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 <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY</p>	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65101 Phone (888) 275-6636
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	If a seal is present on this sheet, JSP's has been electronically sealed and dated.
	JOB NO. J7I3363 Vernon County, MO Date Prepared: 9/15/2020
Only the following items of the Job Special Provisions (Bridge) are authenticated by this seal: All	

A. CONSTRUCTION REQUIREMENTS

1.0 Description. This provision contains general construction requirements for this project.

2.0 Construction Requirements. Plans for the existing structure(s) and the geotechnical report for the new structure(s) (if applicable) are included in the contract in the bridge electronic deliverables zip file for informational purposes only.

2.1 In order to assure the least traffic interference, the work shall be scheduled so that a lane closure is for the absolute minimum amount of time required to complete the work. A lane shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed lane is opened to traffic.

2.2 Bridge work by contractor forces, including erection, rehabilitation or demolition, shall not be allowed over traffic unless a bridge platform protection system is installed below the work area except for work performed above a deck that is intact. The protection system shall be capable of catching all falling objects such as tools, overhang brackets or materials. Lifting of objects that are heavier than the capacity of the bridge protection system shall not be permitted.

2.3 Provisions shall be made to prevent any debris and materials from falling onto the railroad or travelway. If determined necessary by the engineer, any debris and material that falls below the bridge outside the previously specified limits shall be removed as approved by the engineer at the contractor's expense. Traffic under the bridge shall be maintained in accordance with the contract documents.

2.4 Provisions shall be made to prevent damage to any existing utilities. Any damage sustained to the utilities as a result of the contractor's operations shall be the responsibility of the contractor. All costs of repair and disruption of service shall be as determined by the utility owners and as approved by the engineer.

3.0 Method of Measurement. No measurement will be made.

Please review this draft in yellow for content or replace with wording that MoDOT uses for this requirement.

B. FOUNDATION INSPECTION HOLES

1.0 Description. This provision specifies that the foundation inspection holes included for the drilled shafts and rock sockets are to be performed at an early stage in the project.

2.0 Construction Requirements. The contractor shall drill the NX size cores at the drilled shafts and rock socket locations soon after clearance to work within the railroad right of way has been obtained. This is to facilitate any needed adjustments to the drilled shafts and rock sockets early in the project, since previous access on the railroad right of way has been limited. All other provisions for this work shall be in accordance with Section 701.

C. DRILLED SHAFTS

1.0 Description. This work shall consist of constructing cast-in-place concrete drilled shafts and rock sockets, as required, to serve as a structural foundation for the wall. This work shall provide concrete shafts cast in cylindrically excavated holes extending sufficiently into soil or sound rock to adequately support the structure and all externally applied loads for which the shaft was designed. The drilled shaft foundation, including the rock socket, where required, shall be constructed in accordance with these specifications, as shown on the plans and in accordance with other specifications included in the contract documents. When directed by the engineer, corrections made by the contractor will be noncompensable and any effect on time of performance nonexcusable.

2.0 Preconstruction Submittals. At least 30 days prior to drilled shaft construction, the contractor shall submit to the engineer for review an installation plan for the construction of drilled shafts. The installation plan shall be of sufficient detail to outline the contractor's intended overall construction sequence and methods of excavation for the drilled shafts, including use of slurry, placement of soldier piles, including support and centralization methods, details of concrete delivery to the site, an emergency construction joint method, placement of concrete in a continuous pour, including operational procedures for tremie or pump, and methods to prevent and handle delays in concrete batching and delivery to the site. The installation plan shall include details of casings to be used, if applicable, including calculations showing the ability of the casing to withstand anticipated hydraulic and earth pressures, and to withstand stresses due to installation without undue deformation. These details shall include methods for casing handling, splicing, straightening and out-of-round correction. Calculations included in the installation plan shall be signed and sealed by a registered professional engineer licensed to practice in the State of Missouri.

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

Item	Section
Reinforcing Steel for Concrete	1036
Concrete Admixtures	1054
Concrete Curing Material	1055
Mortars and Grout	1066
Water	1070

3.2 Concrete. Drilled shafts shall be constructed of Class B-2 concrete, and all material, proportioning, mixing and transporting of concrete shall be in accordance with Sec 501, except as specified herein. An air entrainment admixture shall be used. A high range water-reducing admixture may be used to increase the slump to a maximum of 9 inches \pm 1 inch. If used, the water-reducing admixture shall be added only after the concrete has reached the job site to reduce the potential for flash setting. The concrete mix for drilled shafts shall be dense, homogeneous, fluid and resistant to segregation, and shall consolidate under self-weight. The concrete mix shall have a set time that ensures that fluidity is maintained throughout the shaft concrete placement and removal of temporary casing, if used. A concrete retarder in accordance with AASHTO M 194, Type B, may be incorporated into the mix to retard set approximately two hours. Concrete for drilled shafts shall have a 28-day minimum compressive strength of 4,000 psi. Portland cement shall be Type I or Type II. The maximum

water to cement ratio of a concrete mix to be placed under water shall be 0.45.

3.3 Casing. Welded or seamless steel permanent casings shall be in accordance with ASTM A 252, Grade 2, unless otherwise specified. The contractor shall furnish two copies of certification from the fabricator detailing the designated specification with which the furnished casings comply.

3.3.1 Shop Drawings. Shop drawings for permanent steel casings shall be prepared in accordance with [Sec 1080](#) and shall be submitted to the engineer prior to installation of the casings.

3.3.2 Condition of Casings. Casings shall be smooth, clean and watertight. For out-of-round tolerance of steel casings before and after installation, the departure of any point on the periphery of the casing from a true circle shall not exceed one inch, measured radially.

3.3.3 Extent of Casing Length. Permanent casings, if required, shall be continuous wherever possible or practical. The permanent casing shall terminate at the specified elevation, and the concrete shall be trimmed to within tolerances specified in [Sec 701.4.16](#) prior to acceptance of the completed drilled shaft. Permanent casings shall be extended into rock, as needed, to provide a positive seal and to stabilize the shaft excavation against collapse, excessive deformation, or flow of water. Casings meeting all specified requirements shall be installed from the work platform to the elevations shown on the plans. Where drilled shafts are located in open water areas, casings shall be extended from at least 18 inches above the water elevation and unless otherwise specified in the contract documents, to the specified bottom of casing elevation to protect the shaft concrete from water action during placement and curing of concrete.

3.3.4 Use of Teeth or Cutting Edge. The casing may be fabricated with teeth or a cutting edge to facilitate insertion into the rock.

3.3.5 Splices. Splicing of permanent casings is not desirable and will only be permitted when approved by the engineer. If splices are required, the welding process shall be in accordance with the requirements specified herein. The contractor shall be fully responsible for the adequacy of welds during driving.

3.3.6 Welding. Shop welding of casings shall be performed by a fully-automated welding process to develop the full capacity of the shell. All welding shall be in accordance with [Sec 1080](#), except that shop welding of casings will not require radiographic inspection. Inspection will be of a visual nature. If evidence indicating poor welding is found, the engineer may require radiographing. Field-welded splices of sections of the steel casings shall be made by shielded metal-arc welding procedures performed by a MoDOT-certified field welder using properly dried low-hydrogen E7018 electrodes that have been protected from the elements to maintain the dry condition. The welds shall be full penetration, watertight and of x-ray quality in accordance with [Sec 1080](#).

3.3 Slurry. Drilling slurry will be defined as mineral slurry, polymer slurry, natural slurry formed during the drilling process, water or other fluids used to maintain stability of the drilled shaft excavation to aid in the drilling process or to maintain the quality of the rock socket. In addition, the terms mineral slurry and polymer slurry, as used herein, will be defined as the final mixed

composite of all additives, including manufactured mineral or polymer slurry additives required to produce the acceptable drilling slurry.

3.3.1 Slurry Usage. Drilling slurry shall be used if detailed in the approved installation plan, if in accordance with the contract documents or if approved in writing by the engineer. Drilling slurry may be used at the contractor's option if the slurry is not in accordance with the contract documents; however, any slurry shall be approved by the engineer prior to use. Drilling slurry, when used, will be noncompensable and effect on time of performance due to the use of the slurry will be nonexcusable.

3.3.2 General Properties. The material used to make the slurry shall not be detrimental to the concrete or surrounding ground strata. Mineral slurries shall have both a mineral grain size that remains in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. Polymer slurries shall have sufficient viscosity and gel characteristics to transport excavated material to suitable screening systems or settling tanks. The percentage and specific gravity of the material used to make the slurry shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement. If approved by the engineer, the contractor may use water and on-site soils as a drilling slurry. In that case, the range of acceptable values for density, viscosity and pH, as shown in the table in Sec 701.3.3.5 for bentonite slurry, shall be met, except that maximum density shall not exceed 70 pounds/cubic foot. When water is used as the drilling fluid to construct rock sockets in limestone, dolomite, sandstone or other formations that are not erodible, the requirements for slurry testing will not apply if the entire fluid column is replaced with fresh water after drilling. To do so, fresh water should be introduced at the top of the casing and existing water used during drilling should be pumped out of the excavation from near the base of the socket until the entire volume of fluid has been replaced.

