



**MISSOURI
HIGHWAYS and TRANSPORTATION
COMMISSION**

JEFFERSON CITY, MISSOURI

**GENERAL PROVISIONS AND
SUPPLEMENTAL SPECIFICATIONS TO 2020
MISSOURI STANDARD SPECIFICATIONS FOR
HIGHWAY CONSTRUCTION**

Effective January 1, 2021

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**MISSOURI HIGHWAY AND TRANSPORTATION
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GENERAL PROVISIONS

SECTION 404 NATIONWIDE PERMIT GENERAL CONDITIONS

04/17

General Conditions. The following general conditions shall be followed in order for authorization by a Nationwide Permit (NWP) to be valid. Permit authorization from U.S. Army Corps of Engineers (USACE) may have additional conditions that will be binding to the project. The contractor shall refer to the permit authorization letter included in the contract.

1.0 Navigation. No activity shall cause more than a minimal adverse effect on navigation.

2.0 Aquatic Life Movements. No activity shall substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3.0 Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practical. Activities that result in the physical destruction (e.g., through excavation, fill or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4.0 Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5.0 Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.) Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

6.0 Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

7.0 Adverse Effects from Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

8.0 Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

9.0 Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

10.0 Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures shall be taken to minimize soil disturbance.

11.0 Soil Erosion and Sediment Controls. Appropriate erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the US during periods of low-flow or no-flow.

12.0 Removal of Temporary Fills. Temporary fills must be completely removed in their entirety and the affected areas returned to the pre-construction elevations. The affected areas must be revegetated, as appropriate.

13.0 Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation, or study status.

14.0 Tribal Rights. No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

15.0 Endangered Species No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which “may affect” a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have “no effect” on listed species or critical habitat, or until ESA section 7 consultation has been completed.

16.0 Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether “incidental take” permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

17.0 Historic Properties. In cases where the USACE District Engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

18.0 Mitigation. The project must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the U.S. to the maximum extent practicable at the project site (i.e., on site).

19.0 Regional and Case-by-Case Conditions. The contractor’s activity shall comply with any regional conditions that may have been added to the contract by the USACE Division Engineer, (see 33 CFR 330.4(e)), and with any case-specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its Section 401 water quality certifications.

20.0 Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a USACE federally authorized Civil Works project (a “USACE project”), the prospective permittee must submit a preconstruction notification. See paragraph (b)(10) of general condition 32. An activity that requires Section 408 Permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the USACE District Engineer issues a written NWP verification.

21.0 Section 404 Conditions. In addition to the General Conditions, the following conditions will apply only to activities that involve the discharge of dredged or fill material into waters of the US, and shall be followed to maintain compliance with the NWP authorization.

21.1 Section 404 Nationwide Permit No. 3.

21.1.1 The repair, rehabilitation, or replacement of any previously authorized, currently serviceable, structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for the fill in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in material, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. This NWP also authorizes the removal of previously authorized structures or fills. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project. This NWP also authorizes the removal of accumulated sediment and debris within, and in the immediate vicinity of, the structure or fill. This NWP also authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the district engineer, provided the permittee can demonstrate funding, contract, or other similar delays.

21.1.2 This NWP also authorizes the removal of accumulated sediments and debris outside the immediate vicinity of existing structures (e.g., bridges, culverts road crossings, water intake structures, etc.). The removal of sediment is limited to the minimum

necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend farther than 200 feet in any direction from the structure. This 200 foot limit does not apply to maintenance dredging to remove accumulated sediments blocking or restricting outfall and intake structures or to maintenance dredging to remove accumulated sediments from canals associated with outfall and intake structures. All dredged or excavated materials must be deposited and retained in an area that has no waters of the United States unless otherwise specifically approved by the district engineer under separate authorization.

21.1.3 This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the maintenance activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. After conducting the maintenance activity, temporary fills must be removed in their entirety and the affected areas returned to preconstruction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

21.2 Section 404 Nationwide Permit No. 12. Activities required for the construction, maintenance and repair of utility lines and associated facilities in waters of the U.S. shall be as follows.

21.2.1 Utility lines. This NWP authorizes discharges of dredged or fill material into waters of the United States and structures or work in navigable waters for crossings of those waters associated with the construction, maintenance, or repair of utility lines, including outfall and intake structures. There must be no change in pre-construction contours of waters of the United States. A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, and telegraph messages, and internet, radio and television communication. The term "utility line" does not include activities that drain a water of the United States, such as drainage tile or french drains, but it does apply to pipes conveying drainage from another area. Material resulting from trench excavation may be temporarily sidecast into waters of the U.S. for no more than three months, provided that the material is not placed in such a manner that it is dispersed by currents or other forces. The USACE District Engineer may extend the period of temporary side casting for no more than a total of 180 days, where appropriate. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench. The trench cannot be constructed or backfilled in such a manner as to drain waters of the U.S. (e.g., backfilling with extensive gravel layers, creating a french drain effect). Any exposed slopes and stream banks shall be stabilized immediately upon completion of the utility line crossing of each waterbody.

21.2.2 Utility line substations. This NWP authorizes the construction, maintenance, or expansion of substation facilities associated with a power line or utility line in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not result in the loss of greater than 1/2-acre of waters of the United States.

21.2.3 Foundations for Overhead Utility Line Towers, Poles, and Anchors. This NWP authorizes the construction or maintenance of foundations for overhead utility line towers, poles, and anchors in all waters of the U.S., provided the foundations are the minimum size necessary and separate footings for each tower leg (rather than a larger single pad) are used where feasible.

21.2.4 Access Roads. This NWP authorizes the construction of access roads for the construction and maintenance of utility lines, including overhead power lines and utility line substations, in non-tidal waters of the US, provided the activity, in combination with all other activities included in one single and complete project, does not cause the loss of greater than 1/2 acre of non-tidal waters of the U.S. Access roads shall be the minimum width necessary. Access roads must be constructed so that the length of the road minimizes any adverse effects on waters of the US and must be as near as possible to preconstruction contours and elevations (e.g., at grade corduroy roads or geotextile/gravel roads). Access roads constructed above preconstruction contours and elevations in waters of the U.S. must be properly bridged or culverted to maintain surface flows. This NWP authorizes, to the extent that Department of the Army authorization is required, temporary structures, fills, and work necessary for the remediation of inadvertent returns of drilling fluids to waters of the United States through sub-soil fissures or fractures that might occur during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines. These remediation activities must be done as soon as practicable, to restore the affected waterbody. District engineers may add special conditions to this NWP to require a remediation plan for addressing inadvertent returns of drilling fluids to waters of the United States during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines. This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the utility line activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. After construction, temporary fills must be removed in their entirety and the affected areas returned to preconstruction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

21.3 Section 404 Nationwide Permit No. 13. The following bank stabilization activities will be necessary for erosion prevention provided the activity meets all of the following criteria.

21.3.1 No material is placed in excess of the minimum needed for erosion protection.

21.3.2 The bank stabilization activity is no more than 500 feet in length.

21.3.3 The activity will not exceed an average of one cubic yard per running foot as measured along the length of the treated bank, below the plane of the ordinary high water mark or the high tide line, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in no more than minimal adverse environmental effects.

21.3.4 No material is placed in any special aquatic site, including wetlands. Special aquatic sites include wildlife sanctuaries and refuges, wetland, mudflats, vegetated shallow and riffle and pool complexes.

21.3.5 No material is of the type, or is placed in any location, or in any manner, to impair surface water flow into or out of any waters of the U.S.

21.3.6 No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas).

21.3.7 Native plants appropriate for current site conditions, including salinity, must be used for bioengineering or vegetative bank stabilization.

21.3.8 This NWP shall not be used for the channelization of a water of the U.S.

21.4 Section 404 Nationwide Permit No. 14. Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the U.S. If the activity meets the following criteria.

21.4.1 The discharge does not cause the loss of greater than 1/2-acre of waters of the US.

21.4.2 Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

21.4.3 This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to preconstruction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

21.5 Section 404 Nationwide Permit No. 15. Discharges of dredged or fill material incidental to the construction of bridges across navigable waters of the U.S., including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills provided the construction of the bridge structure has been authorized by the U.S. Coast Guard under Section 9 of the Rivers and Harbors Act of 1899 or other applicable laws. Causeways and approach fills are not included in this NWP and will require a separate Section 404 permit.

21.6 Section 404 Nationwide Permit No. 23. Activities undertaken, assisted, authorized, regulated, funded, or financed, in whole or in part, by another Federal agency or department where that agency or department has determined, pursuant to the Council on Environmental Quality's implementing regulations for the National Environmental Policy Act (40 CFR Part 1500 et seq.), that the activity is categorically excluded from the requirement to prepare an environmental impact statement or environmental assessment analysis, because it is included within a category of actions which neither individually nor cumulatively have a significant effect on the human environment, and the USACE Office of the Chief of Engineers (ATTN: CECW-OR) has concurred with that agency's or department's determination that the activity is categorically excluded and approved the activity for authorization under NWP23.

21.7 Section 404 Nationwide Permit No. 33. Temporary structures, work and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites; provided that the associated primary activity is authorized by the USACE or the U.S. Coast Guard. This NWP also authorizes temporary structures, work, and discharges, including cofferdams, necessary for construction activities not otherwise subject to the Corps or U.S. Coast Guard permit requirements. Appropriate measures shall be taken to maintain near normal downstream flows and to minimize flooding. Fill must consist of materials, and placed in a manner that will not be eroded by expected high flows. The use of dredged material may be allowed if the USACE District Engineer determines that it will not cause more than minimal adverse effects. Following completion of construction, temporary fill must be entirely removed to areas an area that has no waters of the U.S., dredged material must be

returned to its original location, and the affected areas must be restored to pre-construction elevations. Cofferdams shall not be used to dewater wetlands or other aquatic areas changing the use of these areas. The affected areas must also be revegetated, as appropriate. This permit does not authorize the use of cofferdams to dewater wetlands or other aquatic areas to change their use. Structures left in place after cofferdams are removed will require a Section 10 permit if located in navigable waters of the U. S. (See 33 CFR, Part 322).

SECTION 401 WATER QUALITY CERTIFICATION CONDITIONS

04/17

1.0 Description. When a Clean Water Act Section 404 Nationwide Permit is in effect, the contractor is automatically permitted to perform this work under a Water Quality Certification (Section 401) by the Missouri Department of Natural Resources (MDNR). The contractor shall adhere to the following conditions:

1.1 Temporary stream crossings will be designed so that no drops or dams are created that impede the passage of aquatic life.

1.2 Stream channel modifications should be avoided as much as possible and, if needed, will be minimized. Where modifications are necessary for highway design safety or protection of state infrastructure, they will be designed using scientific guidelines, such as natural channel design.

