WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
Division of Highways
1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505

February 21, 2012

MEMORANDUM

TO: ALL BRIDGE DESIGNERS

FROM: Gregory L. Bailey, P. E.
Director
Engineering Division

SUBJECT: Standard Bridge General Notes

In an effort to reduce the volume of general notes in bridge contract plans, Technical Section was requested to study and implement changes to that end. Results are summarized in a spreadsheet which is available for your use on the West Virginia Division of Highways website at http://www.transportation.wv.gov/highways/engineering/pages/publications.aspx.

Note that this document will continue to be updated, without notice. To ensure you have the current version, you should access this document through the website address above.

Should you require any additional information, please contact Mr. Todd West of this office, at (304) 558-9738 or by e-mail at Todd.G.West@wv.gov.

GLB:Htc

cc: DDT(TGW, JH), DD, DD(MF)

BRIDGE GENERAL NOTES
DISPOSITION

LEGEND	
OK	Means note is acceptable in appropriate situations
Note Not Required	Means note is covered elsewhere (usually noted) and therefore use of note is discouraged.
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HEADING:	NOTE:	DISPOSITION:	COMMENT:
GOVERNING SPECIFICATIONS:	The West Virginia Department of Transportation, Division of Highways Standard Specification, Roads and Bridges adoped 2000, as amended by the Supplemental Specification dated January 1, 2003, the Ciontract Docuents, and the Contract Plans are the Governing Provisions applicable to theis project.	Required	
DESIGN:	The bridge is designed with the Load and Resistance Factor Design Method (LRFD) in accordance with the AASHTO LRFD a Bridge Design Specifications, second edition dated 1998 with the 1999 thru 2003 Interims, using HL-93 live loading.	OK	
	The design provides for an additional wearing surface of 25 pound per square feet of roadway surface. This addtional wearing surface is not included in the contract.	OK	
	A uniform Deck Load of 15 PSF is included in the design for permanent deck forms.	OK	
	The bridge deck is designed in accordance with the Empirical Deck Method.	OK	
	Redistribution of negative moments has not been used for steel girder design.	OK	
	The Superstructure has been designed as a composite section.	OK	
	a. Maximum allowable headwater elev. = xxx.x	OK	
	b. Maximum velocity through the culvert = xx ft./s	OK	
	c. Tailwater used in design = xx	OK	
	d. Minimum required open end area = xxx sq. ft.	OK	
	e. Bearing Capacity at footer = xx KSF	OK	
	f. Design Year ADT = xxxx	OK	
	g. Percent Trucks = x%	OK	
	i. Superelevation Rate = x%	OK	
DESIGN UNIT STRESSES:	Class B Concrete: f ' c - 3,000 psi n-9	OK	
	Class K Concrete: f ' c - 4,000 psi n-8	OK	
	Reinforcing Steel: fy - 60,000 psi	OK	
	Structural Steel: AASHTO Designations:	OK	
	ASSHTO M270 Grade 50W: Fy - 50,000 psi	OK	
	ASSHTO M270 Grade HPS - 70W: Fy - 70,000 psi	OK	
CONCRETE:	Class B concrete shall be used for piers, abutments, wingwalls, and approach slabs.	Note Not Required	Show in quantity tables. Also in 601.1 of specs.
	Class K concrete shall be used for bridge deck, bridge barriers, abutment diaphragms, and barriers on abutment wingwalls.	Note Not Required	Show in quantity tables. Also in 601.1 of specs.
	A water reducing retarding admixture in accordance with Section 707.2 of the specifications shall be used in all superstructure concrete. Payment shall be included in item 601003-001. Retarder will not be required below 50 degrees F, but water reducing admixture shall be used. The Contractor's attention is called to the test requirments for the retarder admixture.	OK	See 601.1 of the Specifications.
	Chamfer all exposed edges of concrete 3/4 inches for superstructure and one inch for substructure concrete.	Note Not Required	601.8.10.5.1 currently says 3/4". Why is substructure different?
	All concrete shall be finished with the requirments of Section 601.11, of the Standard Specifications.	Note Not Required	Covered by 601.11 of specs