3.3.3 Preparation. Prior to introduction into the shaft excavation, the manufactured mineral or polymer slurry admixture shall be pre-mixed thoroughly with clean, fresh water and for adequate time in accordance with the slurry admixture manufacturer's recommendations allotted for hydration. Water used for mixing shall be in accordance with Sec 1070. Slurry tanks of adequate capacity will be required for slurry mixing, circulation, storage and treatment. No excavated slurry pits will be allowed in lieu of slurry tanks without written approval from the engineer. Adequate desanding equipment will be required as necessary to control slurry properties during the drilled shaft excavation in accordance with the values provided in the table below. Desanding will not be required for signposts or lighting mast foundations unless specified in the contract documents.

3.3.4 Control Tests. Control tests using a suitable apparatus shall be performed by the contractor on the slurry to determine density, viscosity, sand content and pH of freshly mixed slurry, recycled slurry and slurry in the excavation. Tests of slurry samples from within one foot of the bottom and at mid-height of the shaft shall be conducted in each shaft excavation during the excavation process to establish a consistent working pattern. A minimum of four sets of tests shall be conducted during the first eight hours of slurry use on the project. When the results show consistent behavior, the testing frequency may be decreased to one set every four hours of slurry use, or as otherwise approved by the engineer. Reports of all tests, signed by an authorized representative of the contractor, shall be furnished to the engineer on completion of each drilled shaft. An acceptance range of values for the physical properties will be as shown in the table below.

3.3.5 Sampling. When slurry samples are found to be unacceptable, the contractor shall bring the slurry in the shaft excavation to within specification requirements. Concrete shall not be poured until resampling and testing results produce acceptable values. Prior to placing shaft concrete, the contractor shall take slurry samples from within one foot of the bottom and at mid- height of the shaft. Any heavily contaminated slurry that has accumulated at the bottom of the shaft shall be removed. Disposal of all slurry shall be done in areas approved by the engineer. The contractor shall perform final shaft bottom cleaning after suspended solids have settled from the slurry mix.

Range of Acceptable Values for Mineral and Polymer Slurries in Fresh Water Without Additives					
Property	Bentonite	Emulsified Polymer	Dry Polymer	Units	Test Method
Density (Unit Weight) At Introduction	63.5 - 66.8	< 63	< 63	lb/ft ³	Density Balance
	Prior to Concreting	63.5 - 70.5	< 63		
Marsh Funnel Viscosity At Introduction	32 - 60	33 - 43 ^b	50 - 80 ^b	sec/qt	Marsh Funnel
	Prior to Concreting	32 - 60	33 - 43 ^b		
pH At Introduction	8 - 10	8 - 11	7 - 11	--	pH Paper or pH Meter
	Prior to Concreting	8 - 10	8 - 11	--	
Sand Content At Introduction	< 4	< 1	< 1	Percent by Volume	API Sand Content Kit
	Prior to Concreting	< 10	< 1		
Maximum Contact Time^a	4	72	72	Hours	

^aWithout agitation and sidewall cleaning.

^bHigher viscosities may be required to maintain excavation stability in loose or gravelly sand deposits.

4.1 Construction.

4.2 Protection of Existing Structures. All precautions shall be taken to prevent damage to existing structures and utilities. These measures shall include, but are not limited to, monitoring and controlling the vibrations from the driving of casing or drilling of the shaft, and selecting construction methods and procedures that shall prevent excessive caving of the shaft excavation.

4.3 Technique Shafts. Construction of the first production shaft will be used to determine if the methods and equipment used by the contractor are acceptable, including being able to satisfactorily handle lift, place, and support the soldier pile during construction. This technique shaft shall be drilled in the position as directed by the engineer and drilled to the maximum depth for the selected production shaft shown on the plans. If at any time the contractor is unable to demonstrate, to the satisfaction of the engineer, the adequacy of methods or equipment and alterations required, failure at any time to demonstrate to the engineer the adequacy of methods or equipment will be cause for the engineer to require appropriate alterations in equipment or method by the contractor to eliminate unsatisfactory results.

4.4 Construction Sequence. Excavation to elevation shown on the plans shall be completed before shaft construction begins, unless otherwise authorized by the engineer. Any disturbance caused by shaft installation shall be repaired by the contractor.

4.5 General Equipment and Methods. The contractor shall perform excavations through whatever material is encountered to the dimensions and elevations shown on the plans. The contractor's methods and equipment shall be suitable for the intended purpose and for whatever material is encountered.

4.5.1 General Equipment. The contractor shall provide equipment capable of constructing shafts to a depth equal to the deepest shaft tip elevation shown on the plans plus 15 feet, or as otherwise specified in the contract documents. When a rock socket is identified on the plans at a shaft location, the definition of "shaft tip elevation", for the purposes of this subsection, shall be taken to refer to the bottom of the rock socket.

4.5.2 General Methods. Excavations required for shafts and rock sockets shall be completed in a continuous operation. The contractor shall be responsible for ensuring the stability of the shaft excavation and the surrounding soil. When obstructions, either expected or unexpected, are encountered, the contractor shall notify the engineer promptly. Either the dry method, wet method, temporary casing method, permanent casing method if specified, or combinations, as necessary, shall be used to produce sound, durable concrete drilled shafts free of defects. The permanent casing method shall be used only when required by the contract documents. Blasting excavation methods will not be permitted. When a rock socket is required, the engineer will be the sole judge as to what constitutes the top of sound rock. Sound rock will be considered as the point where the rock is sufficient quality to allow the permanent casing to be seated. The engineer may order in writing additional depths of rock socket below the top of sound rock as considered necessary to improve the foundation. If the top surface of the sound rock is found to be inclined across the width of the shaft, the contractor shall immediately notify the engineer. The contractor shall use an airlift, or other method approved by the engineer, to clean the bottom of the shaft excavation.

4.5.2.1 Dry Construction Method. The dry construction method shall be used only at sites where the groundwater table and site conditions, generally stiff to hard clays or rock above the water table, are suitable to permit construction of the shaft in a relatively dry excavation and where the sides and bottom of the shaft remain stable without any caving, sloughing or swelling and allow visual inspection prior to concrete placement. The dry method shall consist of drilling the shaft excavation, removing accumulated seepage water and loose material from the excavation and placing the shaft concrete in a relatively dry excavation. The dry construction method shall be used only when shaft excavations, as demonstrated in a technique shaft or

first production shaft, have 12 inches per hour or less of seepage.

4.5.2.2 Wet Construction Method. The wet construction method shall be used at sites where a dry excavation cannot be maintained for placement of the shaft concrete. This method shall consist of drilling the shaft excavation below the water table, keeping the shaft filled with water, natural slurry formed during the drilling process, mineral slurry or polymer slurry to contain seepage and groundwater movement, and to maintain stability of the hole perimeter until excavation to the final depth and placement of the reinforcing cage and concrete has been completed. This procedure will require placing the shaft concrete with either a tremie or concrete pump beginning at the shaft bottom, and displacing the water or slurry as concrete is placed. Temporary partial depth casings near the ground surface shall be provided to aid shaft alignment and position and to prevent sloughing of the top of the shaft excavation. Where drilled shafts are located in open water areas, shafts shall be constructed by the wet method using casings extending from above the water elevation to the plan casing tip elevation to protect the shaft concrete from water action during placement and curing. The casing shall be installed in a manner that produces a positive seal at the bottom of the casing.

4.5.2.3 Temporary Casing Construction Method. The temporary casing construction method shall be used at all sites where the stability of the excavated hole or the effects of groundwater cannot be controlled by other means. In this method, the hole shall be advanced through caving material by the wet method in accordance with [Sec 701.4.4.2.2](#). When a formation is reached that is nearly impervious, a casing shall be placed in the hole and sealed. Drilling may proceed by the dry method to the projected depth. The placement of concrete shall proceed by the dry or wet method, except that the casing shall be withdrawn after the concrete is placed. In the event seepage conditions prevent use of the dry method, excavation shall be completed by the wet method. Before and during casing withdrawal, a 5-foot minimum head of fresh concrete above the bottom of the casing shall be maintained at such a level that fluid trapped behind the casing is displaced upward out of the shaft excavation without mixing with or displacing the shaft concrete. Casing extraction shall be at a slow, uniform rate with the pull in line with the axis of the shaft. Temporary casings shall be removed while the concrete is still workable and the slump of the concrete is between 6 and 10 inches. Vibratory hammers shall not be used for casing installation or removal within 50 feet of other shafts that have been completed less than 24 hours earlier. The reinforcing cage shall not be damaged or displaced when withdrawing the temporary casing.

4.5.2.4 Permanent Casing Construction Method. The permanent casing construction method shall be used only when required by the contract documents or authorized by the engineer. The casing shall be continuous between top and bottom elevations shown on the plans. Vibratory hammers shall not be used for casing installation within 50 feet of shafts that have been completed less than 24 hours earlier.

4.5 Slurry.

4.5.1 Time Limitations. When bentonite slurry is used, the contractor shall adjust construction operations such that the maximum time that slurry is in contact with the bottom 5 feet of the shaft, the time from the end of drilling to the beginning of concrete placement, does not exceed four hours without agitation. If the four-hour limit is exceeded, the bottom 5 feet of the shaft shall be overreamed prior to performing other operations in the shaft. For rock sockets constructed in shale using polymer slurry, concrete placement shall begin within 72 hours of

starting the rock socket excavation to avoid degradation of the shaft sidewall. Before concrete placement begins, foundation inspection, when required, cleaning operations and reinforcing steel placement shall be completed and approved by the engineer. These operations will be included in the 72-hour time limit. If concrete placement is not begun within the time limit, the contractor shall take corrective measures to the satisfaction of the engineer.

