

THIS WORK CONSISTS OF PREPARING EXISTING SOUND CONCRETE SURFACES, DESIGNING THE SYSTEM TO MEET THE REQUIREMENTS IN THE PLANS, AND FURNISHING AND INSTALLING A STRUCTURAL CARBON FIBER REINFORCED POLYMER (CFRP) COMPOSITE WRAP SYSTEM ON THE EXISTING PIER COLUMNS WHERE INDICATED IN THE PLANS. THIS WORK ALSO INCLUDES PROVIDING THE NECESSARY LABOR, MATERIALS, AND EQUIPMENT TO ACCESS THE REPAIR LOCATIONS. THE STRUCTURAL CFRP SYSTEM SHALL BE CAPABLE OF PROVIDING A CONFINING STRESS OF 300 PSI FOR THE ENTIRE AREA OF THE REPAIR PERFORMED. REMOVAL OF UNSOUND AND DETERIORATED EXISTING CONCRETE AND CONCRETE PATCH MATERIAL AND INSTALLATION OF A SOUND TROWELABLE MORTAR SHALL BE PAID FOR SEPARATELY.

WORK SHALL BE PERFORMED IN ACCORDANCE WITH PROPOSAL NOTE 519 – COMPOSITE FIBER WRAP SYSTEM AND THE PROVISIONS OF THIS NOTE. THE CFRP WRAP SYSTEM SHALL BE APPLIED TO THE ENTIRE PERIMETER OF THE PREPARED CONCRETE SURFACE OF EACH PIER COLUMN FOR THE HEIGHT INDICATED IN THE PLANS. THE ESTIMATED QUANTITY PROVIDED IN THE PLANS WAS CALCULATED USING A PERIMETER EQUAL TO TWO TIMES THE ORIGINAL BASIC LENGTH AND WIDTH DIMENSIONS OF THE COLUMN EXTENDED BY AN ADDITIONAL 2.5" OF TROWABLE MORTAR APPLIED TO EACH FACE OF THE COLUMN.

METHOD OF MEASUREMENT.  
THE DEPARTMENT WILL MEASURE THE STRUCTURAL CFRP COMPOSITE WRAP SYSTEM BY THE NUMBER OF SQUARE FEET OF CONCRETE SURFACE WRAPPED TO A CONFINING STRESS OF 300 PSI.

BASIS OF PAYMENT. THE DEPARTMENT WILL PAY FOR REPAIR OF UNSOUND, CRACKED, OR SPALLED CONCRETE SUBSTRATE SEPARATELY. THE DEPARTMENT WILL CONSIDER THE COST FOR FILLING SURFACE IRREGULARITIES IN SOUND CONCRETE SUBSTRATE IN ORDER TO PROVIDE A SMOOTH AND CONTINUOUS SURFACE AS INCIDENTAL TO THIS WORK. THE DEPARTMENT WILL CONSIDER THE REMOVAL OF OBSTRUCTIONS AS INCIDENTAL TO THIS WORK, BUT THE DEPARTMENT WILL PAY FOR REINSTALLATION OR RELOCATION OF OBSTRUCTIONS SEPARATELY. THE DEPARTMENT WILL CONSIDER LAP SPLICES IN THE CFRP WRAP SYSTEM AS INCIDENTAL TO THIS WORK. THE DEPARTMENT WILL PAY FOR ACCEPTED QUANTITIES OF THE COMPLETED CFRP COMPOSITE WRAP SYSTEM INCLUDING PREPARATION OF THE CONCRETE SUBSTRATE SURFACES AS FOLLOWS:

ITEM	UNIT	DESCRIPTION
530E00600 SPECIAL	SQUARE FOOT	STRUCTURES: STRUCTURAL
CFRP		

**ITEM SPECIAL - STRUCTURES: PATCHING CONCRETE  
STRUCTURES WITH TROWELABLE MORTAR**

THIS ITEM CONSISTS OF FURNISHING AND PLACING TROWELABLE MORTAR ON THE EXISTING PIER COLUMNS WHERE INDICATED IN THE PLANS, IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 843 AND THESE ADDITIONAL PROVISIONS. THIS ITEM ALSO INCLUDES PROVIDING THE NECESSARY LABOR, MATERIALS, AND EQUIPMENT TO ACCESS THE REPAIR LOCATIONS.