	All concrete shall be placed in the dry.	OK	
	No reduction of 7-day wet cure will be permitted.	OK. Not needed for most projects, but can be used at the discretion of the PM.	This note was first introduced because of the deck cracking problem to ensure a 7 day cure. Per the 2010 standard specs, bridge decks and parapets must be cured 7 days, so this note is not necessary - unless the designer specifically wants a 7 day cure on substructure units, etc.
	The contractor shall not be permitted to add additional amounts of cement to the approved mix design in order to obtain high early strength and/or reduce cure time.	OK	In process of adding to specs
	The abutment curtain wall and end block shall not be poured until after the superstructure is in place. The abutment bearing seat shall be finished to true elevation as shown on the plans.	OK	
REINFORCING STEEL:	All reinforcing steel bars shall be intermediate grade billet steel in accordence with ASSHTO M31, Grade 60, unless otherwise noted in the plans.	OK	
	The clear distance between the reinforcing steel and the face of the concrete shall be: Top of slab: 2.5 inches Bottom of Slab: 1.0 inches Bottom of footings: 3.0 inches All other locations: 2.0 inches	Note Not Required	Added to 2012 Supplemental. Section 602.
	All reinforcing steel bars in the deck are epoxy coated.	Note Not Required	Show in quantity tables.
	Include payment in Item 602002--001, Epoxy Coated Reinforcing Steel Bars.	Note Not Required	Show in quantity tables.
	Several bars in the abutments and wingwalls are epoxy coated. These bars are suffixed 'E' and include in pay Item 602002-001, Epoxy Coated Reinforcing Steel Bars. All other reinforcing steel bars in the abutments and wingwalls are uncoated reinforcing steel. Include payment in item 602001-001, Reinforcing Steel Bars.	Note Not Required	Show in quantity tables.
	All reinforcing bar dimensions are out to out. Minimum length of lap splice unless otherwise noted:	Note Not Required	Added to 2012 Supplemental. Section 602.7.1.
	* 4 - 1' - 9" * 8 - 4' - 11"		
	* 5 - 2' - 2" * 9 - 6' - 2"		
	* 6 - 2' - 9" * 10 - 7' - 10"		
	* 7 - 3' - 9" * 11 - 9' - 7"		
	For epoxy coated bars, theminimum lap splice length shall be increased by 50 percent at location where concrete cover is less than 3 bar diameters and 20 percent at all other locations.	Note Not Required	Added to 2012 Supplemental. Section 602.7.1.
PRESTRESSING REINFORCEMENT:	Prestressing Steel shall be 1/2 inch DIA (A=0.153 SQ IN), 270 - grade Low Relaxation uncoated seven (7) wire stabilized strand in accordance with AASHTO M203, Supplement S1, with minimum tensile strength (f's) of 270,000 PSI.	OK	
BOX BEAM NOTES:	The top surface of each beam shall receive a rough broom finish. All beams shall be treated with silane, see Sheet BR-B100.	OK	In process of adding to specs
	See Shet BR-101 for reinforcing steel bar detail.	Note Not Required	OK for emphasis.
	All reinforcing steel is Grade 60.	OK	
	Provide a 1/4 inch diameter vent in top of each void at the center of the void. Provide a Conasco, or equal void at each end of each void on the bottom surface of each beam. Ensure the void drains are open.	OK	In process of adding to specs
STRUCTURAL STEEL:	The lump sum bid for Item 615001-001, Steel Superstructure, shall include all structural steel complete in place, including elastomeric bearing pads and painting.	OK	In process of adding elastomeric bearing pads to 615.7 of specs.
	No field welding is permitted unless shown on the plans or approved by the Engineer.	OK	In process of adding to specs
	All girder flanges, webs and splice plates shall meet AASHTO M270 Grade 50-T2 or ASSHTO M270 Grade HPS-70W-T2 as specified in the plans. All other structural steel shall meet ASSHTO Grade 50W.	OK	
	All welding shall be in accordance with section 615.5.7 of the Standard Specifications.	Note Not Required	Already in 615.5.7 of the specs.
-	All welding shall comply with ANSI/AASHTO/AWS bridge welding code D1.5 current edition.	Note Not Required	Already in 615.5.7 of the specs.