1.3 The following materials will not be specified or used for bank stabilization: earthen fill, gravel, fragmented asphalt, broken concrete with exposed rebar, large slabs of unbroken concrete, tires, vehicle bodies, liquid concrete including grouted riprap, or any material containing chemical pollutants.

1.4 During construction, clearing of vegetation will be kept to the minimum necessary to accomplish the project.

1.5 Petroleum products, hazardous chemicals, hazardous wastes, equipment, construction material and solid waste will not be stored after construction working hours below the ordinary high water mark.

1.6 Equipment will not be operated in wetland or stream areas, except where permitted, expressed by the project plans or the engineer in writing. Petroleum products will not be stored in waters of the state.

1.7 Riparian areas and stream banks will be restored to a stable condition as soon as possible after final contouring.

1.8 Work done in streams shall be conducted during low flows whenever possible.

1.9 Petroleum products spilled into any water or in areas where material could enter a water will be cleaned up immediately and disposed of properly. Any such spills of petroleum shall be reported as soon as possible, but no later than 24 hours after discovery to the MDNR, Environmental Emergency Response number at (573) 634-2436.

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM REQUIREMENTS

04/20

See Job Special Provisions.

TRAINING PROVISION

1.0 Description. This provision supplements subparagraph 7(e) of the Contract Provision entitled "Standard Federal Equal Opportunity Construction Contract Specification" (Executive Order 11246)", and in the implementation of CFR Part 230, Subpart A, Appendix B.

2.0 Training Requirements. As part of the contractor's equal employment opportunity affirmative action program, training shall be provided as follows.

2.1 The contractor shall provide on-the-job training aimed at developing full journeymen in the type of trade or job classification

involved.

2.2 The number of trainee hours to be provided under this provision will be specified in the bidding documents.

2.3 Trainee goals will be set in 1,000 hour increments or 1 slot (person). For example, if the trainee goal on the project is 2,000 hours a maximum of 2 trainees will be approved for the project. In the event a trainee leaves the project for valid reasons the trainee shall be replaced as soon as possible. No apprentice/trainee can be assigned less than 500 hours on a contract. Providing less than 500 hours is not considered to be beneficial training nor helping to achieve journey-level status. Therefore, a trainee/apprentice, regardless of craft, must have been trained on the contract for at least 500 hours to be eligible for reimbursement. However, the contractor may transfer the trainee, with MoDOT's approval, to another MoDOT highway construction project in order to continue the training. Upon reaching the 500 hours, the contractor will be compensated as noted herein. If the enrollee is transferred to a non-federal project, MoDOT, upon availability of funding, may have the option of reimbursing the contractor for those hours completed that achieve the 500-hour minimum and for any hours that continue the successful training of the individual(s). The same documentation will be required to be submitted in order to determine if hours will be approved. However, if the trainee is moved to another federally funded enhancement, then a "change order" could be requested for the additional hours, and thus offer the Contractor the necessary credit so as to accomplish the 500 hour plateau. FHWA and MoDOT will only approve training programs meeting the requirements of the Training Special Provisions (TSP). A program will be approved if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee for journeyman 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 a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training will also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts.

2.4 When a contractor subcontracts a portion of the contract work, the contractor shall determine how many, if any, of the trainee hours are to be trained by the subcontractor, provided, however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this provision.. The contractor shall also insure this training provision 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.

2.5 The number of trainee hours shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing construction, the contractor shall submit to the engineer for approval a trainee notification for each individual they intend to train on the project. The contractor will be credited for the hours worked by each trainee employed on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter. If the trainee goal on the project is 1,000, no more than two trainees will be approved for the project. Each individual must complete at least 500 hours before reimbursement or hour will be counted towards meeting the goal. In the event a trainee leaves the training program prior to completing the minimum 500 hours the External Civil Rights Division will determine if that individual can be replaced on the project.

2.6 Training and upgrading of minorities and women toward journeyman status is a primary objective of this provision. Accordingly, the contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor shall be responsible for demonstrating the steps taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with this provision. 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.

2.7 No employee shall be employed as a trainee in any classification in which the employee has successfully completed a training course leading to journeyman status or in which the employee has been employed as a journeyman. The contractor shall 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.

2.8 The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the engineer and FHWA. A program will be approved if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyman 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 a state apprenticeship agency recognized by the Bureau of apprenticeship and training programs approved, but not necessarily sponsored by, the Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training, will also be considered acceptable provided the training is being administered consistent with the equal employment obligations of Federal-aid highway construction contracts.

2.9 Approval or acceptance of a training program shall be obtained from the engineer prior to beginning work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training will be permissible in lower level management positions, such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications and must be approved by FHWA. Training in the laborer classification may be permitted, provided significant and meaningful training is provided and approved by the engineer. Some offsite training will be permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

2.10 Except as otherwise noted below, the contractor will be reimbursed \$10.00 per hour of training given an employee in the contract in accordance with an approved training program. As approved by the engineer, reimbursement will be made for training persons in excess of the number of trainee hours specified in the contract. Reimbursement will be made even though the contractor receives additional training program funds from other sources, provided such other sources do not specifically prohibit the contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the contractor when the trainees are concurrently employed on a federal-aid project and the contractor does one or more of the following, and contributes to the cost of the training, provides instruction to the trainee, or pays the trainee's wages during the offsite training period. In order receive the reimbursement the trainee must complete at least 500 hours on the project

2.11 No payment will be made to the contractor if either failure to provide the required training or failure to hire the trainee as a journeyman is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this provision. It is normally expected that a trainee will begin training on the project as soon as feasible after start of work, utilizing the skill involved and remain on the project as long as training opportunities exist in the trainee's work classification or until the trainee has completed the training program. It is not required that all trainees be on board for the entire length of the contract. The contractor's responsibilities under this provision will be fulfilled if the contractor has provided acceptable training for the number of trainee hours specified.

2.12 Trainees shall 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 in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the U.S. Department of Labor or Transportation in connection with the existing program will apply to all trainees being trained for the same classification who are covered by this provision.

2.13 Contractor may choose to transfer trainee hours worked on another project, whether MoDOT or not. The contractor must submit monthly trainee reports for that project to the RE Office where the hours will be credited. The contractor must submit with the monthly trainee reports, copies of the certified payrolls so the RE Office can verify the number of hours worked on the project, as well as the wage the trainee was being paid. Once the RE reviews the monthly reports, copies of the monthly reports should be sent to the External Civil Rights Division. The RE Office should include with the report a note indicating the hours that are being transferred from the other project. Both job numbers must be included in the note.

2.14 When the job is 50% complete the contractor must have at least 50% of the trainee hours assigned on that job completed. The percentage of job completion is based on the total value of the contract paid to the Contractor. The remaining amount of the hours must be completed before the completion of the project or the Contractor will be subject to liquidated damages unless a GFE is submitted to and approved by the External Civil Rights Division.

2.15 If the training hours have not been obtained and a GFE has not been displayed upon project completion, the Contractor will be assessed liquidated damages in the amount of \$20.00 per hour for those hours not realized. For instance, if the project goal was 1,000 hours and only 450 hours were met, then liquidated damages would be assessed at $550 \times \$20.00 = \$11,000.00$.

2.16 In the event the External Civil Rights Division denies the Good Faith Effort (GFE) submitted by the contractor, the contractor shall have the right to an Administrative Reconsideration Hearing. The request for an Administrative Reconsideration Hearing must be made within seven (7) days of the receipt of the denial letter. The Administrative Reconsideration Committee may be constituted, as MoDOT deems appropriate and fair, provided no committee member on the Reconsideration Committee shall have taken part in the original MoDOT determination that the contractor failed to meet the OJT contract goal and/or failed to make adequate good faith efforts to do so.

2.17 If the Administrative Reconsideration Committee does not find the contractor met the OJT contract goal, and/or does not find the contractor made adequate and sufficient good faith efforts to do so, then the Administrative Reconsideration Committee will recommend that liquidated damages as outlined in the non-compliance sanctions sections of the OJT Training Special Provision will be carried out. If the Administrative Reconsideration Committed does find that the contractor has met a good faith effort (GFE), then no liquidated damages will be assessed.

2.18 If the Contractor does not achieve the full OJT goal, they will not receive partial credit for hours completed. For instance, if the goal on the project was 1,000 hours and only 450 were convened, then no reimbursement will be given for any hours fulfilled.

If the goal on the project is 2,000 hours and only 1,500 hours are completed and no GFE is demonstrated, the contractor will receive credit for the 1,500 hours and also be assessed liquidated damages in the amount of the 500 hours there were not met.

2.19 The contractor shall furnish to the trainee a copy of the training program the contractor will follow in providing the training. The contractor shall provide each trainee and the resident engineer with a certification showing the type and length of training satisfactorily completed.

2.20 The contractor shall provide for the maintenance of records and furnish monthly reports documenting the contractor's performance under this provision. Monthly reports shall include at least the following information:

- Contractor's name and address
- Period that the report covers
- Job Number, Description, and Federal Aid number
- Information for each employee being trained on the project, including:
 - Name
 - Social Security Number
 - Trade/craft
 - Pay percent, based on portion of training complete (if applicable)
 - Journeyman's full prevailing wage applicable
 - Trainee wage
 - Hours this period
 - Cumulative hours for the project
- Total trainee hours for the project for this period
- Cumulative trainee hours for the project

2.21 When a contractor submits a trainee who is economically disadvantaged the following information should be submitted with the trainee notification to verify this status:

- The previous year's tax return verifying the individual's income is less than the federal poverty guidelines.
- Verification of enrollment in food stamps received from Missouri Department of Social Services.
- Verification of housing assistance received from Missouri Department of Social Services.

OPTIONAL ROLLER COMPACTED CONCRETE SHOULDERS AND MAINLINE

01/16

1.0 Description. Roller Compacted Concrete (RCC) is an optional method to be used in constructing A2 and A3 shoulders or mainline pavement up to 7 inches thick in lieu of conventional PCCP or HMA placement. RCC may be used, as designed in the plans, for mainline pavements greater than 7 inches. RCC consists of aggregate, portland cement and water. Supplementary cementing materials, such as fly ash, slag cement (ground granulated blast- furnace slag - GGBFS), and silica fume may be used. RCC is proportioned, mixed, placed, compacted, and cured in accordance with these specifications. RCC shall conform to the lines, grades, thickness, and typical cross section shown in the plans or otherwise established by the Engineer.