4.5.2 Level of Slurry. During construction, the level of slurry shall be maintained at a height sufficient to prevent caving of the excavation. If the engineer determines that the slurry construction method is failing to produce the desired final results, the contractor shall discontinue operations and propose an alternate method for approval from the engineer. Correction for a failed slurry construction method will be noncompensable and any effect on time of performance nonexcusable.

4.5.3 Slurry Manufacturer's Representative. When manufactured mineral or polymer slurry additives are to be incorporated into the drilling slurry mix, the contractor shall provide the technical assistance of a representative of the mineral or polymer slurry additive manufacturer at the site prior to introduction of the slurry into the first shaft where slurry use will be required, and during drilling and completion of a minimum of one shaft to adjust the slurry mix to the specific site conditions.

4.5.4 Drilling Fluids for Rock Socket Excavation. For rock sockets excavated in limestone, dolomite, sandstone or other formations that are not erodible and cannot be constructed in the dry, only water shall be used as the drilling fluid, except that when other slurry types are used in drilling through overburden, that slurry shall be removed and replaced with fresh clean water prior to rock socket excavation. For rock sockets excavated in geomaterial that may be eroded by drilling water, such as shales, a polymer slurry will be required prior to beginning rock socket drilling through completion of concreting the rock socket.

4.6 Cleaning of Shaft or Casing Sidewalls. Cleaning of the shaft or casing sidewalls shall occur by a method approved by the engineer as necessary to remove the depth of softening or to remove excessive slurry cake buildup.

4.7 General Excavation Considerations. The plans will indicate the top of shaft elevations and the estimated bottom of shaft elevations between which the drilled shaft shall be constructed. Drilled shafts may be extended deeper when the engineer determines that the foundation material encountered while drilling the shaft excavation is unsuitable or is not the same as anticipated in the design of the drilled shaft. Drilled shafts may be shortened when the engineer determines the material encountered is better than that anticipated, or based on the results of load tests. It is anticipated, however, that the minimum length of rock sockets will be 5.0 ft, as shown in the plans.

4.7.1 Time Restrictions. The integrity of the drilled shaft excavation shall be maintained by the placing of soldier pile and concrete in a timely manner following completion of the excavation. Drilled shaft excavation shall begin only if the Contractor can complete the excavation, excavation inspection, placement of soldier pile, and concrete placement as a continuous operation. No two adjacent shafts shall be excavated at the same time, and shafts shall not be constructed within 24 hours of the completion of an adjacent shaft if the center-to-center spacing is less than 3 shaft diameters.

4.7.2 Disposal of Excavated Material. Excavated material removed from the shaft and any drilling fluids used shall be disposed of in accordance with the contract documents, as directed by the engineer, and in compliance with federal and state laws.

4.7.3 Worker Entry Into Shaft Excavation. The contractor shall not allow workers to enter the shaft excavation for any reason, unless both a suitable casing has been installed and adequate safety equipment and procedures have been provided to workers entering the excavation.

4.8 Unexpected Obstructions. When unexpected obstructions are encountered, the contractor shall notify the engineer immediately. Obstructions are defined as a impenetrable objects that a) cannot be removed or excavated with augers fitted with soil or rock teeth, drilling buckets and/or underreaming tools and b) cause a significant decrease in the rate of excavation advancement, relative to the rate of advancement for the rest of the shaft excavation with the particular strata that the obstruction is located in. The engineer will be the sole judge of the significance of any reduced rate of shaft advancement and shall be present to evaluate the occurrence of the obstructions. Subsurface obstructions at drilled shaft locations shall be removed by the contractor. Such obstructions may include man-made materials such as old concrete foundations and natural materials such as boulders. The contractor shall employ special procedures or tools which may include but are not limited to: chisels, boulder breakers, core barrels, air tools, hand excavation, temporary casings, and increasing the hole diameter. Blasting will not be permitted. In the event, unexpected obstructions are encountered, the contractor shall strictly follow the procedure provided for a differing site condition set forth in [Sec 104](#). Any adjustment to the contract amount or time will only be those expressly permitted by the contract documents and only to the extent expressly provided in the contract documents. No contract adjustment will be determined, as to entitlement or amount on any basis other than under the contract as a differing site condition. Specifically, but not by way of limitation, the contractor agrees that the contractor will not be entitled to any contract adjustment arising from encountering an unexpected obstruction on the basis that, with respect to the obstruction, the Commission made: (1) a positive representation; (2) of a material fact; (3) which was false or incorrect; (4) as to which positive representation of material fact the contractor lacked knowledge that the representation was false or incorrect; (5) upon which positive representation of material fact the contractor asserts that the contractor relied; and (6) was damaged as a direct result of the positive representation of material fact.

4.9 Lost Tools. Drilling tools lost in the excavation will not be considered obstructions and shall be promptly removed by the contractor. All work required to remove lost tools or to perform associated corrective work, including but not limited to repair of hole degradation due to removal operations, will be noncompensable and any effect on time of performance nonexcusable.

4.10 Excavation Inspection.

4.10.1 Inspection Equipment. The contractor shall maintain at the job at all times, all equipment suitable for use in the shaft inspection.

4.10.2 Removal of Excess Sediment and Water. Final shaft depth shall be measured with approved methods after final cleaning by airlift, or other method approved by the engineer.

Unless otherwise stated in the contract documents, a minimum of 50 percent of the base of each shaft shall have less than 1/2 inch of sediment at the time of concrete placement. The maximum depth of sediment or any debris at any place on the base of the shaft shall not exceed 1 1/2 inches. For dry excavations, the maximum depth of water shall not exceed 3 inches prior to concrete pour. Shaft cleanliness will be verified by the engineer for wet or dry shafts.

4.10.3 Television Camera Inspection. The primary means of inspecting a shaft excavation, steel casing and the rock socket shall be by television camera lowered into the shaft. The contractor shall furnish all equipment necessary to conduct the camera inspection. The contractor shall operate the camera and supporting equipment under the direction of the engineer in such a manner as to obtain optimum results from the equipment. The television camera and lighting equipment shall be capable of operating in dry or submerged conditions encountered during the inspection. The excavated shaft shall have the engineer's approval prior to proceeding with construction.

4.10.3.1 Equipment. Methods and equipment for controlling the camera will be subject to approval from the engineer and achievement of a satisfactory video record.

4.10.3.2 Drawings. The contractor shall submit layout drawings to the engineer showing the relative position of all components of the television inspection system, including type and size of barge or other work area. The information submitted shall include a written description of the operating procedure in a step-by-step sequence and shall state the source of power.

4.10.3.3 Shaft Inspection. Inspection of a shaft by television camera shall be performed as directed by the engineer. The excavated shaft, including the rock socket when applicable, shall be thoroughly cleaned of all loose fragments, sediment and turbidity prior to inspection. The camera shall be operated such that optimum clarity of detail can be obtained and all surface areas of the shaft, including the rock socket and the rock socket's base, can be observed. All scanning of the rock surfaces shall be recorded on videotape. After completion of the inspection of a rock socket, the engineer will direct whether or not drilling of the shaft shall be continued to a greater depth. All tapes shall be stored in proper containers with dust-tight closures and shall be properly labeled as to shaft number along with project and contractor identification. Tapes shall be furnished to and shall become the property of the engineer upon completion of the work.

4.11 Foundation Inspection. NX size cores will be required for drilled shafts with rock sockets, where NX refers to the nominal diameter of rock core, and the NX core barrel has a 2 1/8-inch inside diameter. At least 15 days prior to drilled shaft construction the contractor shall drill on NX size core at the center of each rock socket to a depth of 10 feet or twice the diameter of the rock socket, whichever is greater, below the bottom of the rock socket. The contractor shall use the foundation inspection hole to determine the amount of casing needed and casing ordered prior to foundation inspections holes is at the contractor's risk. The contractor may be directed to extend the rock socket to a lower elevation, resulting from the engineer's evaluation of the foundation inspection cores.

4.11.1 Log of Excavated Material. The contractor shall maintain a log of excavated material for each foundation inspection hole, and a rough draft of the logs shall be delivered to the engineer within 24 hours of completion of the boring. A typed log prepared by a geologist or

engineer along with recommendations for the tip of casing shall be delivered to the engineer within 5 days. The log shall include the following:

- (a) The amount of NX cored per run and the amount recovered. All core loss shall be noted and explained. Clay layers shall be noted and located on the log by depth.
- (b) The Rock Quality Designation (RQD) for the NX core. The bedding thickness and degree of weathering shall also be noted.
- (c) One unconfined compression test per 5 feet of NX core, unless otherwise specified by the contract documents or directed by the engineer, shall be run on samples of NX core from the rock socket. The results of these tests shall be delivered to the engineer. The results of the unconfined compression tests shall be reported in units of kips per square foot (ksf). Any effect on time of performance resulting from delays in delivery of the above test results to the engineer will be nonexcusable.
- (d) Color photographs of the core.

4.11.2 Storage and Labeling of Rock Cores. Rock cores shall be stored in structurally sound core boxes and shall be protected from the elements. The core boxes shall be properly labeled to indicate location, depth, beginning elevation, contractor and date, and shall be delivered to the engineer.

4.12 Soldier pile. The soldier pile, consisting of a HP 12 inch x 53 lb/ft beam, spacers, centering devices, and other necessary appurtenances shall be completely assembled as a prefabricated unit and placed immediately after the shaft excavation is inspected and accepted, and just prior to shaft concrete placement.

