

**FOR INFORMATIONAL USE ONLY - DO NOT USE TO SUBMIT YOUR BID**

Department of Public Works Nassau County, N.Y.

Bid Sheets for Contract: H61587-74G

Item No	Engineers Estimate	Unit	Item Description			
203.02	1,695	CY	UNCLASSIFIED EXCAVATION AND DISPOSAL	For:		
203.07	10	CY	SELECT GRANULAR FILL	For:		
206.0201	10	CY	TRENCH AND CULVERT EXCAVATION	For:		
209.11010024	140	EA	TEMPORARY CATCH BASIN INSERT TRASH, SEDIMENT AND DEBRIS REMOVAL	For:		
304.10119917	100	CY	SUBBASE COURSE, TYPE 1011-2	For:		
404.0971	2,065	TON	9.5 F1 TOP COURSE ASPHALT, 70 SERIES COMPACTION	For:		
404.1979	655	TON	19 F9 BINDER COURSE ASPHALT, 70 SERIES COMPACTION	For:		
404.3779	1,360	TON	37.5 F9 BASE COURSE ASPHALT, 70 SERIES COMPACTION	For:		
407.0102	10,985	GAL	DILUTED TACK COAT	For:		
490.10	20,225	SY	PRODUCTION COLD MILLING OF BITUMINOUS CONCRETE	For:		
490.30	4,345	SY	MISCELLANEOUS COLD MILLING OF BITUMINOUS CONCRETE	For:		
502.10010018	1	LS	PORTLAND CEMENT CONCRETE PAVEMENT REPAIR EVALUATION AND MARK-OUT	For:		

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Item No	Engineers Estimate	Unit	Item Description			
502.90010018	93,165	LF	CLEAN AND FILL CRACKS AND JOINTS IN PORTLAND CEMENT CONCRETE (PCC) PAVEMENT, ASTM D 6690 TYPE IV	For:		
502.9210	21,630	LF	SEALING TRANSVERSE JOINTS - HIGHWAY JOINT SEALANT	For:		
502.9310	13,190	LF	SEALING LONGITUDINAL JOINTS - HIGHWAY JOINT SEALER	For:		
510.01210018	2,645	CY	PORTLAND CEMENT CONCRETE (PCC) FOR FULL-DEPTH PAVEMENT REPAIRS - MESH REINFORCED, HES, FRICTION TYPE 1	For:		
510.20000018	10,540	SY	PORTLAND CEMENT CONCRETE (PCC) PAVEMENT LIFT OUT	For:		
510.81000018	16,870	EA	DRILL AND ANCHOR DOWELS FOR PCC PAVEMENT REPAIRS	For:		
510.91000018	80	LF	TRANSVERSE JOINTS FOR PCC PAVEMENT REPAIRS	For:		
511.70000018	610	SF	PARTIAL-DEPTH REPAIR OF PORTLAND CEMENT CONCRETE PAVEMENT - CLASS HES CONCRETE	For:		
520.05000010	1,305	LF	SAW CUTTING PCC AND COMPOSITE PAVEMENT	For:		
520.09000010	3,530	LF	SAW CUTTING ASPHALT CONCRETE	For:		
552.17	235	SF	SHIELDS AND SHORING	For:		
586.0201	95	EA	DRILLING AND GROUTING BOLTS OR REINFORCING BARS	For:		

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Item No	Engineers Estimate	Unit	Item Description			
603.6118	30	LF	REINFORCED CONCRETE PIPE CLASS IV, 18 INCH DIAMETER	For:		
604.07200110	11	EA	SETTING NEW DRAINAGE FRAMES ON EXISTING DRAINAGE STRUCTURES	For:		
604.07210110	7	EA	RESETTING EXISTING DRAINAGE FRAMES ON EXISTING DRAINAGE STRUCTURES	For:		
604.07240110	8	EA	REBUILDING TOP OF EXISTING DRAINAGE STRUCTURE	For:		
604.07260011	1	EA	CONNECTION TO EXISTING DRAINAGE FACILITIES	For:		
604.07290010	75	SF	REPAIR WALLS OF EXISTING DRAINAGE STRUCTURES	For:		
604.501012	15	LF	SPECIAL DRAINAGE STRUCTURE	For:		
606.5348	220	LF	RESETTING BOX BEAM GUIDE RAIL (NEW POSTS)	For:		
606.76	28	EA	REMOVING AND DISPOSING OF GUIDE POSTS, GUIDE RAIL POSTS, AND MEDIAN BARRIER POSTS	For:		
608.0102	25	CY	ACCELERATED CURE SIDEWALKS AND DRIVEWAYS	For:		
608.01050010	235	CY	CONCRETE SIDEWALKS - UNREINFORCED (GRADING INCLUDED)	For:		
608.01050109	14	EA	CURB RAMP CONGIFURATION TYPE 1	For:		

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Item No	Engineers Estimate	Unit	Item Description			
608.01050309	14	EA	CURB RAMP CONGIFURATION TYPE 3	For:		
608.01050509	17	EA	CURB RAMP CONGIFURATION TYPE 5	For:		
608.01050809	12	EA	CURB RAMP CONGIFURATION TYPE 8	For:		
608.01051009	4	EA	CURB RAMP CONGIFURATION TYPE 10	For:		
608.01051109	6	EA	CURB RAMP CONGIFURATION TYPE 11	For:		
609.04010510	190	LF	CAST-IN-PLACE CONCRETE CURB (GRADING INCLUDED) TYPE VF6	For:		
609.04020510	560	LF	CAST-IN-PLACE CONCRETE CURB (GRADING INCLUDED) TYPE VF6A	For:		
610.1403	155	CY	TOPSOIL - LAWNS	For:		
610.1602	780	SY	TURF ESTABLISHMENT - LAWNS	For:		
614.060403	8	EA	TREE REMOVAL OVER 18 INCHES TO 24 INCHES DIAMETER BREASTHEIGHT - STUMPS CUT TO BELOW GRADE	For:		
614.0701	7	EA	PRE-EXISTING STUMP REMOVAL UP TO 24 INCH DIAMETER AT 6 INCHES ABOVE GRADE	For:		
614.0702	5	EA	PRE-EXISTING STUMP REMOVAL OVER 24 INCH TO 48 INCHDIAMETER AT 6 INCHES ABOVE GRADE	For:		

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Item No	Engineers Estimate	Unit	Item Description			
619.01	1	LS	BASIC WORK ZONE TRAFFIC CONTROL	For:		
619.04	190	EA	TYPE III CONSTRUCTION BARRICADE	For:		
619.0901	3,365	LF	TEMPORARY PAVEMENT MARKINGS STRIPES (TRAFFIC PAINT)	For:		
619.110511	36	EA	(PVMS) STANDARD SIZE - FULL MATRIX (LED) NO OPERATIONAL EQUIPMENT SPECIFIED, NO CELLULAR COMMUNICATIONS REQUIRED	For:		
619.24	1	LS	NIGHTTIME OPERATIONS (ENITRE PROJECT)	For:		
621.03	1,045	LF	CLEANING CLOSED DRAINAGE SYSTEMS	For:		
621.04	135	EA	CLEANING DRAINAGE STRUCTURES	For:		
625.01	1	LS	SURVEY OPERATIONS	For:		
640.25000010	390	LF	BLUE REFLECTORIZED PAVEMENT MARKING PAINT FOR HANDICAPPED PARKING SPACES	For:		
645.5102	83	SF	GROUND-MOUNTED SIGN PANELS LESS THAN OR EQUAL TO 32 SF WITH Z-BARS	For:		
645.81	3	EA	TYPE A SIGN POSTS	For:		
647.51	14	EA	REMOVE AND DISPOSE SIGN PANEL, SIGN PANEL ASSEMBLY SIZE I (UNDER 30 SF)	For:		

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Item No	Engineers Estimate	Unit	Item Description			
655.07030010	1	EA	CAST FRAME F3, WITHOUT CURB BOX AND WITH RETICULINE GRATE G3	For:		
655.0706	11	EA	CAST FRAME F3, UNMOUNTABLE CURB BOX CU3 & RETICULINE GRATE G3	For:		
655.1202	9	EA	MANHOLE FRAME AND COVER	For:		
656.01	5,125	LB	MISCELLANEOUS METALS	For:		
680.51000010	8	EA	ALTER ELEVATION OF PULLBOXES	For:		
680.51111010	4	EA	SLIP RESISTANT SURFACE FOR CAST IRON PULLBOX COVERS	For:		
680.520202	45	LF	TRAFFIC SIGNAL CONDUIT, FLEXIBLE LIQUID TIGHT STEEL, 3/4"	For:		
680.54	595	LF	INDUCTANCE LOOP INSTALLATION	For:		
680.72	1,330	LF	INDUCTANCE LOOP WIRE	For:		
685.03120018	10	EA	RAISED REFLECTORIZED SNOWPLOWABLE PAVEMENT MARKERS (TWO-WAY YELLOW)	For:		
685.072001NA	71,355	LF	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT STRIPES - 20 MILS (TRIPLE DROP)	For:		
685.072002NA	44	EA	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT LETTERS - 20 MILS (TRIPLE DROP)	For:		