2.0 Materials. All materials shall be in accordance with Division 1000, Materials Details, and specifically as follows:

Item	Section
Coarse Aggregate	1005.2
Fine Aggregate	1005.3
Ground Granulated Blast Furnace Slag	1017
Fly Ash	1018
Cement	1019
Concrete Admixture	1054
Curing Compound	407, 1055
Water	1070

2.1 Aggregate. The plasticity index of the aggregates used shall not exceed 5. The aggregate gradation shall be well-graded without gradation gaps and shall meet the following combined gradation for the application type for RCC specified in the contract:

Application	RCC as a Base or Intermediate Lift (Overlaid with 2-inch HMA or greater)	RCC as the Final Surface or with a Thin Lift Overlay (RCC as the final surface or capped with a thin HMA overlay less than 2-inches)
Sieve Size	Percent Passing by Weight	Percent Passing by Weight

1 inch	100	---
¾ inch	---	100
½ inch	70 - 95	85 - 100
3/8 inch	60 - 85	---
No. 4	40 - 60	60 - 85
No. 8	--	40 - 60
No. 200	0 - 8	0 - 10

3.0 Mix Design. At least 30 days prior to the beginning of placing RCC on the project, the Contractor shall submit a proposed mix design to the Engineer. The target and allowable gradation range of each fraction shall be included. The contractor may be required to submit representative samples of each ingredient to Construction and Materials for laboratory testing.

3.1 Required Information. The mix design shall contain the following information:

- (a) Source, type and specific gravity of portland cement
- (b) Source, type (class, grade, etc.) and specific gravity of supplementary materials, if used
- (c) Source, name, type and amount of admixture, if used
- (d) Source, type (formation, etc.), ledge number if applicable, of the aggregate
- (e) Specific gravity and absorption of each fraction in accordance with AASHTO T 85 for coarse aggregate and AASHTO T 84 for fine aggregate, including raw data
- (f) Unit weight of each fraction in accordance with AASHTO T 19
- (g) Batch weights of portland cement and supplemental cementitious materials
- (h) Batch weights of coarse, intermediate and fine aggregates
- (i) Batch weight of water in pounds per cubic yard (optimum moisture content)
- (j) Maximum laboratory density

(k) The laboratory proctor curves illustrating moisture contents vs. density for each cementitious material content.

The RCC mix design shall be done in a similar fashion as is done to determine the relationship between the moisture content and the unit weight as soils and soil aggregate mixtures. The apparatus and compacted effort used to fabricate the moisture density specimens correspond to that described in AASHTO T 180, Method D. Strength specimens shall be made in accordance with ASTM C 1176 or ASTM C 1435 at the optimum moisture content for each cementitious material content to verify minimum compressive strength requirements.

3.2 Trial Batch. The Contractor shall prepare and test a trial batch mixture at the mixing facility to verify that the RCC mix complies with the design criteria. The trial batch shall be prepared and tested in the presence of the Engineer.

3.3 Production. Production shall not begin until an approved mix design has been obtained and verified by the trial batch.

3.4 Design Strength. The mix design shall have a minimum compressive strength of 3,500 psi within 28 days when specimens prepared according to ASTM C 1176 or ASTM C 1435. Compressive strength test shall be performed in accordance with AASHTO T 22.

3.5 Minimum Water Content. The water-cement ratio shall not be lower than 0.25.

3.6 Minimum Cementitious Content. The total amount of cementitious materials shall not be below 450 pounds per cubic yard.

3.7 Supplementary Cementitious Material. RCC may use fly ash, slag cement (GGBFS), or silica fume. Ternary mixes will be allowed for RCC. Ternary mixes are mixes that contain a combination of portland cement and two supplementary cementitious materials. The amount of supplementary cementitious material content shall be limited to the following requirements:

Supplementary Cementitious Material (SCM)	
SCM	Maximum Percent of Total Cementitious Material

Fly Ash (Class C or Class F)	25 %
Slag Cement (GGBFS)	30 %
Silica Fume	8 %
Ternary Combinations	40 %

4.0 Equipment. RCC shall be constructed with any combination of equipment that will produce a pavement meeting the requirements for mixing, transporting, placing, compacting, finishing, and curing as provided in this specification.

4.1 Mixing Plant: The mixing plant shall be capable of producing RCC to the proportions defined by the final approved mix design and within the specified tolerances. The capacity of the plant shall be sufficient to produce a uniform mixture at a rate compatible with the placement equipment.

4.2 Paver: RCC shall be placed with a high-density or conventional asphalt type paver subject to approval by the Engineer. The paver shall be of suitable weight and stability to spread and finish the RCC material, without segregation, to the required thickness, smoothness, surface texture, cross-section, and grade.

4.3 Compactors: When a conventional asphalt type paver is used, self-propelled steel drum vibratory rollers shall be used for primary compaction. For final compaction, a steel drum roller, operated in a static mode, or a rubber-tired roller may be utilized to meet density requirements.

4.4 Haul Equipment: The hauling equipment shall be smooth, mortar-tight, metal containers capable of discharging the concrete at a controlled rate without segregation. Hauling equipment shall have a retractable cover to protect mix from weather and excessive evaporation.

4.5 Access for Inspection and Calibration: The Engineer shall have access at all times for any plant, equipment, or machinery to be used in order to check calibration, scales, controls, or operating adjustments.

5.0 Construction Requirements.

5.1 Preparation of Subgrade. Before the RCC processing begins, the subgrade and base course must be prepared in accordance with Sec 304.

5.2 Subbase Condition. The surface of the subbase shall be clean and free of foreign material and standing water prior to placement of the RCC. The aggregate base shall be uniformly moist at the time of RCC placement. RCC shall not be placed upon frozen subbase.

5.4 Mixing Time. Mixing time shall be adequate to ensure a thorough and complete mixing of all materials. Concrete shall be homogeneous with no aggregate segregation. In no case shall the mixing time, after all materials including water are in the mixer, be less than 90 seconds.

5.5 Operating Tolerances. The mixing plant shall receive the quantities of individual ingredients to within the following tolerances:

Material	Variation by Weight
Cementitious Materials	± 2.0%
Water	± 3.0%
Aggregates	± 4.0%

5.6 Plant Calibration. Prior to RCC production, the Contractor shall calibrate the plant in accordance with the manufacturer's recommended practice. A copy of the calibration shall be provided to the Engineer when requested.

5.7 Curing. Immediately after final rolling, the RCC surface shall be kept continuously moist until an approved curing compound is applied. The application of the curing compound shall progress such that no more than 10 linear feet of the final RCC surface is exposed without curing at any time.

5.7.1. Water Cure. Water cure shall be applied such that a uniform moist condition on the surface of the RCC is attained. Application of this moisture shall be done in a manner that will not erode or damage the finished RCC surface.

5.7.2 Curing Compound. When RCC is used as the final surface, either white pigmented curing compound applied at the rate of one gallon for each 100 square feet or a tack coat product applied at 0.14 gal/yd² shall be used for curing. When RCC is to be overlaid with asphalt, the curing compound shall be a tack coat product applied at 0.14 gal/yd² in accordance with Sec 407.

5.8 Weather Conditions.

5.8.1 Hot Weather Precautions. During periods of hot weather or windy conditions, special precautions shall be taken to minimize moisture loss due to evaporation.

5.8.2 Cold Weather. The contractor shall provide a method, meeting the approval of the engineer, of monitoring the concrete that demonstrates that the concrete has been protected from freezing.

5.8.3 Protection Against Rain. To protect against rain, the contractor shall have on location at all times material for the protection of the unhardened concrete. The contractor shall protect the concrete from damage due to rain.

5.9 Finished Surface. The finished RCC surface shall be smooth, uniform, and continuous without tears, ridges, or aggregate segregation once it leaves the paver. RCC mainline pavement shall meet the smoothness criteria of [Sec 502.8](#). When RCC is the final surface, the finished surface texture shall be broom finished, diamond ground, or other finishes approved by the engineer. All finished surface textures shall be in accordance with [Sec 502.4](#).

5.9.1 Inaccessible Areas. All areas inaccessible to either roller or paver shall be paved with cast-in-place concrete in accordance with [Sec 502](#).

5.9.2 Handwork. Broadcasting or fanning the RCC material across areas being compacted is not permissible. Such additions of materials may only be done immediately behind the paver and before any compaction has taken place.

5.9.3 Segregation. If segregation occurs in the RCC during paving operations, placement shall cease until corrective measures are taken.

5.10 Cold Joints. Prior to placing fresh RCC mixture against a cold vertical joint, the joint shall be thoroughly cleaned of loose or foreign material. The vertical joint face shall be wetted and in a moist condition immediately prior to placement of the adjacent lane.

5.11 Control Joints. Concrete control joints shall be constructed at 15-foot intervals in RCC mainline pavement. Control joint spacing for RCC shoulders adjacent to HMA or composite pavement shall be a minimum of 30-foot intervals. RCC shoulders adjacent to existing PCC pavement shall have control joints located to match the joints of the adjacent pavement. For all other PCC joint spacing; the RCC control joints shall match the adjacent PCC pavement's joints or cracks not to exceed a 30-foot interval. All control joints shall be tooled or cut to 1/3 the depth of the RCC thickness. Sealing the control joints is not required.

5.12 Opening to Traffic. The Contractor shall protect the RCC from traffic during the curing period. The RCC shoulder pavement may be opened to light traffic after one day and opened to unrestricted traffic after 5 days. The RCC mainline pavement may be opened to light traffic at 2,500 psi and opened to unrestricted traffic at 3,000 psi.

6.0 Material Acceptance.

6.1 Quality Control Testing. The contractor shall perform all quality control tests necessary to control the production and construction processes applicable to this specification. Quality control testing shall be performed by technicians qualified through MoDOT's technician certification program. Testing shall include, but not necessarily be limited to, deleterious content, aggregate gradation, coarse aggregate absorption, thin or elongated pieces, pavement thickness and density. The contractor shall record all test results and furnish a copy to the engineer no later than the beginning of the day following the test.

6.2 Quality Control Plan. A Quality Control Plan (QCP) for RCC mainline pavement and shoulders will be required as per [Sec 502.11.1](#).

6.3 Testing.

6.3.1 Density. The density shall be determined in accordance with AASHTO T 310, direct transmission. Tests shall be performed no later than 30 minutes after the completion of the rolling. Only wet density shall be used for evaluation. QC shall determine the density of the RCC shoulder and mainline pavement at a frequency of no less than one per 7500 square yards. Sampling locations will be determined by the engineer using random sampling procedures in accordance with ASTM D 3665.

6.3.2 Thickness. The contractor shall determine thickness of the RCC shoulder and mainline pavement by testing the fresh concrete. The Resident Engineer will need to review and approve the testing procedure. QC shall determine the thickness of the RCC mainline pavement and shoulders at a frequency of no less than one per 7,500 square yards. Sampling locations will be determined by the engineer using random sampling procedures in accordance with ASTM D 3665.