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HEADING:	NOTE:	DISPOSITION:	COMMENT:
BLAST CLEANING AND PAINTING:	Upon completion of all fabrication operations in the shop, and before shipment to the project site, all weathering steel bridge components shall be blast cleaned to a Near White surface condition according to SSPC-SP 10. Prior to the start of any blast cleaning all oil, grease, cutting fluids, or other foreign matter shall be removed from the surfaces of the steel by solvent cleaning according to SSPC-SP 1.	OK	In process of adding to specs
	The members or portions of members listed below shall be blast cleaned and shop painted according to Section 688 using the Inorganic Zinc Rich, Low VOC System, Section 711.22. Apply the full paint system in the fabrication shop, except faying surfaces of high strength bolted connections, which shall be shop painted with primer only. The color of the final top coat shall be 30045 according to Federal Standard 595 and the Gloss at an angle of 60 degrees shall not exceed 25.	OK	In process of adding to specs
	Paint the ends of the girders and all other structural components encased in the concrete abutment plus on additional foot in length.	OK	In process of adding to specs
	Areas of the shop applied paint system which are damaged during erection and high strength bolted connection areas that were only prime painted shall be properly cleaned and painted according to Section 688, and to the satisfaction of the Engineer.	OK	In process of adding to specs
	After completion of all tightening operations, mechanical galvanized fasteners shall be solvent cleaned and field painted as specified for the structural steel.	OK	In process of adding to specs
	Include cleaning and painting costs in item 615001-001, Steel Superstructure.	Note Not Required	Use for added emphasis
	For integral abutment structures, the crevice between the embedded steel and the concrete shall be suitably chamfered to provide for placement of a sealant. Seal the crevice with a sealant material meeting the requirements of ASTM C920, Type S, Grade NS, Class 25, Uses NT and M. Sealant shall be suitable for bonding between concrete and the top coat of the specified paint system. Acid-cure sealants are not allowed. Include payment in item 615001-001, Steel Superstructure.	OK	In process of adding to specs
IDENTIFICATION MARKING OF STEEL MEMBERS:	All steel mill and fabricator identification markings for steel plates, shapes, or fabricated members shall be by metal tags, soapstone, or some other readily removable material; or, shall be marked in an area of the completed member which will be encased or covered with concrete. Marking methods and locations are subject to approval of the Engineer.	OK	In process of adding to specs
	Do not use paint or wax-based crayons for marking.	OK	In process of adding to specs
HANDLING AND STORING STEEL MEMBERS:	Steel members must not be gouged, scratched, dented, or allowed to rub against other members that would result in damage to the blast cleaned profile of the steel. Members shall be handled using softeners and slings instead of chokers and chains.	OK	In process of adding to specs
	Store members in the fabrication shop and on the project site in such a manner as to be kept free and clean of all foreign substances such as grease, oil, mortar and concrete splatter, chalk and crayon marks, paint, and dirt. All storage must be above ground and sloped to allow free drainage of melted snow, rainwater and dew. If stored for periods longer than 3 months, the members must be placed on metal supports. For periods of storage up to 3 months, members may be placed on clean, untreated, wood timbers.	OK	In process of adding to specs
	Store plate girders and rolled beams with the web in the upright position. The members may be stacked provided metal or wood supports, as noted above, separate individual members. Under no circumstances shall members be nesting together or bundled.	OK	In process of adding to specs
	Do not allow treated lumber or treated timber to contact steel members. Contact with clean, untreated, lumber or timber will not damage the steel members.	OK	In process of adding to specs
FINAL CLEANUP OF STRUCTURAL STEEL SURFACES:	Upon completion of all concrete curing operations, the contractor shall clean all steel surfaces to remove all grease, oil, concrete residue, dirt, and other foreign substances to the satisfaction of the Engineer.	OK	In process of adding to specs