ALL UNSOUND CONCRETE (INCLUDING PREVIOUSLY PATCHED AREAS) WHERE INDICATED IN THE PLANS SHALL BE REMOVED AS PER THE REQUIREMENTS OF SS843. AT NO TIME SHALL CONCRETE REMOVAL EXTEND MORE THAN 1" CLEAR BEHIND THE VERTICAL COLUMN REINFORCING STEEL. AFTER REMOVING ALL LOOSE, SOFT, HONEYCOMBED, AND DISINTEGRATED CONCRETE, FURNISH, INSTALL, AND TEST PRE-MANUFACTURED GALVANIC ANODES DESIGNED FOR CATHODIC PROTECTION IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 844.

TROWELABLE MORTAR SHALL BE HYDRAULIC CEMENT-BASED MATERIAL WITH AN ELECTRICAL RESEISTIVITY LESS THAN 50,000 OHM-CM ACCORDING TO ASTM C 1760 OR THE REQUIREMENTS OF THE GALVANIC ANODE SYSTEM, WHICHEVER IS MORE STRINGENT. DO NOT USE NON-CONDUCTIVE REPAIR MATERIALS SUCH AS MAGNESIUM AMMONIUM PHOSPHATE AND EPOXY MORTARS OR BONDING AGENTS. CONCRETE AND MORTAR MIXES CONTAINING HIGH LEVELS OF SUPPLEMENTARY CEMENTITIOUS MATERIALS SUCH AS SILICA FUME, GROUND-GRANULATED BLAST FURNACE SLAG, LATEX, FLY ASH, OR METAKAOLIN MAY NOT MEET THE RESISTIVITY REQUIREMENT.

THE TROWELABLE MORTAR SHALL BE INSTALLED TO PROVIDE A FLAT, RECTANGULAR COLUMN SECTION WITH CHAMFERED CORNERS AND MEET THE SMOOTHNESS REQUIREMENTS OF THE STRUCTURAL CFRP INSTALLATION (SEE PROPOSAL NOTE 519). EXISTING COLUMN REINFORCING SHALL HAVE AT LEAST 1.5" OF COVER AT THE COMPLETION OF THE WORK. THE EXISTING ARCHITECTURAL RELIEF OF THE COLUMNS SHALL BE FILLED IN TO PROVIDE A FLAT, RECTANGULAR SECTION. AT THE CONTRACTOR'S OPTION, THE FULL COLUMN MAY BE ENCASED BY WIDENING THE COLUMN DIMENSIONS BY NO MORE THAN 2.5" IN EACH DIRECTION TO ALLOW A FULL MORTAR SUBSTRATE TO ENCOMPASS THE ENTIRE EXISTING PIER COLUMN.

FOR EACH ITEM 513E95030 – STRUCTURAL STEEL, MISC: STEEL  
PLATE CONFINEMENT ASSEMBLY INSTALLATION, 58 SQUARE FEET  
OF TROWELABLE MORTAR HAS BEEN INCLUDED IN THE ESTIMATED  
QUANTITY FOR ITEM SPECIAL - STRUCTURES: PATCHING CONCRETE  
STRUCTURES WITH TROWELABLE MORTAR. THE MORTAR IN THESE  
AREAS SHALL BE APPLIED TO THE EAST AND WEST COLUMN FACES  
AND TO THE END FACE RECEIVING THE STEEL PLATE CONFINEMENT  
ASSEMBLY INSTALLATION FOR THE ENTIRE HEIGHT OF THE SECOND  
COLUMN SEGMENT AS INDICATED IN THE PLANS, AND COVER ALL  
EXPOSED EXISTING REINFORCING AND THE OUTER THREADED  
BARS OF THE STEEL PLATE CONFINEMENT ASSEMBLY. THE  
MORTAR SHALL ONLY BE PLACED IN THESE AREAS AFTER  
INSTALLATION OF THE STEEL PLATE CONFINEMENT ASSEMBLIES  
HAS BEEN ACCEPTED.