4.12.1 Concrete Cover.

Concrete Cover			
Shaft Diameter	Uncased	Casing Remains	Casing Withdrawn
2'-0" or less	2"	2"	2"
2'-6" or greater	3"	3"	4"

4.12.2 Spacers. Unless other types of spacers are approved by the Engineer, rolling spacers for soldier pile shall be used to minimize disturbance of the shaft sidewalls and to facilitate removal of the casing during concrete placement. Concrete spacers or other approved non-corrosive spacing devices shall be used along the shaft at intervals not exceeding 10 feet to ensure concentric location of the soldier pile within the shaft excavation. As a minimum, a set of centering devices shall be provided within 2 feet of the top and 2 feet of the bottom of the shaft. In addition, one set of centering devices shall be provided 2 feet above the top of bedrock. The centering devices shall be of adequate dimension to maintain the specified clearance between the outside of the soldier pile and the side of the excavated hole or casing.

4.12.3 Bottom Supports. In the event that the shaft has been excavated below the anticipated tip elevation, the beam shall be extended at the tip (low) end by welded splices as necessary

in conformance with the Standard Specifications.

4.12.4 Durability of Spacers. Unless otherwise approved by the Engineer, concrete centering devices shall be constructed of concrete equal in quality and durability to the concrete specified for the shaft. Centering devices fabricated from reinforcing steel shall be epoxy coated. The Contractor shall submit details of the proposed spacers along with the working drawings. Shaft excavation shall not be started until the Engineer has approved the working drawings.

4.12.5 Support and Protection of Soldier pile. During concrete placement, the soldier pile shall be supported at or near the top of shaft such that the bottom supports are positioned approximately 1 inch above the top of shaft excavation. Not sooner than 24 hours after completion of concrete placement, temporary supports shall be removed. Soldier pile supports may be briefly released during casing removal as long as unacceptable beam settlement does not occur. The support must be replaced immediately after casing removal. The Contractor shall provide the needed equipment, including extra cranes if necessary, to provide this support. Prior to placing the soldier pile, the Contractor shall demonstrate to the satisfaction of the Engineer that the fabrication and handling methods to be used result in a soldier pile placed in the proper position, with the proper clearances. During this demonstration the beam shall be brought to an upright position, lowered into a shaft excavation, and supported as if for concrete placement.

4.12.6 Check of Tolerances for Placement of Soldier pile. The elevation of the top of the soldier pile shall be checked before and after the concrete is placed. The soldier pile shall be maintained within the specified tolerances, and the contractor shall make corrections to those tolerances, as required, to the satisfaction of the engineer. No additional shafts shall be constructed until the contractor has modified the soldier pile support to obtain the required tolerances.

4.13 Concrete Placement.

4.13.1 General Considerations. Accumulations of water in casings and excess sediment at the base shall be removed as described herein before the concrete is placed. No concrete shall be placed until all casings, if used, within a 15-foot radius have been installed. Within the 15-foot radius, all driving or vibratory installation methods shall be discontinued until the concrete in the last shaft has set at least five days. Concrete placement shall begin as soon as possible after completion of the excavation, inspection and setting of the soldier pile, and shall proceed in a continuous operation from the bottom of the shaft to the plan construction joint or above as specified herein. An unplanned stoppage of work may require an emergency construction joint during the shaft construction.

4.13.1.1 Placement of Concrete in the Shaft. Concrete shall be placed through a tremie or concrete pump for each shaft with the flow of concrete directed into the centers of the spaces between the flanges of the soldier pile. Care shall be taken to place concrete equally on both sides of web so that the soldier pile will not be displaced.

4.13.1.2 Extent of Concrete Placement. Concrete placement shall continue after the shaft is filled until good quality concrete, as determined by the engineer, is evident at the plan construction joint at the top of the shaft and until a minimum of 18 inches of concrete, measured vertically, has been expelled. Immediately after concrete placement has been

completed, all contaminated concrete and deleterious material accumulated above the top of shaft shall be removed to within one foot of plan top of shaft. Any concrete remaining above the top of shaft shall be carefully removed to the plan construction joint after curing and excess casing removal.

4.13.1.3 Time Limitations. The elapsed time from the beginning of concrete placement in the shaft to the completion of the placement shall not exceed two hours. All admixtures shall be adjusted for the conditions encountered on the job so the concrete remains in a workable plastic state throughout the two-hour placement limit. Prior to concrete placement, the contractor shall provide test results of both a trial mix and a slump loss test conducted by an approved testing laboratory using approved methods to demonstrate that the concrete meets the two-hour requirement. The contractor may request a longer placement time if a concrete mix is provided that will maintain a slump of 6 inches or greater over the longer placement time in the entire shaft as demonstrated by trial mix and slump loss tests. The trial mix and slump loss tests shall be conducted using concrete and ambient temperatures approved for site conditions.

4.13.1.4 Adequacy of Concrete Placement Method. Failure to demonstrate the adequacy of concrete placement methods or equipment during construction of any technique or production shafts will be cause for the engineer to require appropriate alterations in equipment or methods by the contractor to eliminate unsatisfactory results. Drilled shafts that are completed, but do not meet the concrete placement requirements, will be unacceptable. The contractor shall correct all unacceptable completed shafts to the satisfaction of the engineer at the contractor's expense.

4.13.2 Concrete Placement by Tremie. Tremies used to place concrete shall consist of a tube of sufficient length to discharge concrete at the shaft base elevation. The tremie shall have sufficient weight to rest on the shaft bottom before the start of concrete placement and to prevent curling of the tremie line during placement of the concrete. The tremie shall not contain aluminum parts that may come in contact with the concrete. A tremie shall consist of a watertight tube having an inside diameter of no less than 10 inches and fitted with a hopper at the top. The inside and outside surfaces of the tremie shall be clean and smooth to permit both flow of concrete and unimpeded withdrawal during concrete placement. The tremie wall thickness shall be adequate to prevent crimping or sharp bends that restrict concrete placement. Tremies used for depositing concrete in a dry drilled shaft excavation shall be supported such that the free fall of the concrete is less than 80 feet at all times.

4.13.2.1 Adjustment of Concrete Free Fall or Rate of Concrete Flow. If the free fall concrete causes the shaft excavation to cave or slough, the contractor shall control the movement of concrete by reducing the free fall of the concrete or the rate of flow of concrete into the excavation. The contractor shall be responsible for proposing, developing, and after approval from the engineer, implementing corrective work.

4.13.2.2 Tremie Operation. Underwater placement of concrete shall not begin until the tremie is at the shaft base elevation. The discharge end of the tremie shall be constructed to permit the free radial flow of concrete during placement operations. The tremie discharge end shall remain immersed as deep as practical in the concrete, but shall be no less than 5 feet at all times. The tremie shall be supported such as to permit free movement of the discharge end over the entire top surface of the work and to permit rapid lowering when necessary to retard

or stop the flow of concrete. The discharge end shall be sealed closed at the start of work to prevent water from entering the tube before the tube is filled with concrete. After placement has started, the level of the concrete in the tremie shall be maintained above the level of slurry or water in the borehole at all times to prevent water or slurry intrusion into the shaft concrete. If water enters the tube after placement is started, the tremie shall be withdrawn, the discharge end resealed, and the placement restarted. The flow of concrete shall be continuous until the work is completed.

4.13.2.3 Removal of Tremie Orifice from Concrete. If at any time during the concrete pour, when using the wet construction method, the tremie line orifice is removed from the fluid concrete column and discharges concrete above the rising concrete surface, the entire drilled shaft will be considered defective. In such a case, the contractor shall remove the reinforcing cage and concrete, complete any necessary sidewall cleaning or overreaming as directed by the engineer, and repour the shaft. Corrections made by the contractor will be noncompensable and any effect on time of performance nonexcusable.

4.13.3 Concrete Placement by Pump. Concrete pumps and lines may be used for concrete placement by either the wet or dry construction method. All pump lines shall have a minimum diameter of 5 inches and shall be constructed with watertight joints. Concrete placement shall not begin until the pump line discharge orifice is at the shaft base elevation. For the wet construction method, a plug or similar device shall be used to separate the concrete from the fluid in the hole until pumping begins. The plug shall either be removed from the excavation or shall be of a material that does not cause a defect in the shaft if the plug is not removed. The discharge orifice shall remain at least 5 feet below the surface of the fluid concrete. If at any time during the concrete pour the pump line orifice is removed from the fluid concrete column and discharges concrete above the rising concrete level, the shaft will be considered defective. In such a case, the contractor shall remove the reinforcing cage and concrete, complete any necessary sidewall cleaning or overreaming as directed by the engineer, and repour the shaft. Corrections made by the contractor will be noncompensable and any effect on time of performance nonexcusable.

4.14 Construction Joints. Unless otherwise approved by the engineer, construction joints shall be made only where shown on the plans. All planned reinforcing steel shall extend uninterrupted through joints. Unless otherwise shown on the plans, horizontal joints may be constructed without keys. Surfaces of fresh concrete at horizontal construction joints shall be rough floated sufficiently to thoroughly consolidate the surface and to intentionally leave the surface in a roughened condition. Shear keys, if required, shall consist of formed depressions in the surface covering approximately one-third of the contact surface.

4.15 Concrete Protection and Curing. For at least 48 hours after shaft concrete has been placed, no construction operations that will cause soil movement adjacent to the shaft shall be conducted, except for movement of light construction equipment. Portions of drilled shafts exposed to a body of water shall be protected from the action of water by leaving the forms in place for at least seven days after concrete placement or until the shaft concrete reaches a minimum strength of 2,500 psi. After placement, the temporarily exposed surfaces of the shaft concrete shall be cured to prevent loss of water by use of one or more of the approved methods. Curing shall be in accordance with [Sec 502](#).