6.4 Aggregate Gradation. A sieve analysis shall be performed once a week. Testing shall be performed in accordance with AASHTO T 27 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

6.5 Deleterious Materials. Deleterious content shall be determined each day at a frequency of one test per 7500 square yards of material placed or fraction thereof. Test shall be performed in accordance with MoDOT TM 71 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt. Tests shall be performed on coarse aggregate fractions.

6.6 Absorption. Samples for coarse aggregate absorption shall be taken from the discharge gate of storage bins or from the conveyor belt at least once every 2000 cubic yards with a minimum of once per project. Coarse aggregate absorption shall be performed in accordance with AASHTO T 85.

6.7 Thin or Elongated. Thin or elongated pieces shall be determined on samples of coarse aggregate taken from the discharge gate of the storage bins or from the conveyor belt. Test shall be performed in accordance with ASTM D 4791 using a ratio of 5:1. Test shall be performed on aggregate particles retained on the $\frac{3}{4}$ in. sieve. Tests shall be performed at least once every 10,000 cubic yards with a minimum of once per project.

6.8 Retained Samples. All aggregate samples taken by the contractor, including but not limited to gradation, deleterious, absorption, and thin or elongated pieces shall be retained for the engineer for a minimum of seven days unless otherwise instructed. The retained sample shall be the remaining half of the final reduction in sample size obtained for QC testing. These samples shall be maintained in clean covered containers, without contamination, readily accessible to the engineer. The retained sample's identification shall consist of, but is not limited to:

- (a) Time and date sampled
- (b) Product specification number
- (c) Type of sample, i.e. belt, bin, stockpile
- (d) Lot and subplot designation
- (e) Sampler/Tester
- (f) Project Job Number

6.9 Acceptance.

6.9.1 Density. The density shall not be less than 98 percent of the maximum laboratory density.

6.9.1.1 Compressive Strength. Roller compacted concrete properly placed and compacted, but not meeting the density requirements shall be cored and tested for compressive strength at no additional cost. Cores shall be taken in accordance with AASHTO T 24. The compressive strength shall be determined by approved methods. Cores shall be tested for compressive strength within 7 days of density testing. If the tested area achieves the design strength, the material will be paid for at full price. Areas that fail to comply with the design strength will be deemed unacceptable and shall be addressed in accordance with Sec 105.11.

6.9.2 Thickness. The thickness shall not be deficient by more than 10 percent of the plan thickness. Areas that fail to comply with the design thickness will be deemed unacceptable and shall be addressed in accordance with Sec 105.11.

6.9.3 Aggregate Gradation. When one test is outside the allowable gradation range, immediate steps shall be taken to correct the gradation.

6.9.4 Deleterious Materials. When one test is outside the specification limits, immediate steps shall be taken to correct the deleterious content.

6.9.5 Absorption. The contractor shall halt production and make appropriate adjustments whenever either of the following occurs:

- (a) One point falls outside the action limit line for individual measurement
- (b) Two points in a row fall outside the specification limit but within the action limit line for individual measurement

6.9.5.1 Action Limits. The following action limit shall be used to control the aggregate absorption.

Individual Measurements	
Control Parameter	Action Limit
Absorption	Mix Design plus 0.3% to Mix Design plus 0.6%

6.9.6 Thin or Elongated Pieces. The coarse aggregate shall not have more than 5 percent thin or elongated pieces.

7.0 Quality Assurance.

7.1 Independent Samples. Corrective action shall be required when any QA tests are outside the required ranges or action limits. The engineer will at a minimum, independently test at the following frequency:

Test	Frequency
Density	1 test per 30,000 square yards
Thickness	1 test per 30,000 square yards
Aggregate Gradation	1 per project
Coarse Aggregate Deleterious	1 per week
Absorption	1 per 10,000 cubic yards
Thin or Elongated	1 per project

7.2 Test Procedures. The engineer will use the same test procedures as the contractor for determining the density and thickness of the RCC.

7.3 Retained Samples. The QA inspector will test at least ten percent of the retained portion of the QC samples for aggregate gradations and deleterious content. The QA inspector will test at least twenty percent of the QC retained samples for absorption and thin or elongated pieces. Retained samples will be chosen at random. A comparison will be considered favorable when the QA results of a QC retained sample are within the applicable limits specified in [Sec 403](#).

8.0 Method of Measurement. Final measurement of the completed pavement will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity. Where required, measurement of the RCC mainline pavement and shoulders, complete in place, will be made to the nearest 1/10 square yard. The revision or correction will be computed and added to or deducted from the contract quantity.

9.0 Basis of Payment. The accepted quantities of RCC will be paid for at the contract unit price, for specified A2 or A3 shoulders or mainline. Sec 610 for smoothness pay factor adjustments will apply to the final RCC mainline pavement surface. The contract unit price for A2 or A3 shoulders or mainline pavement will be considered as full compensation for all materials, equipment, tools, labor, and incidentals necessary to satisfactorily complete the work. No additional compensation will be allowed for any excess thickness.

SAFETY PLAN

04/16

1.0 Description. This contractor shall submit to the engineer a project Safety Plan (SP) for all work performed by the contractor and all subcontractors. The purpose of the SP is to encourage and enable all work to be performed in the safest possible manner and that all parties involved are aware of their individual responsibility for safety on the jobsite.

1.1 The SP shall be completed by the contractor and provided to the engineer prior to the beginning of any construction activity or phase on the project.

1.2 The contractor shall designate a person to serve as Project Safety Manager (PSM). The PSM shall be responsible for implementing and overseeing the SP. The PSM is not required to be present on the project at all times, but must be available to address safety issues and needs.

1.3 The PSM shall make revisions to the SP as necessary. Any new project activities or phases shall be included in the SP prior to work beginning on that activity or phase.

1.4 An example Safety Plan is available at: www.modot.org/safetyplan

2.0 Emergency Preparedness. The SP shall outline and detail for all workers, the specific procedures and actions necessary to respond to a jobsite emergency and the measures taken to communicate these requirements to all workers.

2.1 The SP shall include a list of local emergency contacts including phone numbers. A copy of the emergency contact list shall be accessible to workers.

2.2 In the case where there is no cellular or land line phone service at the jobsite, the SP shall identify how to reach the nearest available phone service.

3.0 Project Safety Analysis. The SP should contain a basic Project Safety Analysis (PSA) that outlines the actions necessary to complete each activity or phase of the project. The SP shall include a general description of the primary activities or steps required to safely complete the project.

3.1 Each activity should also include a general description of the work involved along with the known risks associated with the activity. In addition the PSA should outline the controls for those risks, including any Personal Protection Equipment (PPE) requirements for that activity or phase, and whether or not the activity or phase requires a specific safety meeting prior to beginning the activity or phase.

3.2 Submittal of the PSA for all activities or phases is not required with the initial submittal of the SP; however, the PSA for each activity or phase shall be completed prior to the beginning of that activity or phase.

4.0 Safety Meetings. The SP shall include the types of safety meetings that will be required of and conducted by the contractor.

5.0 Safety Training. The SP shall identify the required safety training provided to the contractor's personnel. The contractor shall require that the appropriate safety training for the contractor's personnel is completed prior to the beginning of work on each activity or phase.

5.1 The SP shall identify the recommended safety training needs and PPE for MoDOT employees who will be exposed to the work activities. MoDOT will provide safety training and PPE to MoDOT employees based on MoDOT safety policies.

6.0 Payment. There will be no direct payment for compliance with this Safety Plan provision.

SAFETY EDGESM

04/16; 04/18

1.0 Description. An approved longitudinal shoulder wedge system shall be used to create a beveled edge at the edge of pavement for a roadway without a paved shoulder, or at the edge of shoulder for pavement with a paved shoulder up to and including 4 feet in width.

2.0 Construction Requirements. The Safety Edge shall be constructed as shown in Standard Plan 401.00. The construction tolerance of the 30 degree Safety EdgeSM shall be plus or minus 5 degrees.

2.1 The shoulder wedge system shall maintain contact between the device and road shoulder surface and allow automatic transition to cross roads, driveways and obstructions. The device must be removable or be able to be lifted when not in use.

2.2 All shoulder wedge systems to be used for the purpose of creating a Safety EdgeSM must be approved by the engineer. The device must be designed to constrain the material, increase the consolidation of the extruded profile, and provide a smooth wedged surface. The use of a conventional single plate strike-off is not permitted.

3.0 Basis of Payment. There will be no direct payment for compliance with the requirements of this provision.

E-CONSTRUCTION

01/17; 1/19

1.0 Description. E-Construction is a paperless construction administration delivery process that includes electronic submission of construction documents, approval of documents with digital signatures, and communication between stakeholders by mobile

devices. E-Construction saves both time and money for all stakeholders involved, simplifies document storage, and eliminates waste of paper and other resources. This provision does not apply to the execution of the contract which is defined elsewhere in this contract.

2.0 Document Submittals.

2.1 The contractor shall submit all required documents to MoDOT electronically, except as described in Section 2.2 of this provision. Documents to be submitted electronically include, but are not limited to, Change Orders, Request to Subcontract Work (C-220), Project Payrolls, Progress Schedules, Value Engineering proposals, Safety Plans, Quality Plans, Pre-Construction conference submittals, etc. All documents shall be submitted in standard pdf format, except when otherwise directed by the engineer.

2.2 The Affidavit for Compliance with the Prevailing Wage Law and the Contractor's Affidavit Regarding Settlement of Claims (Form C-242) require a notarization and therefore must be submitted on paper.

2.3 The engineer will submit project documents to the contractor via email or through other secure file sharing sites.

2.4 Documents that require multiple signatures, such as change orders, shall include all required signatures on the original electronic document, without scanning.

2.5 Project Payrolls from subcontractors shall be electronically signed by the subcontractor. Payrolls shall be submitted as separate files per contractor per pay period.

3.0 Digital and Electronic Signatures.

3.1 All documents that require signature shall be signed with an electronic signature, except that change orders shall be signed with a registered digital signature in accordance with Section 3.2. Acceptable electronic signatures include any of the following options:

1. A digital signature, either registered or non-registered. A registered digital signature is defined in Section 3.2. Registration is only required for digital signatures on change orders.
2. An electronically written signature by the signee, such as with a stylus pen.
3. Simply typing the name of the author of a document in the signature field is acceptable if the document is also uploaded by the contractor to MoDOT's external Microsoft SharePoint®. This option is authenticated by the user's login credentials which are provided by MoDOT.

3.2 Digital Signature on Change Orders. All change orders shall be executed by the contractor with a registered Digital Signature. The contractor shall submit a letter to the engineer listing all personnel who are authorized to sign change orders on the contractor's behalf. All contractor personnel who are authorized to sign change orders shall create a Digital Signature and shall register their signature with MoDOT by submitting their Digital Signature Certificate (Public Key fdf file) to the Division of Construction prior to signing any change orders. The Public Key file will be used to validate the signee's signature on change orders. To assist contractors with setting up a digital signature, a Quick Reference Guide (QRG) is available in MoDOT's Engineering Policy Guide at <http://epg.modot.org> (click on QRGs in the left hand column and choose "Digital Signature for Adobe Reader").