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Item No	Engineers Estimate	Unit	Item Description			
685.072003NA	63	EA	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT SYMBOLS - 20 MILS (TRIPLE DROP)	For:		
685.072004NA	5,750	LF	HIGHLY REFLECTORIZED WHITE EPOXY CROSS HATCHING - 20 MILS (TRIPLE DROP)	For:		
685.072006NA	66,580	LF	HIGHLY REFLECTORIZED YELLOW EPOXY PAVEMENT STRIPES - 20 MILS (TRIPLE DROP)	For:		
685.072007NA	1,015	LF	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT STRIPES (CROSS HATCHING) - 20 MILS (TRIPLE DROP)	For:		
697.03*	455,000	DC	FIELD CHANGE PAYMENT	For: ONE DOLLAR ZERO CENTS	\$1.00	
698.04*	1,900	DC	ASPHALT PRICE ADJUSTMENT	For: ONE DOLLAR ZERO CENTS	\$1.00	
698.05*	100	DC	FUEL PRICE ADJUSTMENT	For: ONE DOLLAR ZERO CENTS	\$1.00	
699.040001	1	LS	MOBILIZATION	For:		

H61587-74G

**Phase 74 Concrete Roadway Repair - Various Locations  
Nassau County, New York**

**CONTRACT NO. H61587-74G**

**GENERAL NOTES**

1) Specifications and Standards

All work included in the contract shall be in accordance with the January 1, 2025, Standard Specifications (US Customary) and Drawings, as modified and amended in the Contract Specifications and Drawings.

- a. New York State, Department of Transportation Standard Specifications.
- b. New York State, Department of Transportation “Special” Specifications.
- c. New York State, Department of Transportation “Special” Specifications for the County of Nassau, State of New York.

Contractor is directed to the installation detail sheets included in the plans for specific details regarding installation in accordance with the specification. In addition, notes are made in the “General Notes” section of the plan set to identify minor changes to the NYS Specification in order to comply with Nassau County standards.

2) Scope of Work

The scope of work entails the rehabilitation of the travel lanes and shoulders along the following roadways:

- a. Parking Field 6 & 7 Access Roads, Garden City – Court House Drive to Supreme Court Drive;
- b. Court House Drive, Garden City – County Seat Drive to Washington Avenue;
- c. 15<sup>th</sup> Street, Garden City – Suffolk Lane to Franklin Avenue
- d. West Street, Garden City – 15<sup>th</sup> Street to Old Country Road
- e. 1<sup>st</sup> Street, Mineola – Andrew Road to the west curb line of Mineola Boulevard;
- f. 1<sup>st</sup> Street, Mineola – West curb line of Main Street to Willis Avenue;
- g. Henry Street, Hempstead – Totten Street to approximately 160± feet south of Peninsula Boulevard;
- h. Henry Street, Freeport – Merrick Road to Sunrise Highway (NY 27);
- i. Henry Street, Freeport - Sunrise Highway (NY 27) to Broadway;
- j. North Grove Street, Freeport – Sunrise Highway (NY 27) to Brooklyn Avenue;
- k. Lawson Boulevard, Oceanside – Daly Boulevard to approximately 820± feet north of Daly Boulevard;
- l. Daly Boulevard, Oceanside – Hampton Road to approximately 800± feet east of Lawson Boulevard;

- m. Merrick Road, Rockville Centre – No. Centre Avenue to Ocean Avenue;
- n. Long Beach Road, Rockville Centre – Seaman Avenue to DeMott Avenue;
- o. Milburn Avenue, Baldwin – Sunrise Highway (NY 27) to Grand Avenue;
- p. Willis Avenue, Roslyn Heights – Northern State Parkway Eastbound entrance ramp to Gateway;
- q. Long Beach Road, Island Park – Austin Boulevard to approximately 200± feet north of Emerson Place;
- r. Dogwood Avenue, Franklin Square – Colonade Road to Nassau Boulevard; and
- s. Horton Avenue, Lynbrook – Merrick Road to Hendrickson Avenue.

The work includes full depth concrete pavement removal and replacement, partial depth concrete repairs, asphalt milling, asphalt overlay, installation of concrete curb, sidewalk, ADA compliant curb ramps, driveway aprons, topsoil, sod, seed, tree removal, replacement of pavement markings and traffic loops and other incidental work.

Due to the high volume of traffic, roadwork on the following roadways shall be performed during nighttime hours unless otherwise approved by the County:

- Parking Field 6 & 7 Access Roads, Garden City – Court House Drive to Supreme Court Drive;
- Court House Drive, Garden City – County Seat Drive to Washington Avenue;
- 15<sup>th</sup> Street, Garden City – West Street to Franklin Avenue
- West Street, Garden City – 15<sup>th</sup> Street to Old Country Road
- Henry Street, Hempstead – Totten Street to approximately 160± feet south of Peninsula Boulevard;
- Henry Street, Freeport – Merrick Road to Sunrise Highway (NY 27);
- Henry Street, Freeport - Sunrise Highway (NY 27) to Broadway;
- Lawson Boulevard, Oceanside – Daly Boulevard to approximately 820± feet north of Daly Boulevard;
- Daly Boulevard, Oceanside – Hampton Road to approximately 800± feet east of Lawson Boulevard;
- Long Beach Road, Rockville Centre – Seaman Avenue to DeMott Avenue;
- Milburn Avenue, Baldwin – Sunrise Highway (NY 27) to Grand Avenue;
- Willis Avenue, Roslyn Heights – Northern State Parkway Eastbound entrance ramp to Gateway;

The cost of the nighttime operations shall be included in Item 619.24.

All concrete curb and sidewalk repairs can be done during daytime hours, as approved by the County, subject to change due to roadway traffic volume.

Also, part of this project includes concrete curb and sidewalk repair around the County Courts located in Mineola, bounded by County Seat Drive, Old Country Road, Washington Avenue and Court House Road.

3) Right-of-Way (ROW)

No work outside the Nassau County ROW will be permitted under any circumstances unless property and/or easement rights are obtained and approved by the Nassau County Department of Public Works (NCDPW). Minor driveway, walkway and/or turf restoration will only be permitted after a signed release from the property owner has been obtained.

4) Coordination of Work at Intersections of New York State

All coordination requirements necessary due to the following notes are paid for under Item 619.01 "Basic Work Zone Traffic Control" of this contract.

- a. The contractor shall be responsible for and shall replace all signal interconnect cable, detector cable, conduit and all underground accessory equipment damaged during construction.
  - b. Prior to starting any work at this location, the Contractor shall notify the NYSDOT and Nassau County Department of Public Works Traffic Signal Section that a tone- out of signal equipment is needed.
  - c. All traffic signals shall be maintained in a traffic responsive operation and all interconnect, where existing, shall be maintained. The Contractor shall pay a liquidated damaged charge of \$2000.00 per calendar day if actuation and coordination is not maintained.
  - d. All vehicle detection and signal coordination must be maintained at all times. Splicing of inductance loop wire, shielded lead-in cable, and interconnect cable shall be allowed for temporary repairs during construction only. Temporary loop detectors, if necessary, shall be six feet by six feet, (6'×6') be centered in their respective lane and paid for under Item 619.01. Other types of temporary detection may be used upon approval of Nassau County Department of Public Works Traffic Signal Section.
  - e. All detectors shall be centered in their respective lanes and spaced ten feet (10') apart unless otherwise indicated in the plan.
- 5) The contract drawings provide information with respect to "Work Zone Traffic Control Plans". Refer to this site for additional WZTC requirements or information <https://webapps.dot.ny.gov/work-zone-traffic-control>
- 6) It is also intended to replace traffic loops that are destroyed by the Asphalt Removal under Item 680.54 "Inductance Loop Installation" and Item 680.72 "Inductance Loop Wire." The Contractor must coordinate all work with the NYSDOT Traffic Section where appropriate and Nassau County's Engineering Unit's Signal Management Section at (516) 572-0465.

- 7) The Contractor shall submit for approval for HES Concrete Mix Design that the concrete will achieve 2500 psi in 4 hours.
- 8) The Contractor will be required to hand out notices to the local homeowners and businesses affected by the asphalt milling and asphalt paving operations 24 hours prior to work startup.
- 9) The Contractor must set up portable variable message sign three (3) days prior to the start of concrete pavement rehabilitation operations, asphalt milling operations and asphalt paving, giving the dates when work is going to start and work hours before start and end of the job site limits. Payment will be made under Item 619.110533 "Portable Variable Message Sign."
- 10) On all roads temporary traffic lines must be placed as necessary and paid for under Item No. 619.0901 as shown on the plans or as directed by the County Representative or Engineer.
- 11) Work Hours

Special Condition: Unless otherwise specified in other sections of this Contract, the Contractor may not close an active travel lane during peak travel times. Any requests to close the lanes between 7:00 AM and 9:00 AM and/or between 4:00 PM and 6:00 PM must have written approval 72 working hours in advance. If approval is obtained and excessive congestion results, the approval will be withdrawn by verbal notice from a County Representative and no claim for additional compensation will be considered valid. If the contractor does not adhere to the specified time limits, and excessive traffic delays are the result of working beyond the time restrictions, a \$5,000 penalty per day for each infraction will be deducted from the traffic related items.