4.16 Construction Tolerances. During excavation of the shaft, the contractor shall make frequent checks on the plumbness, alignment and dimensions of the shaft. Any deviation

exceeding the allowable construction tolerances specified herein shall be corrected with a procedure approved by the engineer. Drilled shaft excavations constructed in such a manner that the concrete shaft cannot be completed within the required tolerances will not be accepted. Correction methods shall be submitted by the contractor for the engineer's approval. Drilled shaft construction shall not begin until approval has been obtained. When a shaft excavation is completed with unacceptable tolerances, the contractor shall propose, develop and, after approval from the engineer, implement corrective work. Redesign drawings and computations submitted by the contractor shall be signed by a professional engineer registered to practice in the State of Missouri. The following construction tolerances will apply to drilled shafts unless stated otherwise in the contract documents:

- (a) Temporary casing diameters shall provide a final shaft diameter as shown on the plans. When approved by the engineer, the contractor may provide a larger casing at the contractor's expense.
- (b) Shafts shall be constructed such that the center of the top of the shaft is within 3 inches of plan position in the horizontal plane at the plan elevation for the top of the shaft.
- (c) The vertical alignment of a vertical shaft excavation shall not vary from the plan alignment by more than 1/4 inch per foot of depth. The alignment of a battered shaft excavation shall not vary by more than 1/2 inch per foot of the distance along the axis of the shaft from the prescribed batter.
- (d) After all the shaft concrete is placed, the top of the soldier pile shall be no more than 1 inch from the plan location and the plumbness is within 1%.
- (e) After all the shaft concrete is placed, the top of the soldier pile shall be no more than 2 inches above and no more than 3 inches below plan position.
- (f) The top elevation of the shaft shall be no more than one inch above or 3 inches below the plan top of shaft elevation.
- (g) The bottom of the shaft excavation shall be normal to the axis of the shaft within a tolerance of 3/8 inch per foot of shaft diameter.

4.17 Correction of Unacceptable Results. Drilled shaft excavations constructed in such a manner that the concrete shaft cannot be completed within the required tolerances will not be accepted. Correction methods shall be submitted by the Contractor for the Engineer's approval. Drilled shaft construction shall not commence until approval has been obtained. Materials and work necessary, including engineering analysis and redesign, to correct for out-of-tolerance drilled shaft excavations shall be furnished at no additional cost and without any extension of the contract time.

When a shaft excavation is completed with unacceptable tolerances, the Contractor shall be responsible for proposing, developing, and after approval by the Engineer, implementing corrective work. Typical corrective work may include over-drilling the shaft excavation to a larger diameter and/or depth to permit accurate placement of the soldier pile with the required minimum concrete cover, and drilling out the green concrete and reforming the hole. The approval of correction procedures is dependent on

analysis of the effect of misalignment and improper positioning. Redesign drawings and computations submitted by the Contractor shall be signed by a Professional Engineer registered to practice in Missouri.

5.1 Method of Measurement.

5.2 Drilled Shaft. Accepted drilled shafts will be measured for payment to the nearest 0.10 linear foot of length along the axis of each shaft complete-in-place. For shafts without a rock socket, measurement will be from the plan top of the shaft elevation to the bottom of the shaft. For shafts with a rock socket, measurement will be from the plan top of the shaft to the top of the rock socket. "Top of the rock socket" will be defined as the upper elevation at which rock occurs across the entire width of the shaft, as determined by the engineer.

5.3 Rock Socket. The accepted rock sockets, if required, will be measured for payment to the nearest 0.10 linear foot of length along the axis of each rock socket in-place from the top elevation of the rock, as determined by the engineer and in accordance with [Sec 701.6.1](#), to the bottom of the rock socket as built. In the event that additional rock socket construction is directed by the engineer, the additional length will be measured to the nearest 0.10 linear foot.

5.4 Technique Shafts. Accepted technique shafts, if required, will be measured for payment to the nearest 0.10 linear foot of length along the axis of each shaft in-place from the plan top of the shaft elevation to the bottom of the rock socket or shaft as built for each size of acceptable technique shaft drilled, including rock socket.

5.5 Television Camera Inspection. Payment for one complete television camera inspection of each shaft, including the rock socket when applicable, will be included in the payment for drilled shafts. Any additional television inspections required by the engineer due to extending the rock socket to a greater depth or when supplementary inspections are required by the engineer and no defects are found, will be measured for payment as supplementary television camera inspection, per each.

5.6 Foundation Inspection Holes. Measurement for payment for foundation inspection holes will be to the nearest 0.10 linear foot of length along the axis of each hole by the linear foot. Measurement will be from the top of the rock socket to the bottom of the foundation inspection hole. If the engineer directs foundation inspection borings more than 10 feet or twice the diameter of the rock socket, whichever is greater, below the anticipated bottom of the rock socket elevation as shown on the plans, measurement for payment for that portion of the boring in excess of 10 feet below or twice the diameter anticipated bottom of the rock socket elevation as shown on the plans will be to the nearest 0.10 linear foot of excess.

6.1 Basis of Payment.

6.2 Drilled Shaft. Payment will be considered full compensation for all steel casing required, costs of drilling, excavation, slurry, cleaning, an acceptable method of inspection as required, furnishing and placing concrete, grouting and incidental work and material required by the contract documents. Payment for any drilled shaft installed and accepted will be at the contract unit price per linear foot for the diameter of the drilled shafts specified, irrespective of the character of the material actually encountered during excavation. No additional compensation will be made for concrete required to fill an oversized casing or for oversized excavation. If the

method of construction requires that drilled shaft casing be seated into the sound rock such that the bottom of the casing is below the determined top of sound rock elevation, payment for excavation below the top of the sound rock layer (top of the rock socket) will be included in the payment for the rock socket. If sound rock is encountered within the excavation at which point a rock auger, core barrel or other rock-removing specialty tool must be used by the contractor before the top of the sound rock elevation to be used as "top of the rock socket" is confirmed by the engineer, that work will be paid for as rock socket excavation.

6.3 Rock Socket. Payment will be considered full compensation for drilling, excavation, slurry, cleaning, dewatering, an acceptable method of inspection as required, furnishing and placing concrete, and incidental work and material according to the contract documents. For payment purposes the length of any rock socket installed and accepted shall be paid for at the contract unit price per linear foot for the diameter of the rock socket specified, irrespective of the character of the material actually encountered during excavation. In the event that the engineer orders additional rock socket construction, payment for the additional length will be at the rate of 150 percent of the contract unit price per linear foot of rock socket up to a maximum additional length of 8 feet. Any work necessary to extend the length of the rock socket more than the additional 8 feet will be paid for as changes in the work in accordance with [Sec 104.3](#). Payment at the adjusted rate will be considered full compensation for the additional excavation into rock, all additional concrete, except reinforcing steel, including any and all splices, and all incidentals necessary to complete the work down to the elevation designated by the engineer.

6.4 Unexpected Obstructions. Contract adjustment, in time or amount, resulting from encountering any obstructions in the work covered by [Sec 701](#) will be made only if the obstruction constitutes a differing site condition, as defined by the contract. Contract adjustments will be determined only under the terms of the contract for adjustments in time or compensation due to encountering a differing site condition. Contract adjustments will be allowed only to the extent, in type and amount of contract adjustment, that such adjustment is expressly allowed for or permitted by the contract documents, specifically: (1) [Secs 109.4](#) through [109.4.3](#) for cost adjustment; (2) [Sec 109.11](#) for any compensable delay to the work to deal with the obstruction, but not for any effect upon the unchanged work; and (3) [Sec 108.14](#) to determine any adjustment in contract time.

6.4 Television Camera Inspection. Payment for one complete television camera inspection of each shaft, including the rock socket when applicable, will be included in the payment for drilled shafts. Any additional television inspections required by the engineer due to extending the rock socket to a greater depth, or when supplementary inspections are required by the engineer and no defects are found, will be paid for at the contract unit price for supplementary television camera inspection, per each. Payment will not be made for supplementary television camera inspections that reveal defects due to the contractor's operation. Payment for television camera inspection will be considered full compensation for moving in equipment, flushing turbid water from the shaft, conducting the actual scanning as specified, furnishing video tape, removing equipment, and all tools, labor and any incidentals necessary to complete the work. The number of supplementary television camera inspections may vary from the estimated quantities, but the contract unit price shall prevail regardless of the variation.

6.5 Foundation Inspection Holes. Payment for foundation inspection holes will be at the contract unit price and will be considered full compensation for drilling or coring the holes,

extracting and packaging the samples or cores, laboratory testing, delivering the samples or cores to the specified MoDOT location and for all other expenses necessary to complete the work. If the engineer directs foundation inspection borings more than 10 feet or twice the diameter of the rock socket, whichever is greater, below the anticipated bottom of rock socket elevation as shown on the plans, payment for that portion of the boring in excess of 10 feet or twice the diameter of the rock socket, whichever is greater, below the anticipated bottom of the rock socket elevation as shown on the plans will be at the rate of 150 percent of the contract price per linear foot of excess.

6.6 Welding Inspection. If evidence of poor welding is found, radiographing or other non-destructive testing of welds required by the engineer will be noncompensable and any effect on time of performance nonexcusable.