4.0 Communication. The contractor shall be able to communicate and exchange information with MoDOT staff by email and mobile phone.

5.0 Basis of Payment. No payment will be made for compliance with this provision.

ELECTRONIC INFORMATION FOR BIDDER'S AUTOMATION

07/17

1.0 Description. If electronic information for bidder's automation is provided in the Electronic Deliverables, it is for information only. This information, used for project design and quantity estimation purposes, is provided for the bidder's use in automation of bid estimating, project staking, automated machine guidance and other construction methods.

2.0 Information Provided. Electronic information may be provided consisting of survey and design information including but not limited to 3-dimensional design models, cross-section models, alignment data, and plan view geometry. This information does not constitute part of the bid documents or contract documents.

3.0 Disclaimers. The electronic information shall not be considered a representation of actual conditions to be encountered during construction. Furnishing this information does not relieve a bidder or contractor from the responsibility of making an investigation of conditions to be encountered including, but not limited to site visits, and basing the bid on information obtained from these investigations, and the professional interpretations and judgment of the bidder or contractor. The bidder or contractor shall assume the risk of error if the information is used for any purposes for which the information was not intended. The Commission makes no representation as to the accuracy or reliability of the information, since the information may not be representative of the sealed contract documents. Any assumption the bidder or contractor may make from this electronic information is at the bidder or contractor's risk; none are intended by the Missouri Highways and Transportation Commission. The bidder or contractor assumes the sole risk of liability or loss if the bidder or contractor does rely on this electronic information to its detriment, delay or loss.

4.0 Basis of Payment. No payment will be made for compliance with this provision.

"RATE OUR WORK ZONE" SIGNS

03/12; 05/12

1.0 Description. This work shall consist of furnishing and installing a 72 X 36 inch or 48 X 24 inch "Rate Our Work Zone" signs, as indicated in the plans. The contractor shall furnish signs, labor, equipment, posts and hardware for installation of the signs in accordance with this provision, or as directed by the engineer.

2.0 Material. All material shall be in accordance with Division 1000, Material Details.

3.0 Construction Requirements. The signs shall be post-mounted and placed approximately 500 feet before the beginning of the project limits or the "ROAD WORK AHEAD" sign or the "ROAD WORK NEXT XX MILES" sign, if used, when these signs are located outside the project limits for each direction of travel affected by the project. A project on only one pavement of a dual divided facility will require only one sign. The contractor shall maintain all signs until completion of the project. Upon completion of the project, the contractor shall remove the signs, posts and hardware. The signs, posts and hardware shall remain the property of the contractor.

4.0 Basis of Payment. The accepted quantity of signs will be paid for at the contract unit price per square feet of construction signs.

"POINT OF PRESENCE" SIGNS

03/12; 05/12

1.0 Description. This work shall consist of furnishing and installing a 36 X 48 inch or a 96 X 48 inch "Point of Presence" signs, as indicated in the plans. The contractor shall furnish signs, labor, equipment, posts and hardware for installation of the sign in accordance with this provision or as directed by the engineer.

2.0 Construction Requirements. The sign shall be placed as shown on the plans. A project impacting only one direction of a divided highway will require only one sign. The contractor shall maintain all signs until completion of the project. Upon completion of the project, the "Point of Presence" signs shall remain in place ninety days with the "Completed as Promised" decal or plaque attached. After the ninety day period expires, the contractor shall be required to remove the sign. The sign, decal or plaque, posts and hardware will remain the property of the contractor.

2.1 The 36 X 48 inch "Point of Presence" sign shall be post mounted on two 3-pound/foot U-channel posts, or one-2 ½ inch perforated square steel tube post.

2.2 The 96 X 48 inch "Point of Presence" sign shall be post mounted on three 3-pound/foot U-channel posts with 32-inch spacing between posts.

3.0 Basis of Payment. The accepted quantity of "Point of Presence" signs will be paid for at the contract unit price per square feet of construction signing. The "Completed as Promised" decal or plaque shall be considered incidental to the "Point of Presence" sign.

SUPPLEMENTAL GUIDE SIGNS

10/20

1.0 Description. All installation, relocation and repair of Tourist Oriented Destination Signs (TODS), Specific Service Signing (Logos), traffic generator signs (private tourist-oriented activity sites, Colleges, State and Federal Agency sites, Welcome Center Affiliate sites and State Correctional Centers) shall be coordinated between the engineer, contractor and the designated Program Manager for MoDOT's Supplemental Signing Program.

1.1 It shall be noted by the contractor that the Program Manager is responsible for the installation, relocation and repair of all TODS, Logo and traffic generator signs on Commission owned right of way. The contractor shall be solely responsible for determining if the project will affect these signs due to contractor operations during construction of this contract. The contractor shall be responsible for notifying the Program Manager at the time of the preconstruction meeting when one of these signs is determined to be affected and advise the Program Manager of the project details. The Program Manager will attend these meetings at their discretion and shall be contacted during normal business hours Monday-Friday at the number provided by the engineer.

1.2 The Program Manager will be responsible any installation or relocation of these signs necessary for this contract. If the Program Manager has to perform work within the limits of the project, the Program Manager will conduct work so as not to interfere with or hinder the progress or completion of the work being performed by the contractor. Full cooperation of the contractors involved, in careful and complete coordination of their respective activities in the area, will be required.

2.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of equipment, labor, materials or time required to fulfill this provision. The Program Manager shall submit an invoice to the engineer for the work completed, with the costs associated being based on the Supplemental Guide Sign Contract agreed upon pricing. This work is considered non-contractual and will be processed through MoDOT's Financial Services Division.

REVISIONS TO 2020 MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION

SECTION 612 – IMPACT ATTENUATORS

Delete Sec 612.4.2 and substitute the following: 01/21

612.4.2 Impact Attenuator Array (Sand Barrels). Location, and relocation of the impact attenuator arrays shall be as shown on the plans or as directed by the engineer.

Delete Sec 612.5.1 and substitute the following: 01/21

612.5.1 The accepted quantity of truck or trailer mounted attenuators will be paid at the contract unit price. Impact attenuator arrays (sand barrels), will be paid for at the contract unit price for each impact attenuator array per the manufacturer's recommendations for the posted speed limit. Relocation of impact attenuator arrays will be paid for at the contract unit price included in the contract.

Delete Sec 612.5.2 and substitute the following: 01/21

612.5.2 Furnishing and installing replacement sand barrels will be paid for at the contract unit price per each sand barrel. Final payment for this item will be based on the actual number of modules replaced.

SECTION 613 – PAVEMENT REPAIR

Delete Sec 613.30.1.1 and substitute the following: 10/20

613.30.1.1 Class B partial depth pavement repair shall consist of removing areas of unsound concrete or bituminous patching material in a concrete pavement to a maximum depth of one half of the concrete pavement thickness and replacing the unsound material with an approved bituminous mixture. This work shall be performed on projects that include resurfacing as part of the contract.

Amend Sec 613.35.3.1 to include the following: 10/20

613.35.3.1 Removal of Bituminous Material. All unsuitable pavement shall be removed by milling or other method approved by the engineer. For overlay projects that include cold milling the entire surface, the Class C removal and repair work shall be completed prior to the surface milling operation unless otherwise shown on the plans or approved by the engineer. For composite

pavements, the repair may extend into the underlying concrete pavement if deterioration is found at that depth. The minimum depth of repair shall be 2 inches. The repair area shall be square or rectangular in shape. The exposed faces of the repair area shall be cleaned to remove loose material. Material removed from the repair area shall be disposed of off right of way unless otherwise approved by the engineer.

SECTION 616 – TEMPORARY TRAFFIC CONTROL

Renumber Sec 616.7.2 to 616.7.3 and add the following: **10/20**

616.7.2 When a CMS with Communication Interface is specified in the plans, the contractor shall operate and maintain the CMS, including setting up initial communications and paying all monthly communications fees. The contractor shall furnish the telephone number and contact information for the contractor’s work zone specialist who will promptly program the CMS board remotely under the direction of the engineer.

SECTION 620 – PAVEMENT MARKING

Delete Sec 620.20.2.6.1 and substitute the following: **01/21**

620.20.2.6.1 Type L drop-on glass beads, in accordance with [Sec 620.30](#), shall be used for high build waterborne paint applications.

SECTION 703 – CONCRETE MASONRY CONSTRUCTION

Delete Sec 703.3.5.9 and substitute the following: **10/20**

703.3.5.9 Bridge seats shall be finished to a smooth even surface. Where lead plates or fabric pads are used to seat steel bearing plates, the area under the lead plates or fabric pads shall be finished to within 1/8 inch above plan elevation and shall be dressed to a uniform, level bearing with a Carborundum brick or power grinder after the concrete has set sufficiently to fix the larger particles of sand. The deviation of the bearing seat from a true level surface shall not exceed 1/16 inch. Where elastomeric bearing pads are used, the finishing of 1/8 inch above plan elevation and grinding of the bridge seat area will not be required. Wells for anchor bolts shall be completely filled with an approved non-shrink grout in accordance with [ASTM C1107](#) after the steel has been erected and adjusted. In lieu of wells, anchor bolt holes may be drilled in accordance with [Sec 712](#). Keyways, anchor bolt wells, holes and other depressions that might collect water and freeze shall be sealed.

SECTION 712 – STRUCTURAL STEEL CONSTRUCTION

Delete Sec 712.6.3 and substitute the following: **10/20**

712.6.3 Welding Procedures. All welding procedures shall be submitted electronically to [Bridge Division](#) for acceptance prior to welding on bridges at major river crossings, bridges with structural steel with $f_y \geq 70,000$ psi ($f_s \geq 38,000$ psi), truss bridges, bridges with 2 girder systems and bridges containing fracture critical members (FCM). All other locations, the contractor shall have field welding procedures on file prior to welding and available, at the engineer’s request. The engineer may verify the quality of a certified welder at any time.

Delete Sec 712.7.3 and substitute the following: **10/20**

712.7.3 Bolt Tension. Each fastener shall be tightened to provide, when all fasteners in the joint are tight, at least the minimum bolt tension shown below for the size and grade of fastener used. Threaded bolts shall be tightened by methods described in [Secs 712.7.5](#), [712.7.6](#) or [712.7.7](#). If required because of bolt entering and wrench operation clearances, tightening may be done by turning the bolt while the nut is prevented from rotating. On non-parallel abutting surfaces where bevel washers will not be required, the nut shall be torqued against the non-sloping surface. Nuts shall be placed on the inside face of exterior girders, the top of girder flanges or in other situations the least exposed position, except if inaccessible for turning, on a sloping surface or otherwise approved by the engineer. Impact wrenches, if used, shall be of adequate capacity and sufficiently supplied with air to perform the required tightening of each bolt in approximately 10 seconds. Bolts or nuts, once tensioned and subsequently loosened (turned), shall not be used as permanent bolts or nuts. Bolt tension calibration devices shall be calibrated and certified as to accuracy by a private testing lab within one year before usage, or at any time the tensioning process indicates that the calibration is in error.