- 12) The Contractor shall have a full-time supervisor on the project at all times.
- 13) Epoxy pavement markings shall be applied in accordance with the specified width, thickness, and pattern detailed in the Contract Documents.
  - **New PCC Surfaces:** Permanent markings shall not be applied until a minimum of 30 days after placement, or as directed by the Engineer, to ensure adequate curing.
  - **New Asphalt Surfaces:** Permanent markings shall not be applied until at least 14 days after placement.
  - **Surface Preparation:** Marking operations shall commence only after completion and approval of surface preparation by the Engineer, and when atmospheric conditions are deemed acceptable.

- 14) All work will be done during a normal eight (8) hour day, Monday through Friday. Prior County approval is required for work beyond normal working hours. If approval is granted, the Contractor will be responsible for reimbursing the County for the additional cost, including benefits costs of any County employees and/or County representatives working for the County that work these overtime hours. This shall apply to all County holidays as well.
- 15) Any existing traffic signal post, pole, mast arm shaft, or strain pole affected by the installation of handicap ramps or changes in grade must be height adjusted to bring the base plate to match new grades, including removing the pole/post and adjusting the anchor nuts, and reinstallation of the pole and equipment. Existing raincap is to be removed and new one installed as per the Nassau County traffic signal foundation item specifications. All signal head heights must be checked before any pole height is adjusted so that they continue to meet signal head height requirements. No separate payment shall be made for this work. All costs shall be included in various contract items.

All traffic signal pushbuttons need to be adjusted in height to be ADA compliant, if affected by the ramp installation which includes changes in grade from existing and meet the Nassau County traffic signal specifications. No separate payment shall be made for this work. All costs shall be included in various contract items.

The Contractor must notify Mike Kurpicz of the Nassau County Traffic Signal Management Section before any work begins at 516-572-0465, ext. 20958. A Nassau County inspector must be present during this work.

- 16) Conformance to the following Special notes with respect to the American with Disabilities Act Curb Ramps is required:
- All curb ramps installed shall be in compliance with the following standards: ADA, PROWAG, and NYSDOT 608.01 Series Standard Sheets titled "Pedestrian Facilities"..
  - Contractor shall verify the placement of all new ramp configurations prior to installation. Contractor must give 48 hours (2 business days) notification for NCDPW approval.
  - A NCDPW inspector must be present during the installation of any curb ramp. It is recommended that a smart level tool (or equivalent) is used to check the slopes on all form work prior to the placement of concrete.
  - NCDPW Civil Engineering Design Unit must be notified in writing of all work done to curb ramps to update the transition plan inventory.

NOTE: The contractor will be required to maintain safe pathways for pedestrians during the entire time the contract is in effect, including all periods of work shutdown. This may involve mowing of grass, removal of snow and ice, and any other interruptions interfering with their safe travel through the construction zone. Failure of the contractor to ensure safe pedestrian passage as determined by county staff, or from pedestrian

complaints in the work zone will result in a fine of \$500.00 a day. This fine will be deducted from any funds owed to the contractor.

17) **NOTE: Compliance with Law.**

**Prohibition of Gifts.** In accordance with County Executive Order 2-2018, the Contractor shall not offer, give, or agree to give anything of value to any County employee, agent, consultant, construction manager, or other person or firm representing the County (a “County Representative”), including members of a County Representative’s immediate family, in connection with the performance by such County Representative of duties involving transactions with the Contractor on behalf of the County, whether such duties are related to this Agreement or any other County contract or matter. As used herein, “anything of value” shall include, but not be limited to, meals, holiday gifts, holiday baskets, gift cards, tickets to golf outings, tickets to sporting events, currency of any kind, or any other gifts, gratuities, favorable opportunities or preferences. For purposes of this subsection, an immediate family member shall include a spouse, child, parent, or sibling. The Contractor shall include the provisions of this subsection in each subcontract entered into under this Agreement.

**Disclosure of Conflicts of Interest.** In accordance with County Executive Order 2-2018, the Contractor has disclosed as part of its response to the County’s Business History Form, or other disclosure form(s), any and all instances where the Contractor employs any spouse, child, or parent of a County employee of the agency or department that contracted or procured the goods and/or services described under this Agreement. The Contractor shall have a continuing obligation, as circumstances arise, to update this disclosure throughout the term of this Agreement.

18) Schedule: The Contractor shall provide a schedule of operations for when work will be started and completed for each roadway to be repaired within the Contract one week after the Notice to Proceed is issued. Typical information to be provided includes, but is not limited to:

- Removal and Replacement of Deteriorated Pavement and Joint;
- Asphalt Removal;
- Asphalt Placement;
- Modifying pedestrian ramps for compliance with ADA requirements;
- Miscellaneous Items, Curb, Sidewalk, Traffic Loops; cleaning catch basins and drainage pipes;
- Traffic Pavement Markings; and
- Punch List

No claims will be processed until the County has this updated information on a monthly basis until the completion of the project.

19) Utilities

- a. The Contractor is directed to notify all publicly and privately owned utility companies well in advance of his beginning work to allow them time to mark out their facilities.
- b. The Contractor is directed to notify all publicly and privately owned utility companies well in advance of his beginning work to allow them time to adjust their manholes and other castings.
- c. The Contractor will see to it that utility valve boxes and manholes are readily accessible at all times. He will not store materials over them and should it become necessary to cover the boxes and manholes with spoil, he will devise a method for finding them quickly and assist the utility company to uncover them. Further, the boxes will be uncovered during non-working hours.
- d. Mechanical excavation will not be used within two (2) feet on either side of any utility or house service so marked by the utility company. Hand digging will be required to expose the utility pipe.
- e. Prior to backfilling, a gas utility representative will inspect all gas facilities. Damaged pipe will be repaired by the utility company, before backfilling. The County will not be responsible for any of the costs associated with the repair of damaged utilities. The Contractor's attention is called to existing Public Service Enterprise Group Long Island (PSEGLI) overhead circuits. The Contractor is warned to keep all equipment and personnel a minimum of ten (10) feet from primary conductors. The Contractor shall fully cooperate with the Public Service Enterprise Group Long Island (PSEGLI) and comply with its requirements for safe operation.
- f. The Contractor's attention is called to the fact that there are utilities, both publicly and privately owned, that are now in place within the contract area. The owners of privately owned utilities may be relocating parts of their existing plants to conform with the new lines and grades of this project. The Contractor shall cooperate with the various agencies carrying out this work, which must be coordinated with the work of this contract.
- g. Existing structures, utilities and facilities, either shown or not shown on the plans, above or below the ground, which new items of work shall encounter may not have been located accurately. The Contractor shall determine the locations and elevations or pertinent structures, utilities and facilities, before new installations are started, so that there will be no interference with the progression of the work. Any conflict between existing structures, utilities and facilities and the new items of work shall be ascertained by the Contractor prior to commencing any work under the respective items and called to the attention of the Engineer.

- h. Grades and locations of new installations may be changed by the Engineer, if necessary to prevent conflict with existing installations. Therefore, the Contractor shall determine the locations of all existing installations accurately, both as to line and grade, before new items of work are started.
- i. If the Contractor does not follow the above procedure and new work has to be removed and replaced, or there is a delay, all cost will be borne by the Contractor, and the County will only pay for the amount of the items in place complete at the completion of the contract. The Contractor shall conduct his operations so that all utility services are maintained at all times.
- j. The Contractor shall exercise extreme care in the performance of any operation, in the vicinity of the existing or relocated cable pipelines. No such operations shall take place without the PSEG representatives on hand. All excavation in the immediate vicinity of these lines shall be done by hand, with such application as to ensure that the pipe shall not be punctured or the coating disrupted. In the event that any length of cable pipeline is exposed, it shall be supported and protected to the satisfaction of PSEG inspection personnel. No blind sheeting shall be driven in the proximity of the existing electric cable pipes before first exposing these cable pipes by hand.
- k. The Contractor should inspect the plans of the utility companies plan to ascertain the location of the underground work and locations of crossings of sewer and drainage work. The Contractor shall coordinate his work with the work being done by the utility companies. It is anticipated that job meetings will be held at various times to aid coordination of the work.