D. PROTECTION OF UNION PACIFIC RAILROAD AND MISSOURI & NORTHERN ARKANSAS RAILROAD REQUIREMENTS

MoDOT Bridge A8806; US DOT # 443 164P Nevada Sub Milepost 571.4

Summary: There are two Railroads with involvement at this location. Union Pacific Railroad Company (UP) and Missouri & Northern Arkansas Railroad Company, Inc. (MNA). Each Railroad will require a Contractor Right of Entry Agreement and Separate Insurance Policies. Missouri & Northern Arkansas Railroad Co., Inc. will provide the flagging for this project. Contact information for each Railroad representative can be found within the following requirements.

1.0 Introduction.

1.1 These Railroad Requirements set forth terms and conditions agreed between the Missouri & Northern Arkansas Railroad Company, Inc., Union Pacific Railroad Co. (Railroads) and the Missouri Highways and Transportation Commission (Commission), under which Railroads will allow the Commission's contractors to enter in and upon Railroad's real property, right of way, tracks and other facilities (Railroad's Property) to perform the contractor's work relating to this project.

1.2 To report an emergency on the Railroad, call: 866-527-3499

1.3 The project is located on the MNA Nevada Subdivision, USDOT# 443 164P (MP 571.4) in Nevada, MO. **Current FRA data shows 2 daytime, 2 nighttime and zero passenger trains per day.**

1.4 Definitions of terms set forth in the current edition of the Missouri Standard Specifications for Highway Construction shall be applicable to those terms as used in these Railroad Requirements.

1.5 Contractor may not access, at any time, any property of the Railroad outside the State's permanent and temporary easements without Railroad's prior, written approval.

2.0 Authority of Railroad Representative and Engineer.

2.1 The authorized representative of the Railroad, herein called "Railroad Representative", shall have final authority in all matters affecting the safe maintenance and operation of railroad traffic including the adequacy of the foundations and structures supporting the railroad tracks.

2.1.1 The Railroad designates the following individuals as the Railroad Representative for this project. Except as otherwise provided in these Railroad Requirements, the contractor shall address all notices concerning this project to the Railroad Representatives, as follows:

Mr. Greg Feyerabend
General Manager
Missouri & Northern Arkansas
Railroad Company, Inc.
514 North Orner
Carthage, MO 64836
Email: Greg.Feyerabend@gwrr.com
TEL: (918) 289-4861 [mobile]

Mrs. Melinda DuBay,
Engineer Design – Public Projects
Union Pacific Railroad Company
1400 Douglas, MS 0910
Omaha, NE 68179
Telephone: (402) 544-3992
E-mail: msdubay@up.com

2.1.2 The Railroads, or the individuals identified above, may designate a different individual to act as the Railroad Representative for this project, and may change the address information stated above, by giving written notice of the changes to the contractor and to the Engineer, as provided in these Railroad Requirements.

2.2 The authorized representative of the Commission (Engineer) shall have authority over all other matters as prescribed herein and in the project specifications.

3.0 Contractor's Indemnity Obligations to the Railroad. The contractor agrees to indemnify, defend and hold harmless the Railroads from and against any injury or death of persons whomsoever, or from any loss or damage to the Railroad's Property, caused by acts or omissions of the contractor in performing work on this project, whether on, over, under or in the vicinity of the Railroad's Property. In the event the contractor shall fail to restore the Railroad's Property immediately to a condition acceptable to the Railroad when any such loss or damage to the Railroad's Property is called to the contractor's attention by the Railroad, then the Railroad may perform such corrective work at the cost of the contractor. In addition to such remedies of the Railroad, the Commission will withhold from final payment due to the contractor the amount reasonably necessary to reimburse the Railroad for such loss or damage or for performing such work. The term "loss or damage" as used herein shall include, but not be limited to, the erosion and silting of, water damage to, and the accidental or intentional placing or dropping of objects on the Railroad's Property.

4.0 Notice of Starting Work. The contractor shall not commence any work on the Railroad's right of way until contractor has complied with the following conditions:

4.1. At least thirty (30) days in advance of the date the contractor proposes to begin work on the Railroad's Property, the contractor has given written notice of the contractor's proposed start date and time to the Railroad Representative, and Railroad's Manager of Track Maintenance (see paragraph 12.2.3 below), with a copy to the Engineer.

4.2 The Commission has obtained written approval from the Railroad's Representative for the contractor's insurance coverage as required by Section 17 of these Railroad Requirements, and authorization for the contractor to begin work on the Railroad's Property.

4.3 The contractor has determined whether fiber optic cable systems are buried on the Railroad's Property. If fiber optic cable systems are buried on the Railroad's Property, then the contractor has contacted the Railroad at the 24 hour number, 800-336-9193, has contacted the telecommunications company involved, has arranged for a cable locator, and has made arrangements for relocation or other protection of the fiber optic cable system on the Railroad's Property.

4.4 The contractor's employees, representatives or agents who are regularly assigned to perform work on the Railroad's Property have been certified as having completed the Internet Safety Orientation available at www.rtrainers.com/RWTonlineTraining/ where contractor needs to complete the course – 2014 Genesee & Wyoming Roadway Worker Protection Training for Railroad Contractors. This certification shall be renewed annually. In addition the contractor shall require that every employee, representative or agent who is not regularly assigned to perform work on the Railroad's Property has received appropriate safety training before performing any work on the Railroad's property. The cost of the Internet Safety Orientation, which is subject to change, is currently \$35 per person per year.

4.5 Right of Entry. At least forty five (45) days in advance of the date the contractor proposes to begin work on the Railroad's Property, the contractor shall enter into a Right of Entry Agreement with **Union Pacific Railroad Co. and Missouri & Northern Arkansas Railroad Co., Inc.** prior to working on Railroad's property. First, submit the following information to the Union Pacific Railroad Representative:

- a. MoDOT manager contact information
- b. Contractor contact information
- c. Site location (include address, DOT#)
- d. Site map
- e. Brief description of scope of work
- f. Proposed schedule for work on Railroad right of way

4.5.1 After reviewing the information, the Union Pacific Railroad Representative will send all of the information to UP Real Estate for processing. UP Real Estate will draft the CROE agreement and send it to the contractor for signature. The signed contract and administrative fee (\$1025) must then be returned to UP Real Estate. **After the Union Pacific CROE agreement is complete, a separate CROE agreement will need to be completed for Missouri & Northern Arkansas Railroad Co., Inc. by following the following link:**

http://www.gwrr.com/real_estate/accessing_property.be

4.5.2 The applicant must submit the completed application to the MNA Real Estate Department including a check or money order, to cover the non-refundable fee of \$1,750 made payable to the Missouri & Northern Arkansas Railroad Co., Inc. The application must include railroad milepost, railroad subdivision, and scope of work.

4.5.3 Upon approval of the application, the MNA Real Estate Department will draft an agreement and forward to the applicant for signature. **Application does not guarantee approval.** The applicant must then return the signed document to the MNA Real Estate Department along with the pertinent certificate of insurance outlined in the agreement. Once in receipt of these documents, the agreement will then be executed on behalf of the MNA Railroad.

5.0 Interference with Railroad's Operations.

5.1 The Railroad's right of way is located within the limits of this project. The contractor shall take care to insure that it will not drop any debris or material on the Railroad's Property.

5.2 The contractor shall arrange and conduct all of the contractor's work so that it causes no interference with the Railroad's operations, including train, signal, telephone, telegraphic services, damage to the Railroad's Property, poles, wires and other facilities of tenants on the Railroad's Property. Whenever the contractor's work may directly affect the operations or safety of trains, the contractor shall submit a written description of the method of doing such work to the MNA Railroad Representative for approval, but such approval shall not relieve the contractor from liability resulting from the contractor's work. Any work to be performed by the contractor that requires flagging service shall be deferred by the contractor until the flagging services are available at the job site.

5.3 Whenever the contractor's work upon the Railroad's Property will unavoidably cause an impediment to the Railroad's operations, such as requiring the use of runaround tracks or reduced train speed, the contractor should schedule and conduct these operations so that this impediment is reduced to the absolute minimum.

5.4 If conditions arising from, or in connection with the work require immediate and unusual provisions to protect the Railroad's operations and property, the contractor shall make such provisions. If in the judgment of the Railroad Representative, or the Engineer if the Railroad Representative is absent, such provision is insufficient, then the Railroad Representative or Engineer may require or provide such provisions as he/she deems necessary. In any event, the contractor shall make such provisions at the contractor's expense and without cost to the Railroad or the Commission.

6.0 Track Clearances. During construction, the contractor shall maintain not less than the minimum track clearances as shown on the project plans. However, before undertaking any work within the Railroad's Property and before placing any obstruction over any track, the contractor shall:

6.1 Notify the MNA Railroad Representative at least ten (10) days in advance of the proposed work.

6.2 Receive assurance from the MNA Railroad Representative that arrangements have been made for flagging service as may be necessary.

6.3. Receive permission from the MNA and UP Railroad Representatives to proceed with the work, as provided in section 4.0.

6.4. Confirm that the Engineer has received copies of the contractor's notice to the Railroads, and of the Railroad's response.

7.0 Construction Procedures.

7.1. General. The contractor's work on the Railroad's property shall be performed in accordance with these Railroad Requirements and shall be subject to the Railroad's inspection and review. The contractor shall submit plans that shall be signed, sealed, and stamped in accordance with the laws relating to Architects and Professional Engineers, Chapter 327, RSMo, for the demolition of any structure over Railroad right of way, and for temporary shoring and falsework that may affect the Railroad's facilities or traffic.