Bolt Tension		
English		
Bolt Size (in.)	Minimum Bolt Tension (lb x 1000)	
		ASTM F3125 Grade A325

1/2	12	15
5/8	19	24
3/4	28	35
7/8	39	49
1	51	64
1 1/8	64	80
1 1/4	81	102
1 3/8	97	121
1 1/2	118	148

Delete Sec 712.7.10 and substitute the following:

10/20

712.7.10 Rotational-Capacity Testing. The rotational-capacity test shall be performed on each rotational-capacity lot prior to the start of bolt installation in accordance with Sec 1080.2.5.4. Hardened steel washers shall be part of the test, regardless if washers will not be required as part of the installation procedure. Bolt, nut, and washer when required, combinations as installed shall be only from the established and tested rotational-capacity lot.

Amend Sec 712.10.2 to include the following:

10/20

712.10.2 Bolts. The weight of steel bolts for steel-to-steel connections will be included in the contract plan quantities for fabricated structural steel on the basis of following weights per 100 bolts:

Bolt Weights^a	
Bolt Size (in.)	Weight (lb)
5/8	40
3/4	65
7/8	95
1	135
1-1/8	180
1-1/4	245
1-3/8	352
1-1/2	400

SECTION 717 – FLEXIBLE JOINT SYSTEMS

Add Sec 717.50.3.1 and renumber subsequent sections accordingly:

01/21

717.50.3.1 Shop Drawings. Shop drawings for structural steel for expansion joint systems shall be prepared in accordance with [Sec 1080](#). The dimensions of the open cell foam shall be shown on the shop drawings for the armored joint. Shop drawings will not be required when the open cell foam is placed against concrete or existing steel armor.

Delete Sec 717.50.5 and substitute the following:

01/21

717.50.5. Basis of Payment. Open cell foam joint, including all material, coating, equipment, labor, fabrication, installation and any other incidental work necessary to complete this work, will be paid for at the contract unit price.

Add Sec 717.60.3.1 and renumber subsequent sections accordingly:

01/21

717.60.3.1 Shop Drawings. Shop drawings for structural steel for expansion joint systems shall be prepared in accordance with [Sec 1080](#). The dimensions of the preformed silicone or EPDM seal shall be shown on the shop drawings for the armored joint. Shop drawings will not be required when the preformed silicone or EPDM seal is placed against concrete or existing steel armor.

Delete Sec 717.60.5 and substitute the following:

01/21

717.60.5. Basis of Payment. Preformed silicone or EPDM expansion joint, including all material, coating, equipment, labor, fabrication, installation and any other incidental work necessary to complete this work, will be paid for at the contract unit price.

SECTION 733 – PRECAST CONCRETE BOX CULVERTS

Delete Sec 733.2 and substitute the following:

01/21

733.2 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Separation Geotextile	1011
Precast Concrete Box Culverts	1049
Plastic Joint Compound for Vitrified Clay and Concrete Pipe	1057
Tubular Joint Seal	1057
Mortars and Grout	1066

Delete Sec 733.3.2.1.2 and substitute the following:

01/21

733.3.2.1.2 Filter cloth 3 feet in width and double thickness shall be centered over the top and sides of all joints between individual box sections with edges sealed with mastic or two-sided tape. Filter cloth shall be a separation geotextile in accordance with [Sec 1011](#).

Delete Sec 733.3.2.1.2 and substitute the following:

10/20

733.3.2.1.2 Filter cloth 3 feet in width and double thickness shall be centered over the top and sides of all joints between individual box sections with edges sealed with mastic or two-sided tape. Filter cloth shall be a subsurface drainage geotextile in accordance with [Sec 1011](#).

SECTION 901 – HIGHWAY LIGHTING

Delete Sec 901.2.4 thru 901.3.1 and substitute the following:

10/20

901.2.4 Temporary lighting shall be installed to meet the construction schedule. The contractor shall maintain the lighting in proper operating condition in accordance with [Sec 901.14](#). Any damage to the lighting installation shall be repaired by the contractor at the contractor's expense.

901.3 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section/Specification
Concrete	501
Reinforcing Steel for Concrete	1036
Wood Poles for Power Supplies and Temporary Installation	1050
Electrical Conduit	1060
Electrical Conductors	1061
Pull and Junction Boxes	1062
High-Strength Bolts, Nuts and Washers	1080
Carbon Steel Bolts, Nuts and Washers	1080
Galvanized Coating of Steel Lighting Poles and Appurtenances	1080
Lighting Equipment	1091
High-Strength Anchor Bolts and Nuts	ASTM F1554, Grade 55
Structural Low Alloy Steel for Base Plates	AASHTO M 270, Grade 50 (ASTM A709, Grade 50)
Stainless Steel Bolts, Screws and Washers	ASTM A193, Grades B5, B6, B7 or B16
Stainless Steel Nuts	ASTM A194
Circular Steel Pile Foundation	ASTM A252, Grade 2 or ASTM A500, Grade B/C
Steel H-Pile Foundation	ASTM A709, Grade 36

Screw Anchor Foundation Shaft	ASTM A252, Grade 2 or ASTM A500, Grade B/C
Helix	ASTM A575, Grade M 1010 or AASHTO M 270, Grade 36 (ASTM A709, Grade 36)
Helix Core	ASTM A575, Grade M 1023 or AASHTO M 270, Grade 36 (ASTM A709, Grade 36)
Connector Plates and Steel Closure Plates for Circular Pipes and Connector Plates for H-Pile and Screw Anchor Foundations	AASHTO M 270, Grade 36 (ASTM A709, Grade 36)

901.3.1 Anchor bolts, bolts, nuts and washers specified to be galvanized shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C, or mechanically galvanized in accordance with ASTM B695, Class 55. Except for anchor bolts, galvanizing thickness shall not exceed 6 mils. For anchor bolts and nuts and for high strength bolts and nuts, except those in accordance with ASTM F3125 Grade A325, the contractor shall furnish to the engineer a test report certified to be the last completed set of mechanical tests for each size in each shipment. For high strength bolts and nuts in accordance with ASTM F3125 Grade A325, the contractor shall furnish to the engineer a copy of the manufacturer's inspection test report for each production lot or shipping lot furnished and shall certify the bolts furnished are in accordance with the specifications. Bolts and nuts in accordance with ASTM A307 shall be accompanied by a manufacturer's statement that the bolts and nuts were manufactured in accordance with ASTM A307.

SECTION 902 – TRAFFIC SIGNALS

Delete Sec 902.4 thru 902.4.1 and substitute the following:

10/20

902.4 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section/Specification
Concrete	501
Galvanized Coating of Traffic Signal Posts and Appurtenances	1080
High-Strength Bolts, Nuts and Washers	712
Carbon Steel Bolts, Nuts and Washers	712
Structural Low Alloy Steel	712
Luminaires	901
Signs	903
Reinforcing Steel for Concrete	1036
Wood Poles for Power Supplies and Temporary Installations	1050
Concrete Sealer	1053
Concrete Curing Material	1055
Electrical Conduit	1060
Electrical Conductors	1061
Pull and Junction Boxes	1062
Fiber Optic Interconnect	1092
Signal Equipment	1092
High-Strength Anchor Bolts and Nuts	ASTM F1554, Grade 55
Stainless Steel Bolts, Screws and Washers	ASTM A193, Grades B5, B6, B7 or B16
Stainless Steel Nuts	ASTM A194

902.4.1 Anchor bolts, bolts, nuts and washers, except stainless steel, shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C or mechanically galvanized in accordance with ASTM B695, Class 55. Except for anchor bolts, galvanizing thickness shall not exceed 6 mils. For anchor bolts and nuts, and for high strength bolts and nuts, except those in accordance with ASTM F3125 Grade A325, the contractor shall furnish to the engineer a test report certified to be the last completed set of mechanical tests for each size in each shipment. For high strength bolts and nuts in accordance with ASTM F3125 Grade A325, the contractor shall furnish a copy of the manufacturer's inspection test report for each production lot or shipping lot furnished to

the engineer and shall certify the bolts furnished are in accordance with the requirements specified. Bolts and nuts specified to meet ASTM A307 shall be accompanied by a manufacturer's statement that the bolts and nuts were manufactured in accordance with ASTM A307.

Delete Sec 902.16.7 and substitute the following:

01/21

902.16.7 External Conduit on Structure. For existing structures, or if provisions are not made in the plans for providing a conduit raceway in new structures as described in [Sec 707](#), the conduit shall be external conduit on structure. Conduit on structure will include conduit on bridges, retaining walls or other structures, and shall be installed as shown on the plans or as directed by the engineer. The final location of all conduit and junction boxes shall be approved by the engineer before installation begins. Conduit shall not be attached to prestressed concrete girders or prestressed, precast concrete deck panels. The conduit shall be secured to the concrete with clamps at no more than 5-foot intervals. Concrete anchors shall be in accordance with federal specification FF-S-325, Group II, Type 4, Class I, and shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C, or ASTM B695, Class 55, or constructed of stainless steel. The minimum embedment in concrete shall be 1 3/4 inches. The supplier shall furnish a manufacturer's certification that the concrete anchors meet the required material and galvanizing specifications. If necessary to anchor the conduit to steel bridge members, the attachment method shall not involve drilling, grinding or welding. Attachment method to steel members shall be approved by the engineer. Junction boxes shall be installed as shown on the plans or as directed by the engineer. Junction boxes shall be surface-mounted and installed such that covers are accessible. If the conduit crosses a bridge expansion joint, a conduit expansion fitting shall be used. The expansion fitting shall provide a minimum movement in either direction as shown on the plans or as specified by the engineer. Junction boxes, expansion fittings and any hardware or material required for conduit installation shall be at the contractor's expense.