20) Clean up

- a. The Contractor will be required to backfill and regrade all areas that are disturbed by him during the life of this contract. In all cases disturbed areas shall be cleaned up and restored to the condition existing prior to the commencement of the work.
- b. Where the disturbed area was originally earth, it shall be properly graded to meet and match the surrounding terrain and left with a smooth surface. Clean-up shall be as defined herein above, but if in the opinion of the Engineer, the Contractor has exercised carelessness or disregard to private property in the conduct of his work, then restorative measures required thereto shall be included in this procedure.
- c. No separate payment will be made for any of this clean up and restoration work, but the cost thereof shall be included in the unit prices bid for the various items.

21) Job Site Safety

The Contractor shall exercise precaution at all times for the protection of all personnel. The safety provisions of applicable laws shall be observed, but job site safety is the sole responsibility of the Contractor and his subcontractors and cannot be assumed by the County or its agents.

The Contractor shall employ flagmen when deemed necessary by the Engineer and shall erect proper warning signs and necessary barricades to protect the general public and to warn them of changes caused by the progression of his contract. The contractor is responsible for work zone safety as per OSHA requirements.

22) Rubbish and Debris

The Contractor shall legally dispose of all unsuitable material, rubbish, and debris at some separate location, not in the vicinity of the site.

23) Protection of Facilities

The Contractor shall protect all work done under this contract from possible damage for the duration of the contract. He shall be responsible for the repair or replacement, to the satisfaction of the Engineer, of any material, structure, or property on or adjacent to the site and damaged by him or his employees through the construction openings up to the time of acceptance by the County.

24) Construction Site

The Contractor shall obtain permission from the owner of a property before entering that property for any reason whatsoever. The construction site shall include areas beyond the right of way and working easement lines to allow for grade revisions to driveways and walks on private property.

25) Concrete Breaking

The Contractor is cautioned that the use of a ball operated from a crane or other equipment will not be permitted under any circumstances for the breaking up of any concrete. Any machine or method used must meet the approval of the Engineer.

26) Drainage Installation

The Contractor shall plan his work and progress so that, at all times, either the new or the existing drainage facilities will function to carry off stormwater runoff so that no damage or inconvenience will result.

27) Sales Tax Exemptions

Nassau County is exempt from the payment of New York State Sales Tax and Compensating Use Taxes under Section 1116 of Article 28 of the Tax Law of the State of New York, and is exempt from the payment of Nassau County Sales and Uses Taxes under Section 7, Ordinance 404-C-1968, enacted pursuant to Section 1210 of Article 29 of the Tax Law of the State of New York. However, it is not to be construed by bidders as relieving them from any obligation to pay sales tax on applicable items pursuant to the terms of the present sales tax laws.

28) Cold Patch

No separate payment of cold patch material used in this contract will be made. The cost thereof shall be included in the unit prices bid for the various contract items.

29) Requirements of Other Municipal Departments

The Contractor shall give all necessary notices, obtain all permits, and pay all fees in connection with the work under this contract. He shall comply with all laws, ordinances, rules, and regulations of Nassau County and Municipal Departments having jurisdiction over work of this character. These shall take precedence over any requirements of these specifications where and if a conflict occurs. This, however, shall not be interpreted as permitting the use of materials and equipment inferior to these specified.

30) Private Facilities in Public Rights-of-Way

- a. The Contractor shall be aware that sprinkler heads, private lamp and sign posts, electric signs, electric lines, water service, oil inlets, oil lines, horticultural planting, landscaping, etc. are owned privately, but exist in the public rights-of-way. The Contractor may be required to remove these appurtenances as ordered by the Engineer.
- b. No separate payment for this work will be made. The cost thereof shall be included in the unit prices bid for the various contract items.

31) Special O.S.H.A. Notes

- a. The Safety Provisions in the Specification are primarily to protect County property and the public against unsafe acts of the Contractor. The Occupational Safety and Health Act (OSHA) of 1970 requires that "Each Employer (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees; (2) shall comply with the occupational safety and health standards promulgated under this act". All workers on the project site must have successfully passed the OSHA 10 Hour Training Safety

Class, and the certificates should be part of the project records subject to review by the FHWA and NYSDOT.

The regulations in the act may be more stringent than are required by the Plans and/or Specifications. The Contractor however must conform to the O.S.H.A. Regulations and such conformance shall not be reason to demand additional payment or claim extra work.

- b. Sheeting, if included in the project, shall conform strictly to the Requirements of the O.S.H.A. Regulations for Construction-Subpart P, Excavation, Trenching, and Shoring:

1926.650 – General protection requirements;  
1926.651 – Specific excavation requirements;  
1926.652 – Specific trenching requirements; and  
1926.653 – Definitions applicable to this subpart.

- 32) The Contractor shall notify the Nassau County Police Department, local fire departments, and local transportation authorities in writing as to the conditions prevailing on the construction site and detours in use. Duplicate copies of such notices shall be filed with the Engineer.
- 33) Contractor shall provide one (1) cell phone under this item, so that County's Engineer may maintain contact with inspection forces. It must be a smart phone (type to be approved by the Engineer) with a minimum 256 GB storage capacity along with a mobile charger and a hard-protective cover. No work may begin until the phone is provided, and service is activated. The smart phone service shall be maintained for the duration of the contract. The phone shall be replaced at no additional cost to the County if damaged or lost, otherwise cease the operation.

The contractor shall supply the following equipment at the start of the project:

#### MINIMUM SPECIFICATION

N/A

At the completion of the Contract, all above referenced equipment, with exception to the cell phone, shall become the property of Nassau County.

## TECHNICAL SPECIFICATIONS

### Standards of Work:

All work included in this Contract shall conform to the most current New York State Department of Transportation Standard Specifications and New York State Department of Transportation Standard Sheets including addenda, unless otherwise specified. All bidders shall familiarize themselves with these Specifications and Standards, which are available on the NYS DOT website:

<https://www.dot.ny.gov/main/business-center/engineering/specifications/updated-standard-specifications-us>

Such referenced portions of the State Specifications are hereby incorporated into this Contract to the same extent as though written out in full. The Contractor shall have a copy of the State Specifications available at all times on the project site.

In addition, the following **Special Specifications** are hereby incorporated into this Contract.

SPECIAL SPECIFICATION INDEX		
ITEM NO.	ITEM DESCRIPTION	UNIT
209.11010024	TEMPORARY CATCH BASIN INSERT TRASH, SEDIMENT, AND DEBRIS REMOVAL	EA
304.10119917	SUBBASE COURSE, TYPE 1011-2	CY
502.10010018	PORTLAND CEMENT CONCRETE PAVEMENT REPAIR EVALUATION AND MARK-OUT	LS
502.90010018	CLEAN AND FILL CRACKS AND JOINTS IN PORTLAND CEMENT CONCRETE (PCC) PAVEMENT, ASTM D 6690 TYPE IV	LF
510.01210018	PORTLAND CEMENT CONCRETE (PCC) FOR FULL-DEPTH PAVEMENT REPAIRS - MESH REINFORCED, HES, FRICTION TYPE 1	CY
510.20000018	PORTLAND CEMENT CONCRETE (PCC) LIFT OUT	SY
510.81000018	DRILL AND ANCHOR DOWELS FOR PCC PAVEMENT REPAIRS	EA
510.91000018	TRANSVERSE JOINTS FOR PCC PAVEMENT REPAIRS	LF
511.70000018	PARTIAL-DEPTH REPAIR OF PORTLAND CEMENT CONCRETE PAVEMENT - CLASS HES CONCRETE	SF
520.05000010	SAW CUTTING PCC AND COMPOSITE PAVEMENT	LF
520.09000010	SAW CUTTING ASPHALT CONCRETE	LF
604.07200110	SETTING NEW DRAINAGE FRAMES ON EXISTING DRAINAGE STRUCTURES	EA
604.07210110	RESETTING EXISTING DRAINAGE FRAMES ON EXISTING DRAINAGE STRUCTURES	EA
604.07240110	REBUILDING TOP OF EXISTING DRAINAGE STRUCTURE	EA
604.07260011	CONNECTION TO EXISTING DRAINAGE FACILITIES	EA
604.07290010	REPAIR WALLS OF EXISTING DRAINAGE STRUCTURES	SF
608.01050010	CONCRETE SIDEWALKS - UNREINFORCED (GRADING INCLUDED)	CY
608.01050109	CURB RAMP CONFIGURATION TYPE 1	EA
608.01050309	CURB RAMP CONFIGURATION TYPE 3	EA
608.01050509	CURB RAMP CONFIGURATION TYPE 5	EA
608.01050809	CURB RAMP CONFIGURATION TYPE 8	EA
608.01051009	CURB RAMP CONFIGURATION TYPE 10	EA
608.01051109	CURB RAMP CONFIGURATION TYPE 11	EA
609.04010510	CAST-IN-PLACE CONCRETE CURB (GRADING INCLUDED) TYPE VF6	LF
609.04020510	CAST-IN-PLACE CONCRETE CURB (GRADING INCLUDED) TYPE VF6A	LF
640.25000010	BLUE REFLECTORIZED PAVEMENT MARKING PAINT FOR HANDICAPPED PARKING SPACES	LF
655.07030010	CAST FRAME F3, WITHOUT CURB BOX AND WITH RETICULINE GRATE G3	EA
680.51000010	ALTER ELEVATION OF PULLBOX	EA
680.51111010	SLIP RESISTANT SURFACE FOR CAST IRON PULLBOX COVERS	EA
685.03120018	RAISED REFLECTORIZED SNOWPLOWABLE PAVEMENT MARKERS (TWO-WAY YELLOW)	EA
685.072001NA	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT STRIPES - 20 MILS (TRIPLE DROP)	LF
685.072002NA	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT LETTERS - 20 MILS (TRIPLE DROP)	EA
685.072003NA	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT SYMBOLS - 20 MILS (TRIPLE DROP)	EA
685.072004NA	HIGHLY REFLECTORIZED WHITE EPOXY CROSS HATCHING - 20 MILS (TRIPLE DROP)	LF
685.072006NA	HIGHLY REFLECTORIZED YELLOW EPOXY PAVEMENT STRIPES - 20 MILS (TRIPLE DROP)	LF
685.072007NA	HIGHLY REFLECTORIZED WHITE EPOXY PAVEMENT STRIPES (CROSS HATCHING) - 20 MILS (TRIPLE DROP)	LF