7.2 Excavation. The contractor shall maintain the subgrade of an operated track with the beam edge at least 12 feet from centerline of track and not more than 26 inches below top of rail, unless the existing section fails to meet this specification, in which case the contractor shall maintain the existing section.

8.0 Maintenance of Railroad Facilities. Within the project limits, the contractor shall maintain Railroad's Property, including all ditches and drainage structures, free of silt or other obstructions that may result from contractor's operations. The contractor shall promptly repair eroded areas within the Railroad's Property and repair any other damage to the Railroad's Property or the Railroad's tenants. The contractor shall perform all such maintenance and repair of damages due to the contractor's operations at the contractor's expense.

9.0 Storage of Materials and Equipment.

9.1 The contractor shall obtain permission from the Railroad Representative before storing any materials or equipment anywhere on Railroad's Property. The Railroad will not ordinarily permit storage within twenty-five feet (25') from the centerline of any track, or within three hundred feet (300') from any grade crossing. The Railroad will not be liable for damage to such material and equipment from any cause, and the Railroad Representative may move such material and equipment or require the contractor to move it, at the contractor's expense.

9.2 The contractor shall not leave unattended any grading or construction machinery parked upon Railroad's Property, unless it is effectively immobilized so that unauthorized persons cannot move such machinery.

10.0 Cleanup. Upon completion of the work, the contractor shall remove from within the limits of the Railroad's Property all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the contractor's and shall leave Railroad's Property in a neat condition satisfactory to the Railroad Representative.

11.0 Damages. The Railroad shall not assume liability for any damages to the contractor, contractor's work, employees, servants, equipment and materials caused by the Railroad's traffic. However, the preceding sentence shall not exempt the Railroad from liability for any loss, damage or injury proximately caused by the Railroad's intentional misconduct or sole or gross negligence. The contractor shall directly reimburse the Railroad for any cost the Railroad reasonably incurs for repairing damages to the Railroad's Property or to property of the Railroad's tenants, caused by or resulting from the operations of the contractor relating to this project.

12.0 Flagging Services.

12.1 When Flagging is Required. The Railroad has sole authority to determine the need for flagging to protect the Railroad's operations. Whenever the Railroad requires flagging services with reference to any of the contractor's work on this project, the contractor shall not perform any such work until all required flaggers are present at the job site.

12.1.1 In general, the Railroad may require flagging services whenever the contractor's personnel or equipment are, or are likely to be, working on the Railroad's Property, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb a railroad structure or the railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging, to prevent unreasonable risks of accidental hazard to the Railroad's operations or personnel.

12.1.2 Normally the Railroad will assign one flagger to a project; but in some cases, more than one may be necessary, such as yard limits where the Railroad may assign up to three flaggers. However, if the contractor works within the distances that violate instructions given by the Railroad Representative or performs work upon or adjacent to Railroad's Property that has not been scheduled with the Railroad Representative, the Railroad may require flagging services full time until the project is completed.

12.2 Scheduling and Notification of Flagging Services.

12.2.1 The contractor shall arrange with the Railroad all flagging services required by the Railroad to accomplish the contractor's work on this project.

12.2.2 Before the contractor begins work on the Railroad's Property, the contractor shall furnish to the Railroad Representative and the Engineer a schedule for all work required to complete the contractor's portion of the project within the Railroad's Property and shall arrange for a job site meeting between the contractor, the Engineer, and the Railroad Representative. Until the contractor has provided its work schedule and met on-site with the Railroad Representative and the Engineer, the Railroad may withhold all flagging services from the contractor's proposed job site. Before the flagger(s) begin each day's work, the flagger(s) and the contractor shall meet to conduct a job briefing.

12.2.3 Before the contractor first begins any work upon or adjacent to the Railroad's Property, the contractor shall give not less than thirty (30) days' advance notice to the Railroad, and to the Engineer, of its intent to begin such work. The contractor shall address all notices relating to flagging to the Railroad as follows:

Mr. Greg Feyerabend
General Manager
Missouri & Northern Arkansas Railroad Company, Inc.
514 North Orner
Carthage, MO 64836
Email: Greg.Feyerabend@gwrr.com
TEL: (918) 289-4861 [mobile]

12.2.4 The Railroad usually assigns one flagger to work at the job site on a continuous basis until the contractor no longer needs flagging services. The contractor shall not call for flagging services on a spot basis. The Railroad's assigned flagger shall notify the Engineer when flagging services have begun and ended. The flagger shall give these notices immediately upon arrival at the job site on the first day, and before departing from the job site on the last day of each separate period when the Railroad provides flagging services, or as soon as possible thereafter. The Engineer shall document these notifications in the project records.

12.2.5 After the contractor has begun work that requires flagging services, the contractor shall give not less than five (5) day's advance written notice to the Railroad before discontinuing flagging services and terminating the obligation to pay for flagging services. The contractor shall simultaneously provide a copy of this notice to the Engineer. If the contractor's work on or adjacent to the Railroad's Property is suspended at any time, or for any reason, then before the contractor resumes any work on or adjacent to the Railroad's Property, the contractor shall give advance, written notice to the Railroad and to the Engineer of its intent to resume such work. This notice shall provide sufficient details of the contractor's proposed work to enable the Railroad Representative to determine whether flagging services will be required before the contractor resumes its work on or adjacent to the Railroad's Property. The contractor shall give this required notice at least three (3) working days' before it intends to resume such work; however, the Railroad may take up to thirty (30) days after the contractor has given this notice before resuming flagging services at the job site. The requirements of this paragraph 12.2.5 shall not apply if the suspension and resumption of the contractor's work were previously scheduled with the Railroad pursuant to paragraph 12.2.2 of these Railroad Requirements, or the suspension was caused by an emergency as provided in paragraph 12.2.6 of these Railroad Requirements.

12.2.6 If, after the Railroad has assigned a flagger to the project site in accordance with section 12.0, any emergency requires the flagger's presence elsewhere, then the contractor shall suspend work on the Railroad's Property until the flagger is again available. Any additional costs to the contractor resulting from such delay shall be borne by the contractor and not by the Railroad.

12.3 Payment for Flagging Services.

12.3.1 The Commission will pay the Railroad directly for the cost of flagging services associated with this project by deducting the amount from the Commission's payments to the contractor.

12.3.2 The estimated cost of flagging services is approximately \$1,200 per day, based on an 8-hour work day and a 40-hour work week. The Railroad shall charge not more than its actual cost of providing these flagging services, which includes the base pay for the flagger or flaggers who actually performed the required flagging services, the Railroad's reasonable overhead costs, and the reasonable costs actually incurred for the flagger's travel expenses, meals and lodging if required. The Railroad may charge a maximum of one-hour travel time each way per day per flagger, for travel to and from the job site. A flagger's work in excess of 8 hours per day or 40 hours per week, but not more than 12 hours per day, will result in a pay rate of \$225 per hour after 8 hours. If a flagger performs required flagging services on a holiday, then the pay rate shall be \$225 per hour for all hours worked on the holiday. The Commission also shall reimburse the Railroad for its actual expenses reasonably incurred in preparing and handling invoices to the

Commission for the cost of these flagging services. The Railroad's charges to the Commission shall be in accordance with applicable provisions of the Federal Aid Policy Guide issued by the Federal Highway Administration, including all current amendments.

12.3.3 The Railroad shall submit progress invoices to the Engineer during the time the Railroad requires flagging services. The Railroad shall submit its final invoice for flagging services to the Engineer within one hundred eighty (180) days after the contractor has notified the Railroad and the Commission that all its work over the Railroad's Property is complete, in accordance with section 18.0 below. If the Commission does not receive the Railroad's final flagging invoice within this time period, then the Railroad shall obtain payment directly from the contractor.

12.3.4 If a dispute arises between the Railroad, the Commission and the contractor concerning the amount charged for flagging service, then the Commission may deduct the full amount of the Railroad's invoice from the contractor's payment, until the dispute is resolved.

12.4 Flagging Complaints. The contractor and the Railroad shall attempt to resolve any complaints concerning flagging services in a timely manner. If the contractor disputes the need for a flagger, the contractor shall notify the Railroad Engineer and the Engineer. The contractor shall confirm any verbal complaints in writing within five (5) working days, by sending a copy to the Railroad Representative and to the Engineer.

13.0 Temporary Construction Grade Crossing.

13.1 When the contractor has no reasonable alternate method of transporting construction materials and personnel across the Railroad's track, the contractor shall be make all necessary arrangements with the Railroad for the installation, maintenance and removal of one temporary grade crossing for a construction haul road. The contractor shall bear all costs incidental to such crossings, including flagging, whether services are performed by contractor's own forces or by the Railroad's personnel. The contractor shall execute the Railroad's standard Road Crossing Agreement covering terms and conditions for the temporary crossing.

13.2 Neither the contractor nor the Railroad shall construct any crossing for use by the contractor for transporting materials or equipment across the tracks of the Railroad until the Railroad Representative specifically authorizes the installation, maintenance, necessary watching and flagging thereof and removal, which shall be done at the contractor's expense.

14.0 Work for the Benefit of the Contractors. The project plans show all temporary or permanent changes in wire lines or other facilities that are necessary to complete the project, or these changes will be covered by appropriate plan revisions approved by the Commission and the Railroad. If the contractor desires any further changes, the contractor shall make separate arrangements with the Railroad for those changes, at the contractor's expense.