Delete Sec 902.16.7 and substitute the following:

10/20

902.16.7 External Conduit on Structure. For existing structures, or if provisions are not made in the plans for providing a conduit raceway in new structures as described in [Sec 707](#), the conduit shall be external conduit on structure. Conduit on structure will include conduit on bridges, retaining walls or other structures, and shall be installed as shown on the plans or as directed by the engineer. The final location of all conduit and junction boxes shall be approved by the engineer before installation begins. Conduit shall not be attached to prestressed concrete girders or prestressed, precast concrete deck panels. The conduit shall be secured to the concrete with clamps at no more than 5-foot intervals. Concrete anchors shall be in accordance with federal specification FF-S-325, Group II, Type 4, Class I, and shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C, ASTM B695 Class 55, or constructed of stainless steel. The minimum embedment in concrete shall be 1 3/4 inches. The supplier shall furnish a manufacturer's certification that the concrete anchors meet the required material and galvanizing specifications. If necessary to anchor the conduit to steel bridge members, the attachment method shall not involve drilling, grinding or welding. Attachment method to steel members shall be approved by the engineer. Junction boxes shall be installed as shown on the plans or as directed by the engineer. Junction boxes shall be surface-mounted and installed such that covers are accessible. If the conduit crosses a bridge expansion joint, a conduit expansion fitting shall be used. The expansion fitting shall provide a minimum movement in either direction as shown on the plans or as specified by the engineer. Junction boxes, expansion fittings and any hardware or material required for conduit installation shall be at the contractor's expense.

SECTION 903 – HIGHWAY SIGNING

Delete Sec 903.2 and substitute the following:

10/20

903.2 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section/Specification
Reinforcing Steel for Concrete	1036
Highway Sign Material	1042
Delineators, Mile and Marker Posts	1044
Paints for Structural Steel	1045
Electrical Conduit	1060
Expansive Mortars	1066
Carbon Steel Bolts, Nuts and Washers	1080
Structural Carbon Steel	1080
Structural Low Alloy Steel	1080
Low-Carbon Steel Anchor Bolts	ASTM F1554, Grade 36
High-Strength Anchor Bolts and Nuts	ASTM F1554, Grade 55
High-Strength Bolts, Nuts and Washers	1080

Galvanized Coating of Structural Steel, Tubular Steel Sign Supports, Sign Trusses and Appurtenances	1081
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Delete Sec 903.2.3 and substitute the following:

10/20

903.2.3 Hardware. Anchor bolts, bolts, nuts and washers specified to be galvanized shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C or mechanically galvanized in accordance with ASTM B695, Class 55. Except for anchor bolts, galvanizing thickness shall not exceed 6 mils. For high strength bolts, the contractor shall furnish to the engineer a copy of the manufacturer's inspection test report for each production lot or shipping lot furnished, and shall certify the bolts furnished are in accordance with [Sec 1080](#).

SECTION 1040 – GUARDRAIL, END TERMINALS, ONE-STRAND ACCESS RESTRAINT CABLE AND THREE-STRAND GUARD CABLE MATERIAL

Delete Sec 1040.3.2 and substitute the following:

10/20

1040.3.2 Steel Posts, Plates and Rails. Steel posts, anchor plates, bearing plates, soil plates, plate washers and channel rail shall be structural steel in accordance with AASHTO M 270, Grade 36, shall be of the dimensions and weights shown on the plans and shall be galvanized in accordance with AASHTO M 111. Bolts, nuts and washers shall be in accordance with the dimensions shown on the plans and shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C, or may be mechanically galvanized. If mechanically galvanized, the coating thickness, adherence and quality requirements shall be in accordance with ASTM B695, Class 55. Any dimensional defects and structural discontinuities will be cause for rejection. The material to be welded shall be preheated in accordance with good welding practice, and welds shall be full-section and sound throughout. All welds shall be mechanically cleaned before galvanizing. No punching, drilling, cutting or welding will be permitted after galvanizing.

SECTION 1063 – TEMPORARY TRAFFIC CONTROL DEVICES

Delete Sec 1063.7 thru 1063.7.2 and substitute the following:

10/20

1063.7 Changeable Message Sign. Each portable Changeable Message Sign (CMS) shall consist of a message board, solar power supply, control systems and mounting and transporting equipment. The unit shall be assembled to form a complete self-contained CMS that can be delivered to the job site and placed into immediate operation. The sign unit shall be capable of operating at an ambient air temperature of -20 to 120 degrees F. and shall not be affected by two-way radio transmissions other than those required to control the CMS.

A CMS shall be permanently mounted on a trailer, truck bed, or truck cab per manufacturer's recommendations. The CMS must be securely mounted on the support vehicle such that it should remain attached during an impact to the vehicle. If it is mounted on a trailer, the trailer must be capable of being leveled and plumbed.

CMS trailers should be delineated on a permanent basis by affixing retroreflective material, per Sec 1042.2.7 in a continuous line on the face of the trailer as to be seen by oncoming road users.

1063.7.1 Message Board. The CMS shall be equipped with a power source and battery back-up to provide continuous operation when failure of the primary power source occurs. Either message board shall be capable to provide three lines of eight individual changeable characters per line. Each character shall be yellow in display on a black background and be a minimum of 18-inches in height. CMS used on roadways with speed limits of 55 mph or higher should be visible from ½ mile under both day and night conditions. The message should be designed to be legible from a minimum of 600 ft. for nighttime conditions and 800 ft. for normal daylight conditions. When environmental conditions that reduce visibility and legibility are present, or when the legibility distances stated in the previous sentences in this paragraph cannot be practically achieved, messages composed of fewer units of information should be used and consideration should be given to limiting the message to a single phase. .

1063.7.1.1 The CMS shall have a control system to allow the message to be changed from the CMS location. The control system shall include a display screen upon which messages can be reviewed before being displayed on the sign and a variable display rate that allows the operator to match the information display to the speed of the approaching traffic. For onsite operation, the CMS shall have a removable waterproof keyboard with display panel that allows the operator to generate an unlimited number of additional messages in addition to the preprogrammed stored messages. The keyboard must be equipped with a security lockout feature to prevent unauthorized use of the controller.

1063.7.2 Changeable Message Sign with Communication Interface. The CMS with communication interface shall have a digital cellular transceiver capable of receiving a message in the location deployed from a remote location and forwarding the message to the CMS controller to change the displayed message.

SECTION 1080 – STRUCTURAL STEEL FABRICATION

Delete Sec 1080.2 thru 1080.2.1 and substitute the following:

10/20

1080.2 Material. Except as amended by [Sec 1080.2.4](#), all material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section / Specification
Shear Connectors	1037
Paint for Structural Steel	1045
Coating of Structural Steel	1081
Structural Carbon Steel	AASHTO M 270, Grade 36 ASTM A709, Grade 36
Structural Low Alloy Steel	AASHTO M 270, Grade 50 ASTM A709, Grade 50 AASHTO M 270, Grade 50W ASTM A709, Grade 50W
Quenched and Tempered Alloy Steel	AASHTO M 270, Grade HPS 50W ASTM A709, Grade HPS 50W AASHTO M 270, Grade HPS 70W ASTM A709, Grade HPS 70W ASTM A709, Grade 100/100W
Carbon Steel Bolts and Nuts	ASTM A307
High Strength Bolts, Nuts and Washers	ASTM F3125 Grade A 325 Type-1 ASTM F3125 Grade A325 Type-3 ASTM F3125 Grade A 490 Type-1 (Plain only) ASTM F3125 Grade A490 Type-3 ASTM F436 ASTM A563 AASHTO M 292
Cold Finished Carbon Steel Shafting	AASHTO M 169
Carbon Steel Forgings	AASHTO M 102 Class F
Alloy Steel Forgings	AASHTO M 102 Class G
Gray Iron Castings	AASHTO M 105 Class 50
Malleable Iron Castings	ASTM A47
Carbon Steel Castings	AASHTO M 103 Grade 485-275
Galvanized Coatings	AASHTO M 111 AASHTO M 232 Class C ASTM B695 Class 55
Lead for Bearing Pads	ASTM B29
Identification of Metals	ASTM A6

1080.2.1 Galvanized Bolts. Bolts, nuts and washers specified to be galvanized shall be galvanized in accordance with the requirements of AASHTO M 232 (ASTM A153), Class C or shall be mechanically galvanized in accordance with ASTM B695, Class 55. Except for anchor bolts, galvanizing thickness shall not exceed 6 mils. Fasteners installed prior to the completion of shop blast cleaning will not require galvanizing. The thickness of the zinc coating for galvanized bolts shall be measured on the wrench flats and top of the bolt head. For mechanically galvanized bolts, the significant surfaces as referenced in ASTM B695 shall be the entire bolt surface, excluding the underside of the surface of the head and the shank surface between the threaded portion and the underside of the head. The thickness of the zinc coating on the galvanized nuts shall be measured on the wrench flats. For mechanically galvanized nuts, the significant surfaces shall be all surfaces of the nut excluding the threads. The thickness of the zinc coating on galvanized washers shall be measured on both sides. The significant surfaces on mechanically galvanized washers shall be all surfaces of the washer.

Delete Sec 1080.2.5 thru 1080.2.5.1.2 and substitute the following:

10/20

1080.2.5 High Strength Fastener Assemblies. In addition to the requirements of [Sec 712.2](#), high strength bolts, nuts and washers shall meet the following requirements. The contractor shall furnish a manufacturer's certification showing results of tests performed. Identification in accordance with the appropriate AASHTO/ASTM specifications shall be maintained by container markings which shall match identifying numbers on the certifications and be traceable to the certified mill test reports. High

strength fastener assemblies shall be galvanized unless specifically indicated otherwise by the contract documents. When high strength bolts are used with weathering steel, the fasteners shall be Type 3. ASTM F3125 Grade A490 bolts shall be installed plain (also referred to as uncoated or black), tensioned and then cleaned and coated with the coating system as specified on the plans. The cleaning and the zinc coating shall not be applied by any process, which can cause hydrogen embrittlement. All certification testing requirements and mill test reports referenced in the following sections shall be in accordance with [Sec 106](#).

1080.2.5.1 Bolts. All bolts shall be in accordance with ASTM F3125 Grade A325 except when ASTM F3125 Grade A490 bolts are specified on the plans. If the contractor elects to use load indicator bolts, only a hex head will be permitted. The type of head used shall be consistent throughout the entire structure, unless otherwise approved by the engineer.

1080.2.5.1.1 Proof Load Tests. Proof load tests in accordance with ASTM F606 Method 1 shall be performed. Minimum test frequency shall be in accordance with ASTM F3125 Grade A325.

1080.2.5.1.2 Wedge Tests. Wedge tests on full size bolts, in accordance with ASTM F606, paragraph 3.5 shall be performed. If bolts are to be galvanized, tests shall be performed after galvanizing. Minimum test frequency shall be in accordance with ASTM F3125 Grade A325.

Delete Sec 1080.2.5.4.1 and substitute the following: **10/20**

1080.2.5.4.1 Test Methods. Except as modified herein, the rotational-capacity test shall be performed in accordance with ASTM F3125 Grade A325.