**ITEM 209.11XXNN24 – TEMPORARY CATCH BASIN INSERT (CBI)**

**DESCRIPTION:**

The work shall consist of furnishing, installing, maintaining (removing, disposal of debris and resetting), replacing (if needed), and disposing (at end of contract) a temporary catch basin insert at the locations indicated in and according to the contract documents, and as directed by the Engineer.

The work shall also consist of removing and storing an existing temporary catch basin insert prior to a catastrophic storm event (e.g., flooding), and reinstalling it after the event at the locations indicated in and according to the contract documents, and as directed by the Engineer.

Acronyms

CBI – Temporary Catch Basin Insert

Temporary removal, storage and reinstallation of temporary catch basin inserts does not include the cost of a new temporary catch basin insert.

**MATERIALS:**

The following sections of the standard specification shall apply:

Temporary Catch Basin Insert 713-21

**CONSTRUCTION DETAILS**

The following section of the standard specifications shall apply:

Soil Erosion and Sediment Control 209-3.01

with the following exceptions:

- Torn or punctured geotextile must be replaced (see Maintenance below)
- Sediment deposition removed from the CBI shall be disposed of in accordance with §107-10 E.

Installation: Install the CBI according to manufacturer’s instructions.

Inspection: Using the most restrictive inspection criteria listed below, the Contractor shall inspect each CBI:

- daily,
- after a rainfall event of 0.5” or more per twenty-four (24) hour period,
- as per manufacturer’s instructions, and
- as per the conditions of the Stormwater Pollution Prevention Plan (SWPPP) (if the contract includes one).

Maintenance: Maintenance shall include the following:

- Removal of all accumulated sediment and debris from the vicinity of the CBI after each rainfall event of 0.5” or more per twenty-four (24) hour period and prior to removal of the insert for maintenance.
- Removal of CBI according to manufacturer’s instructions.

## **ITEM 209.11XXNN24 – TEMPORARY CATCH BASIN INSERT (CBI)**

- Emptying the CBI when the CBI's containment area is more than one third (1/3) full or before the sediment/trash/debris reaches the overflow openings. The Contractor shall ensure that the CBI is not so full that removing it causes the geotextile to rip, tear or become non-functioning. CBIs damaged during sediment removal shall be replaced at the Contractor's expense. The Engineer will determine if a damaged CBI warrants replacement. Sediment and/or debris that has been released into the drainage structure shall be removed by the Contractor and disposed of as below.
  - Refer to the manufacturer's instructions for emptying and re-installing the CBI. Removal of trash, sediment and debris from the CBI shall be done in a manner that ensures no trash, sediment or debris will enter an unprotected drainage structure.
- Disposal of the removed sediment shall occur at an upland location away from all stormwater conveyances.
  - Trash shall be disposed of according to §107-10 E. of the standard specifications.
- If a CBI's fabric or strap is torn,
  - dispose of the sediment and debris contained within the unit according to this specification, and
  - replace the entire CBI. A CBI shall be replaced at no additional cost to the state.
- When CBI servicing results in a non-functioning or poorly functioning CBI, the CBI shall be replaced at no additional cost to the state. The Engineer will determine if a CBI is non-functioning or poorly functioning.
- CBIs shall be removed prior to winter shut down. Re-installation of the CBIs shall occur prior to ground disturbance or first thaw in the following spring, whichever occurs first, and according to manufacturer's instructions.

Emergency Removal, Storage and Reinstallation: Emergency removal, storage and reinstallation shall be performed in association with catastrophic events (e.g. storms and flooding) as follows:

- As directed in consideration of forecasted events (e.g. moderate or major flood warnings) in impacted urban or residential locations where flooding is likely to result in hazardous public conditions.
- Removal, storage, and reinstallation as specified and applicable under Maintenance above. This includes replacing any damaged, poorly functioning, or non-functioning CBI.
- CBIs removed for emergency flooding events shall be reinstalled prior to resuming construction.

CBIs shall be removed according to §209-3.01 and disposed of according to §107-01 E. after all soil disturbance areas have been fully stabilized with an established, permanent, and approved vegetative cover at a uniform density of eighty percent (80%).

### **METHOD OF MEASUREMENT**

Temporary Catch Basin Insert. The work will be measured as the number of each CBI furnished, installed, maintained, replaced, and disposed.

Temporary Catch Basin Insert Emergency Removal and Reinstallation. The work will be measured as the number of each CBI removed, stored, and reinstalled.

**ITEM 209.11XXNN24 – TEMPORARY CATCH BASIN INSERT (CBI)**

**BASIS OF PAYMENT**

Temporary Catch Basin Insert. The unit price bid for each CBI furnished, installed, maintained, replaced, and disposed shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work.

Temporary Catch Basin Insert Emergency Removal and Reinstallation. The unit price bid for each CBI removed, stored, and reinstalled shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work.

Progress payments will be made at fifty percent (50%) of the unit price bid upon installation of each CBI. The remaining fifty percent (50%) will be paid after soil disturbance areas have been fully stabilized with an established, permanent, and approved vegetative cover at a uniform density of eighty percent (80%) and the CBI has been removed. No progress payments are offered for the emergency removal and reinstallation of CBI.

Payment will be made under:

<b>Item Number</b>	<b>Description</b>	<b>Unit</b>
209.11010024	Temporary Catch Basin Insert – Trash, Sediment, and Debris Removal	EA
209.11020024	Temporary Catch Basin Insert –Trash, Sediment and Debris Removal, plus Oil and Hydrocarbon Removal	EA
209.11030024	Oil and Hydrocarbon Absorbent Pouches for Temporary Catch Basin Insert	EA
209.11040024	Temporary Removal, Storage and Reinstallation of a Temporary Catch Basin Insert	EA

**ITEM 304.10119917 - SUBBASE COURSE, TYPE 1011-2**

All of the requirements of Section 304 *Subbase Course* shall apply except as herein modified:

**MATERIALS**

Material shall conform to the requirements of §733-04 *Subbase Course* with the addition of the following requirement:

**Natural Material.** Natural material obtained from sources located in Richmond, Kings, Queens, Nassau and Suffolk Counties shall conform to the following gradation:

<b>Sieve Size Designation</b>	<b>Percentage Passing by Weight</b>
2 in.	100
1 in.	80-100
¼ in.	50-85
No. 10	30-70
No. 40	15-40
No. 200	6-12

Natural material obtained from sources other than those listed above shall conform to the gradation requirements of Table 733-04A *Subbase Gradation* in §733-04B. *Gradation*.

**BASIS OF PAYMENT**

*Payment will be made under:*

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
304.10119917	Subbase Course, Type 1011-2	Cubic Yard

**ITEM 502.10010018 - PORTLAND CEMENT CONCRETE PAVEMENT REPAIR  
EVALUATION AND MARK-OUT**

**DESCRIPTION.** Evaluate and tabulate pavement repair needs, develop a repair referencing system, and mark repair boundaries.

**MATERIALS.** None specified.

**CONSTRUCTION DETAILS.**

**Reference Slabs.** Develop a referencing system for the pavement slabs within the project limits and mark every 5th slab (maximum) with a unique designation visible from a shoulder. Maintain the referencing system throughout the project duration. Re-mark slabs with the same designations after diamond grinding, if necessary. In addition to marking slabs, mark and maintain plan stationing on or near the pavement to correlate repairs to the plans.

**Pavement Evaluation and Mark-out.** Coordinate evaluation and mark-out to ensure the Engineer's presence. Recommend a repair type and limits for each repair area identified in the contract documents. Use the repair items, quantities, and limits in the contract documents as a starting point for the repair recommendations. Modifying or grouping repairs is subject to the approval of the Engineer. Mark the repair type and limits on the pavement after approval by the Engineer. Ensure that the marked repair is not in conflict with the contract's maintenance and protection of traffic plan.

