid connectors shall be fabricated of malleable cast iron; Grade 32510, in accordance with ASTM A47.

d. Miscellaneous Requirements. Bolts shall have either standard square, hexagonal, or dome heads, or economy type (washer) heads. Unless otherwise specified, bolts shall conform to ASTM A307; "Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile." They shall have coarse threads, Class 2 tolerance, that conform to ANSI Standard Specifications.

Nails shall be cut or round wire of standard forms. Spikes shall be cut or wire spikes, or boat spikes, as specified in the Special Provisions.

e. Galvanizing. Unless otherwise specified in the Special Provisions, all hardware and steel components shall be galvanized. Hardware shall be galvanized in accordance with AASHTO M232; "Zinc Coating (Hot-Dip) on Iron and Steel Hardware." Other steel components shall be galvanized in accordance with AASHTO M111; "Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strip."

M.05.05 GALVANIZING FOR BAR REINFORCEMENT. The bar reinforcement shall be either:

Class 1 galvanized after bar fabrication, in accordance with ASTM A767, Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement, including Supplemental Requirements S1 and S3.

Or:

ASTM A1094, Continuous Hot-Dip Galvanized Steel Bars for Concrete Reinforcement, which shall be bent after galvanizing.

Chromating is not allowed for either type of galvanizing.

Prior to galvanizing, the material shall have all grease, dirt, mortar, mill scale, injurious rust, or any other foreign substance removed.

For the purpose of these specifications, the term "injurious rust" shall be interpreted to mean rust which is not firmly bonded to the steel. Rust which is difficult to remove, even by vigorous scrubbing with a wire brush, shall be considered firmly bonded to the steel.

The galvanized threads of nuts and mechanical connectors used for assembly with galvanized bolts and reinforcement shall be tapped oversize prior to coating and need not be retapped afterwards. The minimum additional diameter for Class-2A threads galvanized to Class C is as follows:

<u>Class-2A Thread Diameter (in.)</u>	<u>Additional Diameter (in.)*</u>
7/16" and smaller:	0.016"
Over 7/16" to 1":	0.021"
Over 1":	0.031"

* applies to both pitch and minor (root) diameters, minimum and maximum limits.

Material galvanized in accordance with these specifications shall be free from any buildup of unadhered wet storage stains (white rust). These corrosion deposits, if present, shall be removed in a manner satisfactory to the Engineer prior to incorporation of the material in the work. After removal of these deposits, the coating shall have a uniform appearance free from unusual discolorations and/or surface defects, including but not limited to: uncoated spots, lumps, blisters, gritty areas, acid flux and black spots. Materials with these defects, or not meeting the finish and adherence of coating requirements as defined in the relevant ASTM specification, will be rejected and shall be immediately removed from the work site. Acceptable material shall be provided to replace rejected material at no additional cost to the State.

Zinc-Rich Paint. Zinc-rich paint used for the field application and repair of galvanized coatings shall meet the following requirements:

- A. One application of the material shall provide a dry coating thickness of at least 2.0 mils.
- B. The applied coating shall provide barrier protection and shall be anodic to steel.
- C. Application of the coating material shall be possible under shop or field conditions.
- D. The dried film shall have a minimum zinc dust content equal to 94% (by weight).

E. The brand of material used shall be approved by the galvanizer, and shall be compatible with the galvanizing, and inert in concrete.

Miscellaneous Hardware -Chairs, tie wires, nuts, bolts, washers, other devices, and miscellaneous hardware used to support, position, or fasten the reinforcement shall be made of or coated with, a non-conducting material, or galvanized. The specific hardware that the Contractor proposes to use shall be approved by the Engineer. If the specific hardware is galvanized, the hardware shall be prepared and galvanized in accordance with the requirements of both AASHTO M232 (ASTM A153) and this specification. The deflection of the hardware used to support the reinforcing bar mat shall not exceed ten percent of the specified concrete clear cover. Mechanical Couplers.

Mechanical couplers shall be on the RIDOT Approved Products list or submitted to the Engineer for approval a minimum of 15 working days prior to their use. They shall be sized to fit the reinforcing bar to be spliced and designed such that the splice connection shall meet or exceed 125% of the specified yield strength of the rebar.