Delete Sec 1080.2.5.4.4 thru 1080.2.5.4.5 and substitute the following: **10/20**

1080.2.5.4.4 Minimum Rotation. The minimum rotation, from a snug tight condition, 10 percent of the specified proof load, shall be as follows:

Minimum Bolt Rotation		
Bolt Length	Rotation	
	ASTM F3125 Grade A325	ASTM F3125 Grade A490
≤ 4 Diameters	240° (2/3 turn)	240° (2/3 turn)
> 4 Diameters and ≤ 8 Diameters	360° (1 turn)	300° (5/6 turn)
> 8 Diameters	420° (1 1/6 turn)	360° (1 turn)

1080.2.5.4.5 Required Tension. The tension reached at the above rotation shall be equal to or greater than 1.15 times the required installation tension. The installation tension and the tension for the turn test for ASTM F3125 Grade A325 and ASTM F3125 Grade A490 bolts shall be as follows:

Required Bolt Tensions									
Diameter, in.	1/2	5/8	3/4	7/8	1.00	1-1/8	1-1/4	1-3/8	1-1/2
ASTM F3125 Grade A325									
Req. Installation Tension, kips	12	19	28	39	51	64	81	97	118
Turn Test Tension, kips	14	22	32	45	59	74	94	112	136
ASTM F3125 Grade A490									
Req. Installation Tension, kips	15	24	35	49	64	80	102	121	148
Turn Test Tension, kips	17	28	40	56	74	92	117	139	170

Delete Sec 1080.3.1.2 and substitute the following: **01/21**

1080.3.1.2 Notification of Inspection. The Bridge Division shall be electronically notified at least four working days prior to the beginning of the shop fabrication so a QA inspector may be present if so desired and to allow the QA inspector to make travel arrangements. If the fabricator notifies and requests inspection and the QA inspector arrives at the location of inspection to find

the material is not ready for inspection as indicated in the request, any travel costs incurred by MoDOT for additional inspection shall be paid by the contractor.

Delete Sec 1080.3.1.2 and substitute the following:

10/20

1080.3.1.2 Notification of Inspection. The engineer shall be electronically notified at least four working days prior to the beginning of the shop fabrication so a QA inspector may be present if so desired and to allow the QA inspector to make travel arrangements. If the fabricator notifies and requests inspection and the QA inspector arrives at the location of inspection to find the material is not ready for inspection as indicated in the request, any travel costs incurred by MoDOT for additional inspection shall be paid by the contractor.

Delete Sec 1080.3.2 and substitute the following:

01/21

1080.3.2 Shop Drawings. Shop drawings for structural steel and miscellaneous metals shall be required and shall be prepared in strict accordance with the design details shown on the plans. If details are lacking, the details shall be supplied and shall conform to the design plans and specifications. All drawings shall be clear and complete and shall be thoroughly checked before submittal. Shop drawings shall be completely titled in accordance with the contract plans and shall pertain to only a single structure. One set of the shop drawings for railroad structures and other structures shall be submitted electronically to the Bridge Division for approval. The prints submitted shall be legible and shall have distinct details of sufficient contrast. Prints that do not have the desired clarity and contrast will be returned for corrective action. One set of prints will be returned marked reviewed or approved subject to noted corrections. The contractor shall promptly make necessary corrections and resubmit for final approval. When shop drawings are approved, the contractor shall furnish as many additional prints as requested. Reproductions on cloth or film of the original shop drawings shall be required for railroad structures and shall be delivered to the engineer prior to completion of the work. The approval of shop drawings will cover only the general design features and in no case shall this approval be considered to cover errors or omissions in shop details. The contractor shall be responsible for the accuracy of the shop drawings, the fabrication of material and the fit of all connections. All changes in the fabrication and erection work caused by errors in shop drawings and any changes in fabrication necessary for satisfactory results shall be at the contractor's expense. After shop drawings have been approved, no changes in dimensions or substitutions of sections shall be made without written approval from the engineer. Shop drawings shall be revised to show any authorized changes and the required number of prints shall be furnished to the engineer.

Delete Sec 1080.3.2 and substitute the following:

10/20

1080.3.2 Shop Drawings. Shop drawings for structural steel and miscellaneous metals shall be required and shall be prepared in strict accordance with the design details shown on the plans. If details are lacking, the details shall be supplied and shall conform to the design plans and specifications. All drawings shall be clear and complete and shall be thoroughly checked before submittal. Shop drawings shall be completely titled in accordance with the contract plans and shall pertain to only a single structure. One set of the shop drawings for railroad structures and other structures shall be submitted electronically to Bridge for approval. The prints submitted shall be legible and shall have distinct details of sufficient contrast. Prints that do not have the desired clarity and contrast will be returned for corrective action. One set of prints will be returned marked reviewed or approved subject to noted corrections. The contractor shall promptly make necessary corrections and resubmit for final approval. When shop drawings are approved, the contractor shall furnish as many additional prints as requested. Reproductions on cloth or film of the original shop drawings shall be required for railroad structures and shall be delivered to the engineer prior to completion of the work. The approval of shop drawings will cover only the general design features and in no case shall this approval be considered to cover errors or omissions in shop details. The contractor shall be responsible for the accuracy of the shop drawings, the fabrication of material and the fit of all connections. All changes in the fabrication and erection work caused by errors in shop drawings and any changes in fabrication necessary for satisfactory results shall be at the contractor's expense. After shop drawings have been approved, no changes in dimensions or substitutions of sections shall be made without written approval from the engineer. Shop drawings shall be revised to show any authorized changes and the required number of prints shall be furnished to the engineer.

Delete Sec 1080.3.2.2 and substitute the following:

10/20

1080.3.2.2 Weld Procedures. All welding procedures to be used shall be prepared by the manufacturer, contractor or fabricator as a written procedure specification. For new welding procedures, one copy shall be electronically submitted for approval prior to submitting shop drawings. Approved weld procedures will be kept on file by Bridge and may be considered for use on multiple projects. Any changes to the parameters of an approved welding procedure shall require submittal for approval. The shop drawings submitted for approval shall indicate the welding procedure to be used for each joint.

Delete Sec 1080.3.3.5.16 AWS Sec 6.7 Paragraphs 6.7.1, 6.7.1.1 and 6.7.1.2 and substitute the following:

10/20

1080.3.3.5.16 AWS Sec 6.7 Paragraphs 6.7.1, 6.7.1.1 and 6.7.1.2 - Paragraphs 6.7.1, 6.7.1.1 and 6.7.1.2 shall be replaced with the following:

Radiographic inspection shall be required for areas of both shop and field butt welds as specified herein. One hundred percent inspection shall be required for flanges of rolled beams and girders and 100 percent of transverse butt welds in webs for a distance of no less than one-sixth of the web depth from each flange and 25 percent of the remainder of the web depth. At least one-third of the length of all longitudinal web splices shall be radiographed at even intervals throughout the length of the splice. When a rejectable defect is found by radiography in any partially tested joint, either initially or in a later additional radiograph, tests shall be conducted on either side of and adjacent to the rejectable test area. If a rejectable defect is found in any additional areas, then 100 percent of vertical web splices and an additional 10 percent of total weld length in longitudinal web splices shall be tested. The location of these additional test areas shall be as directed by the engineer. All complete joint penetration groove welds in T- and corner joints shall be 100 percent tested by ultrasonic testing, except as follows. L shaped plate connection brackets, with complete joint penetration welds at the corner, are not required to be ultrasonically tested. On fabricating expansion joints only (does not apply to finger, flat and modular expansion devices), 25 percent of each joint subject to compression or shear, or, at the contractor's option, 25 percent of the total joints subject to compression or shear. When the latter is selected, the tested joints shall be distributed throughout the work and shall total at least 25 percent of the compression or shear weld length.

- a. If unacceptable discontinuities are found in spot testing, the entire length shall be tested.
- b. If unacceptable discontinuities are found in 20 percent or more of the compression or shear joints in that "lot", all compression and shear joints in that "lot" shall be tested for their full length. A "lot" is defined as those tension or compression/shear joints, or both, which were welded in accordance with the same approved WPS and non-destructively tested-as a group.
- c. Ultrasonic testing acceptance or rejection criteria will be in accordance with Table 6.4 Compressive Stress, AWS D1.5, 2002.

Shop complete joint penetration splicing of flat bar, beam, or support angle under the expansion joint is only by approval and shown on the shop drawings, this type of splicing will require 25 percent ultrasonic testing as stated.

Delete Sec 1080.3.3.16 and substitute the following:

10/20

1080.3.3.16 Shop Measurement of Curvature and Camber. Horizontal curvature and vertical camber will not be measured for QA inspection in the shop until all welding (except shear connectors), drilling and heat curving operations have been completed and the flanges have cooled to a uniform temperature. For bridges not requiring complete shop assembly, the vertical camber will be checked with the girder in a horizontal position and the horizontal curvature will be checked with the girder in either a horizontal or vertical position. The shop drawings shall show the required offsets for both curvature and camber at approximately 10-foot intervals, measured along the girder. The permissible variation in specified sweep for horizontally curved beams and girders, measured in inches, but not to exceed 1/2 inch, shall be as follows:

$$1/8 \text{ inch} \times 0.1 \times (\text{number of feet from end bearing})$$

Delete Sec 1080.3.5 and substitute the following:

10/20

1080.3.5 Shipping. Fabricated material shall not be shipped before a "Fabrication Inspection Shipment Release" is issued by MoDOT's fabrication inspector to the fabricator and engineer by email. The fabricator shall email this release to the contractor prior to shipping fabricated parts. All parts shall be loaded and protected to prevent damage in transit. Pins, nuts, bolts and other small parts shall be boxed or crated.

Delete Sec 1080.4.5 and substitute the following:

10/20

1080.4.5 Bolting and Fasteners. All fasteners, such as bolts, nuts and washers, that bolt directly to the weathering grade structural steel, including fasteners located in areas of the structure to be partially coated and fasteners for expansion device supports and similar items shall be high strength weathering fasteners. All bolts shall be in accordance with ASTM F3125 Grade A325, Type 3. Nuts shall be in accordance with the requirements of ASTM A563 and shall be Grades C3 or DH3. Washers shall meet the requirements of ASTM F436, Type 3. All other requirements of [Secs 712](#) and [1080](#) relating to high strength fastener assemblies and fastener assembly installation shall remain in effect. Fasteners for slab drain brackets may be plain uncoated assemblies in accordance with [Sec 1080.2.5](#) and coated in accordance with [Sec 1080.4.5.1](#).

Delete Sec 1080.4.7 and substitute the following:

10/20

1080.4.7 Bearings. Steel bearings, plate steel for elastomeric and PTFE bearings, structural steel for POT bearings, sole plates, masonry plates and associated items shall be in accordance with ASTM A709 Grade 50W. The exposed surfaces of all bearings

for weathering steel structures under expansion joints shall be shop primed and field coated with the complete System H in accordance with [Sec 1080.4.4](#) and [1081](#).