METHOD OF MEASUREMENT. THE DEPARTMENT WILL MEASURE THE TROWELABLE MORTAR BY THE NUMBER OF SQUARE FEET OF PIER COLUMN REPAIRED. THE DEPARTMENT WILL MEASURE ALL COMPLETED, TESTED, AND APPROVED PATCHES, IRRESPECTIVE OF DEPTH OR THICKNESS OF THE PATCH. THE DEPARTMENT WILL SEPARATELY MEASURE THE NUMBER OF INSTALLED AND ACCEPTED GALVANIC ANODES IN ACCORDANCE WITH SS 844.

BASIS OF PAYMENT. THE DEPARTMENT WILL NOT PAY FOR ADDITIONAL REINFORCEMENT TO REPLACE THAT DAMAGED BY THE CONTRACTOR'S OPERATIONS. THE DEPARTMENT WILL NOT PAY FOR REMOVING, REPLACING, AND RE-INSPECTING OF DEFECTIVE PATCHES AS DETERMINED BY SOUNDING, VISIBLE CRACKS, OR UNACCEPTABLE CORES. THE DEPARTMENT WILL SEPARATELY PAY FOR FURNISHING AND INSTALLING REINFORCING STEEL THAT IS USED TO REPLACE EXISTING REINFORCING DEEMED BY THE ENGINEER TO BE UNUSABLE BECAUSE OF CORROSION. THE DEPARTMENT WILL SEPARATELY PAY FOR FURNISHING AND INSTALLING GALVANIC ANODES IN ACCORDANCE WITH SS 844.

THE DEPARTMENT WILL PAY FOR ACCEPTED QUANTITIES AT THE CONTRACT PRICE AS FOLLOWS.

ITEM	UNIT	DESCRIPTION
530E00600 SPECIAL	SQUARE FOOT	STRUCTURES: PATCHING
CONCRETE STRUCTURES WITH TROWELABLE MORTAR		

ITEM 513 – STRUCTURAL STEEL, MISC.: STEEL PLATE  
CONFINEMENT ASSEMBLY

IN ADDITION TO THE REQUIREMENTS OF ITEM 513, THIS WORK CONSISTS OF FURNISHING AND FABRICATING STEEL PLATES, FURNISHING AND INSTALLING THREADED RODS AND ASSOCIATED NUTS AND WASHERS, PREPARING THE EXISTING CONCRETE SURFACES, LOCATING THE EXISTING PIER COLUMN REINFORCING, DRILLING HOLES THROUGH THE EXISTING PIER COLUMNS, AND COMPLETING THE INSTALLATION OF ALL STEEL CONFINEMENT COMPONENTS. THIS WORK ALSO INCLUDES PROVIDING THE NECESSARY LABOR, MATERIALS, AND EQUIPMENT TO ACCESS THE REPAIR LOCATIONS.

STEEL FABRICATION AND MATERIALS SHALL BE PER CMS 513 (LEVEL UF).

THE EXISTING ARCHITECTURAL REVEAL/EXTENSION AT THE COLUMN CORNERS SHALL BE REMOVED TO PROVIDE A UNIFORM BEARING SURFACE FOR THE STEEL CONFINEMENT PLATE. ALL SOUND AND UNSOUND CONCRETE SHALL BE REMOVED TO PROVIDE A UNIFORM BEARING SURFACE FOR THE STEEL PLATES. REMOVAL SHALL BE INCLUDED IN THE COST OF THIS REPAIR AND SHALL BE PERFORMED AS PER SS843 REQUIREMENTS. AS DIRECTED BY THE ENGINEER, USE A BUSHHAMMER OR GRINDER FOLLOWED BY A THIN FILM OF PORTLAND CEMENT MORTAR OR PASTE TO PROVIDE A LEVEL, EVEN BEARING SURFACE.