	Cleaning may be by high pressure water, power or hand wire brushing, or by Brush-off Blast Cleaning according to SSPC-SP 7. Cleaning shall be followed by a clean water rinse to remove all residue of detergents and cleaners if they were used. All grease and oil shall be removed prior to the clean water rinse by Solvent Cleaning.	OK	In process of adding to specs
	Do not use acids to remove stains.	OK	In process of adding to specs
	Include costs for final cleanup of steel surfaces in item 615001-001.	Note Not Required	Use for added emphasis
PROTECTION OF CONCRETE SUBSTRUCTURE:	Before placing any steel superstructure members on the concrete substructure units, the Contractor shall coat all exposed areas of the abutments, and tops, sides and all faces of pier stems to the ground or water line elevation with an approved saline based concrete sealer. Preparations of surfaces, application rates, and methods shall be recommended by the silane manufacturer.	OK	In process of adding to specs
	The Contactor shall take appropriate measures to protect the concrete substructure from rust staining during construction and curing the superstructure concrete. Water runoff from concrete curing operations shall be deflected away from the steel girders and shall not drain onto the substructure concrete after contacting the weathering steel.	OK	In process of adding to specs
	Upon completion of all superstructure concrete curing operations, the Contractor shall remove all rust stains from substructure units using proprietary chemical stain removers or mild acid etching. Abrasive blast cleaning may be used to supplement the other cleaning methods if the stained areas are severe or extensive. All cleaning methods shall be subject to approval of the Engineer.	OK	In process of adding to specs
	Re-coat substructure concrete at all areas where rust stains were removed, regardless of the cleaning method used, with an approved silane based concrete sealer as specified above.	OK	In process of adding to specs
	Include the cost of silane coating, protecting, cleaning, and re-coating substructure units in item 601002-001, Class B Concrete.	OK	In process of adding to specs
FASTENERS:	All fasteners shall be 7/8" High Strength Bolts (AASHTO M164), unless otherwise noted. The threaded ends of the bolts shall be placed on the inside where practical for protection from the weather.	OK	
	Holes shall be 1/16" larger that the nominal diameter of the fasteners.	Note Not Required	
	High strength fasteners shall meet Section 709.24 and shall be black (uncoated) Type 3 (weathering steel). The high strength fasteners used in regions of the structure that require painting shall be Type 1 or 3 and shall be mechanically galvanized.	OK	
	Before assembling the high strength bolted connections, remove all loose and non-adherent rust that may have formed on the connection areas by hand or power brushing.	Note Not Required	Added to 2012 Supplemental
ANCHOR BOLTS:	Anchor bolts shall be galvanized in accordance with AASHTO M111. Cost shall be included in the price pays for Item 615001-001, Steel Superstructure.	Note Not Required	Already in 615.7.1 and 615.3.7 of the specs
	Anchor bolt, nuts and washers may be manufactured from ordinary mild steel and shall be hot-dipped galvanized according to AASHTO M111 after fabrication. The fabricator's shop drawings shall identify the material specifications and grade for each item and are subject to approval of the Engineer.	OK	Already in 615.3.7 of specs. In process of adding to specs
	The Contractor shall coordinate installation of anchor bolts and erection of pier / abutment diaphragms to avoid any construction conflicts. Where applicable, fill anchor bolt holes with non-shrink grout in accordance with Section 715.5 of the Standard Specifications after set. Cost shall be included in Item 601002-001, Class B Concrete.	Note Not Required	
EXCAVATION:	All excavation outside the limits shown for structure excavation shall be paid for as unclassified excavation, Item 207001-001 in Roadway Quantities.	Note Not Required	Limits shown in plans. May use for added emhasis
	No excavation is to be classified as rock excavation. All excavation within the limits shown on the plans, shall be paid for as Structure Excavation, Item 212001-00. Excavate rock or shale under this classification to the footing only.	Note Not Required	Limits shown in plans. May use for added emhasis
	Any shoring required shall be incidental to Item 212001-000, Structure Excavation.	Note Not Required	Already in 212 spec. May use for added emphasis.
	Shoring shall be required between CR XXX and Pier XXX.	OK	