After repair types and limits are marked, develop a repair table for the Engineer's review and verification which includes station, slab designation, repair type, and quantity. If repair types are detailed in the contract plans, note additions, deletions, and changes from the plans. The Engineer will review the repair table within 2 work days of receipt. If necessary, modify the table until it meets the Engineer's approval and note any unresolved differences with the Engineer in repair type or quantity. Refer to the appropriate specifications for quantity determination.

Make no repairs until the Engineer approves the repair table and mark-outs. Do not alter the table or mark outs without the Engineer's approval. Any alteration, addition, or subtraction requires re-submission and approval of the Engineer.

**Full-Depth Repair Joint Layout.** Transverse joint layout for full-depth repairs is the Contractor's responsibility. Submit a proposed layout for multiple slab replacements and obtain the Engineer's approval before placing concrete.

**METHOD OF MEASUREMENT.** The work under PCC Pavement Repair Evaluation and Mark-out will be measured for payment on the lump sum basis.

**BASIS OF PAYMENT.** Include the cost of all labor, material, and equipment necessary to satisfactorily perform the work in the lump sum bid for PCC Pavement Repair Evaluation and Mark-out. No additional payment will be made for re-tabulating or re-marking concrete repair areas.

**ITEM 502.90010018 - CLEAN AND FILL CRACKS AND JOINTS IN PORTLAND CEMENT CONCRETE (PCC) PAVEMENT, ASTM D 6690 TYPE IV**

**DESCRIPTION.** Clean and fill the following cracks and joints that are 1/4 - 1 inch wide at the locations indicated in the contract documents:

- New transverse contraction joints within full depth repairs.
- Existing transverse and longitudinal joints outside new full depth repairs.
- Existing cracks.

Do not clean and fill:

- Transverse and longitudinal joints that define new full depth repair boundaries.
- New longitudinal joints within full depth repairs.

**MATERIALS.**

Highway Joint Sealants (ASTM D 6690 Type IV)..... 705-02  
Backer Rods ..... ASTM D5249 (Type 1)

In addition to meeting the requirement of ASTM D5249 (Type 1), backer rods must have a diameter at least 25% wider than the location of the crack it is placed into.

The Department may perform supplementary sampling and testing of the sealant. Deliver sealant in the Manufacturer’s original sealed container legibly marked with the:

- Manufacturer’s name.
- Trade name of the sealant.
- Manufacturer’s batch or lot number.
- ASTM D 6690, Type IV.
- Minimum application temperature.
- Maximum (or Safe) heating temperature.

**CONSTRUCTION DETAILS.** If diamond grinding is included in the contract documents, prepare the joints and cracks, diamond grind the pavement, then clean and fill the joints and cracks.

Prepare New Transverse Contraction Joints Within Full Depth Repairs. Widen the joint to 1/4 – 3/8 inch for a depth of 1 inch if the first stage saw cut is less than ¼ inch wide. Use diamond blade saws equipped with cutting guides, blade guards, water cooling systems, dust controls, and cut depth control. Immediately wash the slurry from the pavement such that it does not re-enter the joint. Do not place backer rod in these joints.

Prepare Existing Transverse and Longitudinal Joints. Use a 1/8 – 1/4 inch wide, 1 5/8 inches deep saw cut to dislodge debris and existing sealant or filler from the joint without damaging the joint faces. Follow the saw cut with a compressed air blast to remove the dislodged debris to the bottom of the existing joint sealant reservoir or to a depth of 3 inches if there is no existing reservoir. Install a trap or other device on the compressed air equipment to prevent oil from contaminating the joint surfaces. Supplement the air blast with mechanical removal, such as a screwdriver, if it is not sufficient to remove the debris. Do not damage the joint faces. Immediately wash or sweep the dislodged debris from the pavement such that it does not re-enter the joint. Do not place backer rod in these joints.

Prepare Existing Cracks. Remove all debris from existing cracks as deep as possible using a compressed air blast supplemented with mechanical removal. Install a trap or other device on the compressed air

**ITEM 502.90010018 - CLEAN AND FILL CRACKS AND JOINTS IN PORTLAND CEMENT  
CONCRETE (PCC) PAVEMENT, ASTM D 6690 TYPE IV**

equipment to prevent oil from contaminating the crack surfaces. Immediately wash or sweep the dislodged debris from the pavement such that it does not re-enter the joint. Backer rod may be placed after cleaning provided it is at least 25 % wider than the crack everywhere along the crack and is placed 2 inches beneath the pavement surface.

Cleaning. Clean the joints and cracks by abrasive blasting before filling. Do not allow any traffic on the pavement between cleaning and filling. Reclean if it rains between cleaning and filling.

Sealant Melting. Provide the Engineer a copy of the sealant Manufacturer's recommendations for heating and application at least 24 business hours before filling. Follow those recommendations for heating and application. Unless stated otherwise, the recommended pouring temperature is 10°F below the Manufacturer's designated safe heating temperature, with an allowable variation of ± 10°F. Heat the sealant in a melter constructed either:

- As a double boiler with the space between inner and outer shells filled with a heat-transfer medium.
- With internal tubes or coils carrying the sealant through a heated oil bath and into a heated double wall hopper.

Do not use direct heating. Use a melter capable of maintaining the pouring temperature that is equipped with:

- Positive temperature controls.
- Mechanical agitation or a re-circulation pump capable of providing homogeneous sealant.
- Separate thermometers indicating the temperatures of the heat transfer medium and the sealant in the hopper. Do not place any sealant if the thermometers are defective or missing.

Prior to any sealing, measure the sealant temperature at discharge from the applicator wand. The temperature must be equal to or above the Manufacturer's recommended minimum pouring temperature and equal to or below the Manufacturer's recommended safe heating temperature. Discharge sealant into a vessel and measure the sealant temperature in the presence of the Engineer or the Engineer's representative. Provide 2 thermometers each having an 18 inches stem. Alternate methods to measure the sealant discharge temperature are subject to the Engineer's approval.

Use a discharge hose equipped with a thermostatically controlled heating apparatus or sufficiently insulated to maintain the proper sealant pouring temperature.

Do not use sealant heated beyond the safe heating temperature. Sealant may be reheated or heated in excess of six hours if allowed by the Manufacturer's heating and application recommendations. In these cases, recharge the melter with fresh sealant amounting to at least 20 % of the sealant volume remaining in the melter.

Filling. Fill within 8 hours of cleaning. Fill the joint or crack to within ¼ - ⅜ inch of the pavement surface. Fill when the:

- Air and surface temperatures are 40°F or warmer.
- Air temperature is above the dew point.
- Pavement surface and vertical joint\crack surfaces are dry.

Open to traffic after the sealant has cured to prevent tracking. A water mist may be used to accelerate curing. Do not blot with fine aggregate.

**ITEM 502.90010018 - CLEAN AND FILL CRACKS AND JOINTS IN PORTLAND CEMENT  
CONCRETE (PCC) PAVEMENT, ASTM D 6690 TYPE IV**

**METHOD OF MEASUREMENT.** The work will be measured for payment as the number of feet of joints/cracks satisfactorily filled.

**BASIS OF PAYMENT.** Include the cost of all labor, material, and equipment necessary to satisfactorily perform the work in the unit price bid for Clean and Fill Cracks and Joints in Portland Cement Concrete (PCC) Pavement, ASTM D 6690, Type IV.

**510.0RCF0018 –Portland Cement Concrete for Full-Depth Pavement Repairs**  
**510.20000018- Portland Cement Concrete Lift-Out**  
**510.81000018 – Drill and Anchor Dowels for PCC Pavement Repairs**  
**510.81100018- Drill and Anchor Ties for PCC Pavement Repairs**  
**510.91000018- Transverse Joints for PCC Pavement Repairs**  
**510.91100018- Longitudinal Joints for PCC Pavement Repairs**

**DESCRIPTION.** This work shall consist of removing and replacing full depth Portland Cement Concrete (PCC) pavement as detailed in the contract documents.

**MATERIALS.** The Contractor shall use materials meeting the requirements specified in the following sections of the Standard Specifications:

Portland Cement Concrete	501
High-Early Strength (HES) Concrete	502-2.02
Chemically Curing Adhesives for PCC Pavement Applications	701-14
Premolded Resilient Joint Filler	705-07
Longitudinal Joint Ties	705-14
Transverse Joint Supports	705-15
Wire Fabric for Concrete Reinforcement	709-02
Epoxy-Coated Bar Reinforcement Grade 60	709-04
Quilted Covers (for Curing)	711-02
Plastic Coated Fiber Blankets (for Curing)	711-03
Polyethylene Curing Cover (White Opaque)	711-04
Membrane Curing Compound	711-05
Form Insulating Materials for Cold Weather Concreting	711-07
Water	712-01

If requested, provide the Engineer with any appropriate manufacturer’s details and/or instructions for use of the listed materials before use of the product.