M.05.06 GALVANIZING. Structural steel shall be galvanized in accordance with the Specifications for Zinc (Hot-dip-Galvanized) Coatings on iron and steel products, AASHTO M111 (ASTM A123). Fasteners and hardware items shall be galvanized in accordance with the specifications for Zinc Coating (Hot-dip) on Iron and Steel Hardware, AASHTO M232 (ASTM A153) except that high strength fasteners shall not be galvanized if hydrogen embrittlement can occur. Corrosion protection for these fasteners shall be per **Subsection 825.03.3(c)**.

M.05.07 METALIZING. Structural steel shall be metalized in accordance with C2.2, Recommended Practices for Metalizing with Aluminum and Zinc for protection of Iron and Steel of the American Welding Society.

M.05.07.1 Materials. All materials shall conform to the following requirements:

All coating shall meet current VOC emission requirements of the EPA Clean Air Act of 1977.

M.05.07.2 Blast Abrasive. Material shall be fresh, dry and sharp. The grain size shall be such as to provide a surface profile as defined in Subsection 827.03.1b. In no case may round, soft sand be used. Samples of the abrasive shall be submitted to and approved by the Engineer prior to the commencement of any work.

The Contractor shall verify that abrasive cleaning materials meet the requirements of SSPC AB2, "Cleanliness of Recycled Ferrous Metallic Abrasives," or SSPC AB 3, "Newly Manufactured or Remanufactured Steel Abrasive." The condition and cleanliness of the recycled abrasives shall be in accordance with the fabricators approved quality control program as per SSPC QP3 and/or AISC Special Paint Endorsement.

M.05.07.3 Wire. The wire used for spraying required herein shall be pure zinc or an alloy consisting of 85 percent zinc and 15 percent aluminum by weight drawn to manufacturer's recommendation for compatibility with equipment being used. The chemical composition shall be in accordance with ASTM B833.

SECTION M.07

SHEET PILING AND PILES

M.07.01 UNTREATED TIMBER SHEET PILING. Timber sheeting shall be sound spruce, Douglas fir, white or yellow Lodgepole or Ponderosa pine, or western hemlock plank, planed on one side and either tongue and grooved or splined. Timber sheeting shall not be less than nominal 4 inches thick. The properties of timber sheeting shall conform to the requirements of AASHTO M168; Structural Timber, Lumber, and Piling.

M.07.02 TREATED TIMBER SHEET PILING. Treated timber sheet piling shall conform to the requirements for untreated sheet piling as set forth above in **Subsection M.07.01**. In addition, treated sheet piling shall conform to the requirements of AASHTO M133, and the current American Wood Protection Association (AWPA) standards U1 and T1 in regard to acceptable wood species, approved preservatives, and treatment processing. Also, the wood preservative selected must be approved for the end use by the US EPA and registered for use in the state where the treated wood is produced and acceptable by current RIDEM regulations.

M.07.05 UNTREATED TIMBER PILES.

M.07.05.1 General. Timber piles shall conform to the requirements of AASHTO M168 and shall be cut from sound and live trees, preferable during the winter season. Piles shall be free from any defects which will impair their strength or usefulness for the purpose intended or that will prevent proper driving.

Unless otherwise specified, untreated timber piles shall have the bark unpeeled. Treated timber piles shall be clean-peeled so that all of the outer bark and at least 80 percent of the inner bark well distributed over the outer surface of the pile shall be removed. In order to obtain proper preservative treatment, no strips of inner bark wider than ½-inch shall remain.

All piles shall be cut above the ground swell, shall have a uniform taper from butt to tip end, and shall be free from short kinks. Knots or blemishes shall be trimmed off close and even with the body of the pile. A line from the center of the butt to the center of the tip must lie wholly within the body of the pile.

M.07.05.2 Inspection. All piles will be subject to inspection before or after shipment to the site, or both, at the option of the Engineer. Any pile that does not conform to all the requirements will be rejected.

M.07.05.3 Specific Requirements. Untreated piles shall be new Spruce, Oak, Douglas Fir, Yellow Pine, or any other species, subject to the approval of the Engineer, which will withstand the specified driving without injury.

Butt and tip dimension for various lengths of piles shall be set forth in the following table:

Length	Minimum Dimension 3 Feet from Butt	Tip Diameter Dimension
Up to 40 feet	12 inches	8 inches
	12 inches	7 inches
	13 inches	6 inches

For all piles the maximum dimension 3 feet from the butt shall be 20 inches. Measurements are under the bark in all cases. Where the piles are to support a concrete cap, the maximum butt dimensions shall be 6 inches less than the designated width of the concrete cap. Where piles are to be in line in a bent, all piles in the bent shall be of uniform size to permit the proper fastening of the bracing. Cutting of piles to accommodate the bracing will not be permitted.