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BACKFILL:	The Contractor shall backfill around the substructure as soon as possible after from removal and slope the surfaces to drain, all in accordance with Subsection 212.10 of the Standard Specifications.	Note Not Required	Already in 212.10 spec.
FOUNDATION PROTECTION:	Stone for foundation protection at the abutments shall be paid for under Item 218006-000, Foundation Protection and in accordance with Section 218.4.	Note Not Required	Already in 218.4 spec.
JOINT FILLER:	Preformed joint filler for vertical joints in the superstructure shall be sponge rubber in accordance with Section 708.1.1. The cost shall be included in Item 601002.001, Class B Concrete.	OK	In process of adding to specs
	All joint filler for vertical joints in the substructure shall be accordance with Section 708.1.2. The cost shall be included in Item 601002.001, Class B Concrete.	OK	In process of adding to specs
SCOUR PROTECTION:	The average stone size for scour protection for this bridge is xx inches. Uniformly grade the rock for scour protection as follows:	OK	
	Percentage of Gradation Stone Size Smaller than: 29 Inch 100% 24 Inch 85% 18 Inch 50% 9 Inch 15%	OK	
	The stone shall be well graded throughout the scour protection thickness as decided by the Engineer by visual inspection. Stones smaller than the specified 15% are not allowed in an amount exceeding 20% by weight. Material shall consist of rock of a quality satisfactory to the Engineer. The use of shale are not permitted.	Note Not Required	Added to 2012 Supplemental. Section 218.
	Stone for scour protection at the abutments shall be paid for under Item 211002-000, Rock Borrow Excavation per cubic yard.	OK	
SELECT MATERIAL FOR BACKFILLING:	Select material for backfilling shall be placed to the limits shown on the plans and in accordance with Section 212.10 of the specifications. All material & labor costs shall be paid for in Item 212005-000, Select Material For Backfilling.	Note Not Required	Already in 212.10 spec.
	Six inch diameter under drain pipe meeting the requirements of Section 714.19, shall be installed as shown on the plans. Only portions of the pipe which lie within the select backfill shall have perforations. Concrete under drain slope walls shall be constructed in accordance with Standard Drawing M.S. 7-A. DR-8	OK	
FISH SPAWNING:	In steam work is not permissible during the warm water fish spawning season, April through June, except as may be authorized by the West Virginia Department of Natural Resources Section. The Contractor is cautioned to review the conditions of the permit included in these contract documents.	OK	
DISMANTLING STRUCTURE:	The temporary bridge shall remain in service until the new structure is erected and open to traffic.	OK	
	Item 203001-000, Dismantling Superstructures, per lump sum, shall include the removal and disposal of the existing superstructure and abutment xx in its entirety. Abutment XX shall be removed 2 foot below finished ground.	OK	
	In accordance with the specifications. All material removed shall become the property of the contractor and shall be removed from the right-of-way in accordance with the current regulations for disposal of materials.	Note Not Required	Added to 2012 Supplemental. Section 203.3.
	Ground lines, final slopes and slope dressing shall be in directed by the Engineer.	Note Not Required	Added to 2012 Supplemental. Section 203.3.
	The final ground lines around the excavated substructure of the existing bridge substructure units shall conform closely to the final grading around the new bridge abutments so as to maintain continuity of the stream bank slopes.	Note Not Required	Added to 2012 Supplemental. Section 203.3.
	Piers shall be dismantled to the elevation delineated by the hatched area shown on the pier sheets.	Note Not Required	
	The Contractor shall submit his procedure for dismantling the structure to the Engineer per the Standard Specifications.	Note Not Required	Already in 203 spec.