In addition to meeting the requirements of §701-14, *Chemically Curing Adhesives for PCC Pavement Applications*, the material used for filling overcut saw cuts during PCC removal and for anchoring longitudinal ties, dowels, or other miscellaneous items into the hardened concrete shall be a pourable, 2 component 100% solids structural epoxy meeting dispensed:

- From side-by-side cartridges by manual or pneumatically powered injection guns.
- Through static nozzle that homogenously mixes the material without any hand mixing.

**Performance Engineered Mixes (PEM)** Provide a Performance Engineered Mix (PEM) in accordance with Section 501, Portland Cement Concrete -General. The PEM Concrete shall meet the design requirements of Materials Procedure MP502-01 *Design and Approval of Performance Engineered Concrete Pavement* for Section 502-Portland Cement Concrete Pavement or MP501-2 *Mix Design and Approval Procedure for Performance Engineered Mixtures- Structural Concrete 579,582- Repair*.

Obtain approval of the mix design from the Regional Materials Engineer prior to placing any concrete. Any change in aggregate sources, major proportioning changes, cement type, supplementary cementitious material type or chemical admixture type/brand will require a new mix design. Minor changes in

**510.0RCF0018 –Portland Cement Concrete for Full-Depth Pavement Repairs**

**510.20000018- Portland Cement Concrete Lift-Out**

**510.81000018 – Drill and Anchor Dowels for PCC Pavement Repairs**

**510.81100018- Drill and Anchor Ties for PCC Pavement Repairs**

**510.91000018- Transverse Joints for PCC Pavement Repairs**

**510.91100018- Longitudinal Joints for PCC Pavement Repairs**

admixture dosages based on environmental conditions will not constitute a new mix design. The Regional Materials Engineer will evaluate changes to determine if a new trial batch is required.

**Longitudinal Joint Ties** For pavement less than 7 inches thick, use #4 Grade 60 Epoxy Coated Bar Reinforcement at locations where longitudinal joint ties are required. Provide Longitudinal Joint Ties meeting the requirements of §705-14 for pavements 7 inches or greater.

**Transverse Joint Supports** Provide transverse joint hardware for pavements 7 inches or greater when the original pavement was constructed with dowels. In addition to meeting the requirements of §705-15, dowel bar diameters vary with pavement thickness as detailed in Standard Sheet 510-01. Use 14 inch long dowels for drilling and anchoring applications.

**Grout Retention Disks** Use plastic grout retention disks, 1/8 inch thick, of sufficient diameter to prevent grout from entering the joint. The hole in the center of the disk must have the same diameter as the dowel.

**Epoxy Repair Material** Provide a spray-on epoxy repair material meeting the Coating Repair Materials requirements of ASTM D3963 and the Patching Material Requirements of ASTM A775. Provide the Engineer written documentation for the repair product at least 7 days prior to beginning work.

**CONSTRUCTION DETAILS.**

Hold a pre-pave meeting 7 to 14 days before the planned start of repair work with the Engineer, any PCC paving and saw cutting subcontractors, and concrete suppliers to coordinate all aspects of pavement repair and inspection, including equipment review, construction methods, and time and personnel requirements.

Schedule all operations to minimize the total time to complete any individual repair. As the time frame from initial saw cutting of the concrete for removal to placement of new concrete increases, the potential for damage to pavement to remain in place increases, particularly in hot weather or as temperature increases.

**Equipment.** Provide the Engineer with an equipment list and specifications a minimum of 14 days prior to the planned start of PCC repairs. Bring all equipment needed to remove, replace, consolidate, finish, texture, cure, saw cut, seal, and test the PCC pavement to the job site a minimum of 1 full workday before its use to allow examination by the Engineer. Repair or replace any equipment found to be defective before or during its use. Discontinue any operation if unsatisfactory results are being obtained. Use of equipment other than described below is subject to the approval of the Director, Materials Bureau.

- A. Forms.** Provide forms meeting the requirements of §502-3.01B.1, forms. Repairs are considered irregular areas.
- B. Paving Equipment.** Provide equipment capable of placing, spreading, consolidating, screeding, and finishing the concrete to the specified line, grade, and cross section.

**510.0RCF0018 –Portland Cement Concrete for Full-Depth Pavement Repairs**

**510.20000018- Portland Cement Concrete Lift-Out**

**510.81000018 – Drill and Anchor Dowels for PCC Pavement Repairs**

**510.81100018- Drill and Anchor Ties for PCC Pavement Repairs**

**510.91000018- Transverse Joints for PCC Pavement Repairs**

**510.91100018- Longitudinal Joints for PCC Pavement Repairs**

- C. Vibrators.* Use hand-held or machine mounted vibrators capable of operating through a frequency range of 6,000 – 10,000 vibrations per minute in any location.
- D. Saw Cutting Equipment.* Provide saw cutting equipment meeting the requirements of §502-3.01D.
- E. Curing Compound Applicators.* Provide curing compound applicators meeting the requirements of 502-3.01E
- F. Drills.* Provide drilling equipment meeting the requirements of §502-3.01F for drilling and anchoring joint ties and dowels. Hand-held drills may be used for drilling holes to insert lift pins into concrete to be removed.
- G. Air Blasting Equipment.* Provide air blasting equipment meeting the requirements of §502-3.01H

**Weather Limitations.** Apply §502-3.02 *Weather Limitations*.

**PCC Pavement Lift-Out:** Mark the boundaries of the area to be lifted out. Do not sawcut until the Engineer approves the marked boundaries. Sawcut the pavement longitudinally along existing longitudinal joints and transversely such that the resulting cut is perpendicular to the longitudinal joint. Saw cuts shall be made to the full depth of the existing pavement, plus permeable base (if applicable) such that the resulting sawcut face is smooth, straight, and perpendicular to the pavement surface. Set the cut depth to minimize subbase disturbance.

Overcut the saw cut intersections to a distance equal to the pavement thickness plus permeable base (if applicable). After removal of the existing concrete, and prior to placement of new concrete, fill the overcuts with anchoring material. Block the deepest portion of the overcut such that material does not enter the lift-out area. Finish the anchoring material flush with the pavement surface.

When using new cartridges of anchoring material, ensure the initial material existing the nozzle appears uniformly mixed. If it is not uniformly mixed, waste the material until uniformly mixed material extrudes.

The contractor may make additional saw cuts for their convenience within the repair boundaries to facilitate removal. Additional saw cuts made for the contractor's convenience shall not extend into concrete to remain in place. Overcutting into adjacent concrete to be removed is permitted.

If traffic is maintained on the pavement after saw cutting, all debris shall be removed from the pavement prior to restoring traffic.

Drill holes and insert lift pins into the concrete to be removed. Lift and dispose of the concrete such that there is:

- No damage to the surrounding pavement to remain in place.
- Minimal disturbance to the existing subbase
- No damage to any adjacent curb, drainage structure, or utility.

**510.0RCF0018 –Portland Cement Concrete for Full-Depth Pavement Repairs**  
**510.20000018- Portland Cement Concrete Lift-Out**  
**510.81000018 – Drill and Anchor Dowels for PCC Pavement Repairs**  
**510.81100018- Drill and Anchor Ties for PCC Pavement Repairs**  
**510.91000018- Transverse Joints for PCC Pavement Repairs**  
**510.91100018- Longitudinal Joints for PCC Pavement Repairs**

Pavement determined by the Engineer to be too deteriorated to lift-out may be excavated rather than lifted. Excavate the pavement such that there is minimal disturbance to the subbase.

Dispose of all material in accordance with §203-3.02B, Disposal of Surplus Excavated Material.

After removal, clean and coat cut transverse joint supports and longitudinal joint ties with the spray-on epoxy repair material.

**Joint Construction** Submit a proposed joint layout for repair areas requiring transverse joints within the repair boundaries to meet the geometric requirements of the 502 standard sheets. Provide this layout to the Engineer at least 10 calendar days prior to beginning pavement repairs. Include proposed joint type reinforcement, and utilities/ drainage structures.

Obtain the Engineer’s approval of the joint layout before paving. Base final joint layout on construction staging and the actual location of utilities, drainage structures, intersections, tapers, and other irregular areas.

**A. Transverse Joints**

- 1. Joints Within the Repair** Construct transverse joints in accordance with §502-3.06A, *Transverse Joints*, except as modified herein, such that the panels created within the pavement repair location meet the geometric requirements of the 502 Standard Sheets.

When longitudinally tying repair locations to existing PCC to remain in place, align new transverse contraction joints with transverse joints or transverse working cracks in existing PCC to remain in place. Place hinge joints in accordance with §502-3.06A4 *Transverse Hinge Joints* where no transverse joint or crack exists in adjacent lanes of the existing pavement, but a transverse joint is required in the repair pavement to meet the geometric requirements of the 502 standard sheets.