M.07.06 TREATED TIMBER PILES. Treated timber piles shall conform to the requirements as set forth above in **Subsections M.07.05.1** and **M.07.05.2**.

M.07.06.1 Specific Requirements. Preservative treatment shall conform to the requirement of AASHTO M133 and the current American Wood Protection Association (AWPA) standards U1 and T1 in regard to acceptable wood species, approved preservatives, and treatment processing. Also, the wood preservative selected must be approved for the end use by the US EPA and registered for use in the state where the treated wood is produced and acceptable by current RIDEM regulations..

SECTION M.08

FENCE AND GUARDRAIL

M.08.04 TIMBER RAIL. The timber rail shall be cut from the specified grade for dry, well seasoned and dressed Southern Yellow Pine, spruce or fir, which shall meet the applicable requirements of AASHTO M168.

Where preservative treatment is specified this shall conform to the requirements of AASHTO M133 and the current American Wood Protection Association (AWPA) standards U1 and T1 in regard to acceptable wood species, approved preservatives, and treatment processing. Also, the wood preservative selected must be approved for the end use by the US EPA and registered for use in the state where the treated wood is produced and acceptable by current RIDEM regulations.

M.08.06 FENCE POSTS. Wood posts shall conform to the details and dimensions indicated on the Plans. All wood posts shall be, peeled and with ends cut square or as indicated on the Plans. Posts shall conform to AASHTO M168. The posts shall be straight and all knots trimmed flush with the surface. Where treated posts are called for, the kind and type of treatment shall conform to the requirements of AASHTO M133 and the current American Wood Protection Association (AWPA) standards U1 and T1 in regard to acceptable wood species, approved preservatives, and treatment processing. Also, the wood preservative selected must be approved for the end use by the US EPA and registered for use in the state where the treated wood is produced and acceptable by current RIDEM regulations.

All dimension timber and lumber required for fences or gates shall be sound, straight and free from knots, splits and shakes, and shall conform to AASHTO M168. It shall be of the species referenced in AASHTO M133 or AWPA U1 standards and grades indicated on the Plans and shall be dressed and finished on four sides.

Steel posts shall be galvanized in accordance with AASHTO M 111. Fittings, hardware and other appurtenances not specifically covered by the Plans and Specifications shall be standard commercial grade, and in accord with current standard practice.

M.08.07 GUARDRAIL POSTS. Railing posts shall be of either wood, steel or concrete as may be specified or shown.

M.08.07.1 Wood Posts. Wood posts shall be fabricated from an approved or specified timber species and shall be of the quality, diameter or section, and length as specified or as shown on the Plans. When treated posts are specified, they shall be fabricated before treatment. Timber preservatives and preservative treatment shall conform to the requirements of **Subsection M.08.06.**

Remove **Subsection M.11, Timber**, pages M-45 to M-46 of the RI Standard Specifications for Road and Bridge Construction in its entirety and replace it with the following.

SECTION M.11

TIMBER

M.11.01 SAWN LUMBER. All timber used for construction shall be sawn lumber that meets both the classification and grading requirements for stress graded structural species and the following special requirements.

M.11.01.4 Structural Lumber shall be American Standard Lumber manufactured and graded in accordance with the latest edition of the ALS PS 20. All such lumber shall be grade-marked in accordance with both the requirements of that standard and the applicable grading rules agency.

M.11.01.5 Sawn Lumber and Timber shall conform to AASHTO M168; "Standard Specification for Wood Products."

M.11.03 PRESERVATIVE TREATMENT. The preparation, process, amount, and type of preservative treatments shall conform to the requirements of Section 17; Division II of the AASHTO Standard Specifications for Highway Bridges. These requirements shall apply to both the wood preservatives and the preservative treatments of dimensional lumber, timber, posts, beams, stringer, and laminated members indicated on the Plans or in the Special Provisions.

The preservative treatment of structural timber and lumber shall be provided by the pressure process and, unless otherwise provided by the Special Provisions, shall conform to the requirements of AASHTO M133 and the current American Wood Protection Association (AWPA) standards U1 and T1 in regard to acceptable wood species, approved preservatives, and treatment processing. Also, the wood preservative selected must be approved for the end use by the US EPA and registered for use in the state where the treated wood is produced and acceptable by current RIDEM regulations.