15.0 Cooperation and Delays. The contractor shall arrange a schedule with the Railroad for accomplishing staged construction involving work by the Railroad or tenants of the Railroad. In arranging a schedule, the contractor shall request information from the Railroad, and the Railroad shall promptly provide information, concerning the minimum lead-time required for assembling crews and materials. The contractor shall schedule adequate time for those activities. The contractor shall not make any claim against the Railroad for hindrance or delay on account of railway traffic for:

15.1 Any work the Railroad performs.

15.2 Other delay incident to or necessary for the safe maintenance of railway traffic.

15.3 Any delays due to compliance with these Railroad Requirements.

16.0 Trainman's Walkways. The contractor shall maintain along the outer side of each exterior track of multiple operated tracks, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than 12 feet from the centerline of the track. Before the close of each workday, the contractor shall remove all temporary impediments to walkways and track drainage encroachments or obstructions that were allowed during work hours when flagging services were available. Whenever the contractor excavates or maintains any excavation near the walkway, the contractor shall install a handrail with 12 feet minimum clearance from the centerline of the track.

17.0 Insurance.

17.1 General Insurance Provisions. The contractor shall, at its sole cost and expense, procure and continuously maintain in force during this project, the insurance coverage required under this section 17 until the contractor has completed all project work on the Railroad's Property, has removed all equipment and materials from the Railroad's Property, and has cleaned and restored the Railroad's Property to the satisfaction of the Engineer and the Railroad Representative. The amount of work to be performed upon, over or under the Railroad's Property is estimated to be ___ percent (___%) of the contractor's total bid for the project.

17.2 Commercial General Liability Insurance. The contractor shall maintain commercial general liability ("CGL") insurance with a limit of not less than \$2,000,000 for each occurrence and an aggregate limit of not less than \$6,000,000. CGL insurance must be written on ISO occurrence form CG 00 01 12 04 (or a substitute form providing equivalent coverage). The policy must contain the following endorsement, which must be stated on the certificate of insurance: "Contractual Liability Railroads" ISO form CG 24 17 10 01 (or a substitute form providing equivalent coverage) showing "**Missouri & Northern Arkansas Railroad Company Property**" as the Designated Job Site.

17.3 Business Automobile Coverage Insurance. The contractor shall maintain business auto coverage written on ISO form CA 00 01 (or a substitute form providing equivalent liability coverage) with a combined single limit of not less than \$5,000,000 for each accident. The policy must contain the following endorsements, which must be stated on the certificate of insurance: "Coverage For Certain Operations In Connection With Railroads" ISO form CA 20 70 10 01 (or a substitute form providing equivalent coverage) showing "Missouri & Northern Arkansas Railroad Company Property" as the Designated Job Site; and Motor Carrier Act Endorsement - Hazardous Materials Clean Up (MCS-90) if required by law.

17.4 Workers' Compensation and Employers' Liability Insurance. The contractor shall maintain workers' compensation insurance coverage, with not less than the minimum statutory liability required under the workers' compensation laws of the State of Missouri. The contractor shall maintain Employers' Liability (Part B) insurance coverage with limits of at least \$500,000 for each accident, a \$500,000 disease policy limit, and \$500,000 for each employee. If the contractor

is self-insured, then the contractor shall provide evidence of state approval and excess workers' compensation coverage, which must include coverage for liability arising out of the U. S. Longshoremen's and Harbor Workers' Act, the Jones Act, and the Outer Continental Shelf Land Act, if applicable. The policy must contain the following endorsement, which must be stated on the certificate of insurance: "Alternate Employer Endorsement" ISO form WC 00 03 01 A (or a substitute form providing equivalent coverage) showing the Railroad in the schedule as the alternate employer (or a substitute form providing equivalent coverage).

17.6 Railroad Protective Liability Insurance. The contractor must maintain Railroad Protective Liability insurance written on ISO occurrence form CG 00 35 12 04 (or a substitute form providing equivalent coverage) on behalf of the Railroad as named insured, with a limit of not less than \$2,000,000 per occurrence and an aggregate limit of \$6,000,000. Before commencing any work on the Railroad's Property, the contractor shall submit the original insurance policy to the Railroad or may submit a binder stating that the required Railroad Protective Liability policy is in place until the contractor delivers the original policy to the Railroad. The contractor shall cause the Railroad Protective Liability Insurance policy to include a description of the named insured, the work, and the job site, as follows:

17.6.1 Named Insured. The Named Insured on the Railroad Protective Liability Insurance policy shall be Missouri & Northern Arkansas Railroad Company, Inc.

17.6.2 Description and Designation. The description of the work and designation of the job site to be shown on the Railroad Protective Liability Insurance policy are as follows:

Replace MoDOT Bridge A1343
Job No. J713363, Vernon County, US Route 49
MNA US DOT # 443 164P Nevada Sub Milepost 571.4

17.7 Umbrella or Excess Insurance. If the contractor utilizes umbrella or excess insurance policies, these policies must "follow form" and afford no less coverage than the primary policy.

17.8 Pollution Liability Insurance. The contractor shall maintain pollution liability insurance coverage, which must be written on ISO form Pollution Liability Coverage Form Designated Sites CG 00 39 12 04 (or a substitute form providing equivalent liability coverage), with limits of at least \$5,000,000 per occurrence and an aggregate limit of \$10,000,000. If the scope of work as defined in this Project includes the disposal of any hazardous or non-hazardous materials from the job site, the contractor must furnish to the Railroad evidence of pollution legal liability insurance maintained by the disposal site operator for losses arising from the insured facility accepting the materials, with coverage in minimum amounts of \$1,000,000 per loss, and an annual aggregate of \$2,000,000.

17.9 Other Insurance Requirements.

17.9.1. Each policy required above (except workers' compensation and employers' liability) must include the Railroad and its affiliated companies, including but not limited to Genesee & Wyoming, Inc. as "Additional Insured" using ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage). The coverage provided to the Railroad as an additional insured shall, to the extent provided under ISO Additional Insured Endorsement CG 20

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26 and CA 20 48, provide coverage for the Railroad's negligence whether sole or partial, active or passive.

17.9.2 Where allowable by law, the punitive damage exclusion shall be deleted, and the deletion shall be indicated on the certificate of insurance.

17.9.3 The contractor waives all rights of recovery, and its insurers also waive all rights of subrogation of damages against the Railroad and its agents, officers, directors and employees, except that these waivers shall not apply to punitive damages, nor to any loss, damage or injury proximately caused by the Railroad's intentional misconduct or sole or gross negligence. The certificate of insurance shall acknowledge these waivers.

17.9.4 Prior to commencing any work on the Railroad's Property, the contractor shall furnish the Railroad with one or more certificates of insurance, executed by a duly authorized representative of each insurer, showing compliance with the insurance requirements set forth in this Section 17.

17.9.5 The contractor shall only obtain insurance policies written by a reputable insurance company acceptable to the Railroad, or which currently has a Best's Insurance Guide Rating of "A-" and Class VII or better, and which is authorized to do business in the State of Missouri.

17.9.6 The fact that insurance is obtained by the contractor or by the Railroad on behalf of the contractor will not be deemed to release or diminish the liability of the contractor, including, without limitation, liability under the indemnity provisions contained in Section 3.0 of these Railroad Requirements. Damages recoverable by the Railroad from the contractor or any third party will not be limited by the amount of the required insurance coverage, except to the extent of any payments the Railroad has received pursuant to insurance coverage obtained and paid for by the contractor.

17.10 Evidence of Insurance. The contractor shall provide evidence of insurance as required above to the addresses shown below, for review by the Commission and approval by the Railroad.

Railroad

Mr. Michael R. Morningstar
Director of Risk Management and Claims
Genesee & Wyoming Railroad Services,
Inc.
13901 Sutton Park Drive South
Suite 150
Jacksonville, FL 32224
Phone: (904) 900-6258
[Fax: \(904\)223-4618](tel:(904)223-4618)

Commission

Mr. Dave Ahlvers
State Construction & Materials Engineer
MoDOT
P.O. Box 270
Jefferson City, MO 65102

17.11 Except as otherwise specifically provided in these Railroad Requirements, the Railroad will not accept binders as evidence of insurance, and the contractor shall provide the Railroad with the original insurance policy.

17.12 Insurance Required of Subcontractors. If any part of the work is sublet, the contractor shall maintain and provide evidence of similar insurance, in the same amounts as required of the prime contractor, to cover the subcontractor's operations. The Railroad will accept endorsements

to the prime contractor's policies specifically naming subcontractors and describing the subcontractor's operations, for this purpose.

17.13 Cancellation of Insurance. The contractor and its insurers shall not cancel any of the required insurance coverage, except by permission of the Commission and the Railroad, or after thirty (30) days' written notice to the Commission and the Railroad at the addresses shown in subsection 17.10.

18.0 Completion of Work on Railroad's Property. The contractor shall notify Engineer and Railroad's Representative when the contractor has completed its work on Railroad's Property.

19.0 Failure to Comply. If the contractor violates or fails to comply with any of these Railroad Requirements, then the Railroad Engineer may require that the contractor vacate the Railroad's property and the Engineer may withhold all monies due to the contractor until the contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

20.0 Payment for Cost of Compliance. The contractor is not entitled to any separate payment for any extra cost it may incur on account of compliance with these Railroad Requirements. The contractor shall include all such costs in the contract unit price for items properly authorized in the contract.