FURNISH THREADED RODS, NUTS, AND WASHERS PER CMS 711.09. THREADED RODS, WITH A HEAVY DUTY WASHER AND TWO NUTS ON EACH END, MAY BE REPLACED BY ASTM F3125, GRADE A325, BOLTS AND A DOUBLE NUT ON ONLY ONE END.

ALL STEEL PLATES, THREADED RODS, NUTS, WASHERS, AND OTHER STEEL COMPONENTS SHALL BE GALVANIZED PER CMS 711.02, INCLUDING ANY REQUIRED FIELD TOUCH-UP.

FABRICATE THE STEEL PLATES WITH OVERSIZED HOLES FOR THE  
THREADED RODS.

PRIOR TO FIELD DRILLING HOLES THROUGH THE PIER COLUMNS AND FABRICATING THE STEEL PLATES, LOCATE THE EXISTING REINFORCING STEEL IN THE VICINITY OF THE PROPOSED HOLES TO VERIFY THE DRILLING OPERATION WILL NOT DAMAGE THE EXISTING REINFORCING. IF EXISTING REINFORCING STEEL INTERFERES WITH A PROPOSED HOLE LOCATION AND FIELD-FABRICATING HORIZONTAL, LONG SLOTTED HOLES PER AISC TABLE J3.3 IN THE PLATE WILL NOT ACHIEVE A PROPER FIT, A NEW GALVANIZED STEEL PLATE SHALL BE FURNISHED TO FIT THE REVISED HOLE PATTERN AT NO COST TO THE DEPARTMENT. THE FIELD-DRILLED HOLES THROUGH THE PIER COLUMN SHALL NOT BE MORE THAN 1/8" LARGER IN DIAMETER THAN THE THREADED ROD.

AFTER INSTALLATION OF THE STEEL PLATE CONFINEMENT ASSEMBLIES HAS BEEN COMPLETED AND ACCEPTED, APPLY TROWELABLE MORTAR IN THESE AREAS TO COVER ALL EXPOSED EXISTING REINFORCING STEEL AND THE OUTER THREADED RODS OF THE STEEL PLATE CONFINEMENT ASSEMBLY. FIFTY-EIGHT (58) SQUARE FEET OF TROWELABLE MORTAR HAS BEEN INCLUDED IN THE ESTIMATED QUANTITY FOR ITEM SPECIAL - STRUCTURES: PATCHING CONCRETE STRUCTURES WITH TROWELABLE MORTAR FOR EACH STEEL PLATE CONFINEMENT ASSEMBLY.

METHOD OF MEASUREMENT. THE DEPARTMENT WILL MEASURE THE STEEL PLATE CONFINEMENT ASSEMBLIES BY THE NUMBER OF EACH. EACH ASSEMBLY INCLUDES 2 STEEL PLATES, 4 THREADED RODS, 16 NUTS, AND 8 WASHERS.

BASIS OF PAYMENT. THE DEPARTMENT WILL CONSIDER THE COSTS FOR REMOVING EXISTING CONCRETE AND PROVIDING A UNIFORM BEARING SURFACE FOR THE STEEL CONFINEMENT PLATE AS INCIDENTAL TO THIS WORK. THE DEPARTMENT WILL CONSIDER THE COSTS FOR DRILLING THREADED ROD HOLES THROUGH THE EXISTING CONCRETE AS INCIDENTAL TO THIS WORK. THE DEPARTMENT WILL NOT PAY FOR FURNISHING NEW STEEL PLATES SO THE THREADED ROD HOLE LOCATIONS DO NOT INTERFERE WITH EXISTING REINFORCING STEEL, IF THE EXISTING REINFORCING WAS NOT PROPERLY LOCATED PRIOR TO FABRICATING THE PLATES. THE DEPARTMENT WILL SEPARATELY PAY FOR APPLYING TROWELABLE MORTAR. THE DEPARTMENT WILL PAY FOR ACCEPTED QUANTITIES OF STEEL PLATE CONFINEMENT ASSEMBLIES AS FOLLOWS:

ITEM	UNIT	DESCRIPTION
513E95030	EACH	STRUCTURAL STEEL, MISC: STEEL
PLATE CONFINEMENT ASSEMBLY		