	Best management practices shall be used in the structural removal. The Contractor shall use extreme caution to prevent debris from falling into the river. Any and all steel reinforcement, and all concrete debris in excess of 8" nominal size, shall be removed from the river.	OK	
	Inspection documents are available for review in the departments Operations Division.	Note Not Required	Already in 203 spec.
	The Contractors attention is directed to the fact that the existing bridge may contain Lead Based Paint Coating. Inspection documents for the existing structure are available for review in the Maintenance Division and District XX Office.	Use for added emphasis	Already in 203 spec.
TEMPORARY BRIDGE:	The Contractor shall erect and maintain a temporary bridge at the location shown on the plains prior to closing the existing bridge. It shall be maintained until the new bridge is open to traffic. The bridge length shall be determined by applying the following minimum superstructure elevation and net waterway opening.	OK	
	The Temporary Bridge shall have a clear roadway width of xx' - xx".	OK	
	A minimum net waterway opening of xxx SQ FT below elevation xxx. The stream bank slope shall be limited to a maximum of xx horizontal to 1.0 vertical.	OK	
	The structure shall be designed for HL - 93 live loading.	Move to DESIGN section of general notes	
	The use of used material is acceptable. Such material shall be inspected visually and accepted by the Engineer prior to its use. The design and plans for the temporary structure shall be submitted to the Engineer for approval before beginning construction. ~~If the plans and calculations submitted for review are not satisfactory to the Engineer, the Contractor shall make such changes in them as may be required.~~	Note Not Required	Added to 2012 Supplemental. Section 636.5.
	Erection, maintenance, and removal of the structure and embankment shall be paid for under Item 636005-001, Temporary Structure for Maintaining Traffic.	Note Not Required	Added to 2012 Supplemental. Section 636.23.4.
SHEAR STUD CONNECTORS:	The welded shear studs shall be installed in accordance with Section 615.3.3, except as follows:	Note Not Required	Already in 615.3.3 spec.
	"The Contractor may shop install shear studs to the beam or girder for the purpose of attaching a worker fall protection system. Only the shear studs required to shop. All shop installed shear studs for the purpose of attaching a worker fall protection system shall be shown on the shop drawings."	Note Not Required	Already in 615.3.3.1 spec.
	The field installation of the connectors shall not commence prior to the installation of deck forms in the area surrounding the studs. Exterior deck overhang forms may be installed after the welded stud shear connectors. The shear connectors and deck forms shall be installed in a sequence that permits workers access through the deck area without walking through installed connectors.	Note Not Required	Already in 615.3.3 spec.
PILING:	All piling shall be in accordance with AASHTO M223, Grade 50 (FY - 50,000 PSI).	OK	
	All piling shall be installed in accordance with section 616.12 of the Supplemental Specifications.	Note Not Required	Already in 616.12 spec.
	Pile driving construction tolerances shall be with in three inches.	Note Not Required	Conflicts with 616.6 of spec.
	All piling shall be predrilled a minimum of 10 foot and driven to refusal into the foundation strata as indicated by the estimated pile tip elevations.	OK	616.12
	Refusal is defined as the equivalent of 20 blows for 1 inch or less of penetration with a power hammer developing a minimum capacity of 15,000 foot pounds of energy per blow. If larger hammer is used, the number of blows in the last 1 inch of penetration may reduced in direct proportion to the energy rating of the hammer, but no less than 12.	OK	Actually in 616.8.2 of specs, but does not specify text in red.
	Before beginning pile driving, the Contractor shall provide a written certification to the Engineer that the pile drivers, air compressors, and air valves have been inspected and found to be in good working condition.	Note Not Required	Already in 616.4.1 spec.

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	New stock material may be used for steel bearing piles, provided that each piece can be identified by heat number and provided that certified mill test reports are furnished to the Department indicating that the material conforms that the specifications.	OK	616.2
	Abutment Piles shall be HP xxXxx piling shall have a maximum design load of xxx tons.	OK	
	Payment for the Predrilled and Driven Piling shall be included in Item 616005-00X, HP xxXxx Steel Bearing Pile, Predrilled and Driven.	Note Not Required	Show in quantity tables.
DECK SLAB OVERHANG FORM:	Deck slab overhang forms shall be supported from the bottom flange of fascia girders or stringers. The Contractor shall submit forming plans and supporting calculations for the overhang to the Engineer for approval prior to erecting the formwork.	OK	
CONSTRUCTION PERMITS:	The Contractor's attention is directed to Section 107.27.1.1 of the Supplemental Specifications dated January 1, 2003.	Use for added emphasis	
GEOTECHNICAL INFORMATION:			
	A copy of the geotechnical report is available upon request that includes geological and subsurface investigations. Additional information may be available. Any inquireries should be directed to:	Note Not Required	Already in 102.16 spec.
	Engineering Division WVDOT Building 5, Room 317 Kanawha Blvd. East Charleston, WV 25305	Note Not Required	Use of this note is discouraged. Inquires for any additional info should go thru Contract Admin.
CONTRUCTION LOAD LIMITATIONS:	No construction equipment with an axle load greater than 20,000 lbs. (20 kips) shall be permitted on the bridge deck.	OK	In process of adding to specs
	No construction equipment or loads that are not required to complete the slab, parapets, railing, overlay, laying or other appurtenances shall be allowed on the bridge deck.	OK	In process of adding to specs
ASBESTOS	The Contractor's attention is directed to the fact that the existing structure contains asbestos.	Use for added emphasis	
ERECTION REQUIREMENTS	The Contractor's attention is directed to Sections 615.6, Erection and 615.2.2, Erection Drawings, of the Standard Specifications.	Use for added emphasis	
ABBREVIATIONS:	AASHTO - AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS	OK	
	ABUT - ABUTMENT		
	BOS - BOTTOM OF SLAB; MAX - MAXIUM		
	BOT - BOTTOM; MIN - MINMUM		
	BRG - BEARING; NF - NEAR FACE		
	BTWN - BETWEEN; OD - OUTSIDE DIAMATER		
	CJ - CONSTRUCTION JOINT; OHW - ORDINARY HIGH WATER		
	CLR - CLEAR; PSI - POUND PER SQUARE INCH		
	CTR - CENTER; PVC - POLY VINYL CHLORIDE		
	¢ - CENTERLINE; R - RADIUS		
	CY - CUBIC YARD; RCJ - ROUGHNED CONSTRUCTION JOINT		
	DIA - DIAMETER; REC - RECOVERED		
	EA - EACH; REQ'D - REQUIRED		
	EF - EACH FACE; RQD - ROCK QUALITY DESIGNNATION		
	EL - ELEVATION; SER - SERIES		
	EOW - EDGE OF WATER; SF - SQUARE FOOT		
	EQ - EQUAL; SIP - STAY-IN-PLACE		
	ES - EACH SIDE; SPA - SPACES		
	EXP - EXPANSION; SQ - SQUARE		
	FF - FAR FACE; STA - STATION		
	FS - FIELD SPLICE; T&B - TOP & BOTTOM		
	FTG - FOOTING; TOS - TOP OF SLAB		
	GA - GAUGE; TYP - TYPICAL		
	GDR - GIRDER; VC - VERTICAL CURVE		
	HS - HIGH STRENGTH; VCJ - VERTICAL CONST.JOINT		
	ID - INSIDE DIAMETER; WP - WORK POINT		
	INT - INTERGRAL		
	LF - LINEAR FOOT		
	LRFD - LOAD REDUCTION FACTOR DEISGN		
	LS - LUMP SUM		
	MAT - MATERIAL		