- 2. Transverse Joints at Repair Boundaries** At transverse sawcut faces defining the repair boundary, drill 4 holes per wheelpath (8 per lane). Space holes 12 inches apart on center. Determine the location and length of longitudinal joint ties in the concrete to remain in place outside the repair area. Use a pachometer or other device capable of locating steel embedded in concrete.

If a longitudinal joint tie is within 12 inches of the surface being drilled, drill the outer holes 3 – 4 inches from the end of the tie. If no ties are within 12 inches of the surface being drilled, drill the outer holes 18 inches from a longitudinal joint between 2 travel lanes and 12 inches from a longitudinal joint between a travel lane and a shoulder.

When the transverse repair boundary aligns with an existing transverse joint, center holes between the existing sawcut dowels.

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For slabs with nonstandard widths, or pavements with longitudinal joints offset from permanent longitudinal pavement markings that define a travel lane, drill the outer holes 18 inches from the nearest edge of the permanent longitudinal marking between 2 travel lanes and 12 inches from the marking between a travel lane and a shoulder. In any case, do not drill within 3 inches of the end a longitudinal joint tie. The Engineer may require additional holes in nonstandard slab widths to ensure 4 dowels are placed in each wheelpath.

Drill holes such that:

- The hole diameters are in accordance with the anchoring material Manufacturer’s written recommendations. Provide those recommendations to the Engineer before drilling any holes.
- The hole depth is 7 inches (+3/8 inch/- 0 inch).
- When the dowels are anchored, the longitudinal axes of the protruding dowels are parallel to the pavement centerline, the pavement surface, and each other,  $\pm 1/8$ , measured at the saw cut face and the dowel end.
- When the dowels are anchored, they protrude  $6\frac{1}{2}$  - 7 inches from the saw cut face.

Extend the full depth repair boundaries if drilling cracks or damages pavement to remain in place. Replace worn bits when necessary to ensure the proper hole diameter is drilled. Follow the anchoring material manufacturer’s written recommendations for cleaning the holes. As a minimum, clean the drilled holes with compressed air. Insert the nozzle to the back of the hole to force out all dust and debris.

When using new cartridges of anchoring material, ensure the initial material exiting the nozzle appears uniformly mixed. If it is not uniformly mixed, waste the material until uniformly mixed material extrudes.

Place the anchoring material in the back of the hole using a nozzle with sufficient reach. Push the dowel into the hole while twisting such that the air pocket within the hole is heard to burst and the anchoring material is evenly distributed around the bar. Use enough anchoring material such that it slightly extrudes out the hole as the bar is inserted. Place a grout retention disk over the dowel and tight against the exposed concrete face such that the anchoring material does not enter the joint.

***B. Longitudinal Joint Ties***

Include longitudinal joint ties in PCC pavement repairs when the original longitudinal pavement joint was constructed as a tied joint AND:

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**510.20000018- Portland Cement Concrete Lift-Out**

**510.81000018 – Drill and Anchor Dowels for PCC Pavement Repairs**

**510.81100018- Drill and Anchor Ties for PCC Pavement Repairs**

**510.91000018- Transverse Joints for PCC Pavement Repairs**

**510.91100018- Longitudinal Joints for PCC Pavement Repairs**

- The repair is longer than 22 feet, or
- The repair is less than 22 feet in length, but full depth repairs are performed in adjacent lanes. In this case, ties are only required between adjacent repairs placed under the same contract.

Do not install longitudinal joint ties within 16 inches of transverse joints or cracks in existing PCC to remain in place. Do not tie a repair across transverse joints or cracks in adjacent lanes.

1. ***Joints Within the Repair Boundaries*** Construct longitudinal joints within the repair boundaries in accordance with §502-3.06B, *Longitudinal Joints*. Longitudinal joints with concrete on both sides placed under the current contract are considered joints within the repair boundaries.
2. ***Longitudinal Joints that Define the Repair Boundary*** At longitudinal sawcut faces defining the boundary with concrete placed under a previous contract, drill and anchor one-piece or multiple piece ties into the hardened concrete.

Drill holes such that:

- The end ties in a repair are placed 14 – 18 inches from the transverse joints.
- The ties between the end ties are placed 36 inches apart, maximum. Decrease tie spacing to 24 inches for longitudinal joints placed in vehicle wheel paths (generally the area 12 to 48 inches offset from permanent lane lines).
- 8 inches of tie is embedded in the existing concrete and 12 inches of tie protrudes from the drilled concrete face.
- The hole diameters are in accordance with the anchoring material Manufacturer’s written recommendations. Provide those recommendations to the Engineer before drilling any holes.

Extend the full depth repair boundaries as indicated in the contract documents if drilling cracks or damages the pavement to remain in place. Replace worn bits when necessary to ensure the proper hole diameter is drilled. Follow the anchoring material manufacturer’s written recommendations for cleaning the holes. As a minimum, clean the drilled holes with compressed air. Insert the nozzle to the back of the hole to force out all dust and debris.

When using new cartridges of anchoring material, ensure the initial material exiting the nozzle appears uniformly mixed. If it is not uniformly mixed, waste the material until uniformly mixed material extrudes.

Place the anchoring material in the back of the hole using a nozzle with sufficient reach. Push the tie into the hole while twisting such that the air pocket within the hole is heard to burst and the anchoring material is evenly distributed around the bar. Use enough anchoring material such that it slightly extrudes out the hole as the bar is inserted.

**Finishing.** Apply the requirements of §502-3.09 *Finishing*. Ensure joints that define the repair boundaries can be clearly located. This may be accomplished with a small radius (1/4 inch) edger.

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**510.81000018 – Drill and Anchor Dowels for PCC Pavement Repairs**

**510.81100018- Drill and Anchor Ties for PCC Pavement Repairs**

**510.91000018- Transverse Joints for PCC Pavement Repairs**

**510.91100018- Longitudinal Joints for PCC Pavement Repairs**

**Surface Tolerance.** Immediately after finishing the concrete, prior to texturing, test each repair area with straight edges laid both longitudinally and transversely. Immediately correct any longitudinal surface irregularity exceeding ¼ inch in 15 feet, and transverse deviations exceeding ¼ inch in 10 feet.

Pavement to be diamond ground or overlaid as part of the contract, shoulders and other areas not routinely exposed to traffic shall meet a surface tolerance of 3/8 inch in 10 feet both longitudinally and transversely.

**Texturing** Apply a surface texture to the plastic concrete surface matching the surface texture of the surrounding existing PCC pavement.

If the repair location will be diamond ground or overlaid as part of the contract, texture using an artificial turf drag as per §502-3.10B *Artificial Turf Drag* or apply a broom finish.

**Curing.** Apply §502-3.11 *Curing*. Do not use curing compound on pavement which will be overlaid.

**Damaged or Defective Concrete.** Apply §502-3.14 *Damaged or Defective Concrete*.

**Opening to Traffic.** Apply §502-3.16 *Opening to Traffic*.

**METHOD OF MEASUREMENT.**

**Portland Cement Concrete, Unreinforced, All Classes.** The work will be measured for payment as the number of cubic yards of concrete satisfactorily placed, including first stage sawcuts at new joints, measured to the nearest 0.1 yard<sup>3</sup> based on the Engineer-approved repair area marked on the pavement prior to repair and the thickness of the concrete placed. Deductions will be made for catch basins, manholes, or other similar pavement obstructions requiring either mesh or heavily reinforced placements.

**Portland Cement Concrete, Mesh or Heavily Reinforced, All Classes.** The work will be measured for payment as the number of cubic yards of concrete satisfactorily placed, measured to the nearest 0.1 yard<sup>3</sup>, based on the Engineer-approved repair area marked on the pavement prior to repair and the thickness of concrete placed. No deductions will be made for drainage and utility structures, or other similar pavement obstructions being isolated from the surrounding pavement.

**Portland Cement Concrete Lift-Out.** The work will be measured for payment as the number of square yards of pavement satisfactorily lifted or excavated, measured to the nearest 0.1 yard<sup>2</sup> based on the Engineer-approved removal areas marked on the pavement prior to saw cutting.

**Drill and Anchor Dowels for PCC Pavement Repairs.** The work will be measured for payment as the number of dowels satisfactorily drilled and anchored into concrete placed under a previous contract.

**Drill and Anchor Ties for PCC Pavement Repairs.** The work will be measured for payment as the number of longitudinal joint ties satisfactorily drilled and anchored into concrete placed under a previous contract.

**510.0RCF0018 –Portland Cement Concrete for Full-Depth Pavement Repairs**

**510.20000018- Portland Cement Concrete Lift-Out**

**510.81000018 – Drill and Anchor Dowels for PCC Pavement Repairs**

**510.81100018- Drill and Anchor Ties for PCC Pavement Repairs**

**510.91000018- Transverse Joints for PCC Pavement Repairs**

**510.91100018- Longitudinal Joints for PCC Pavement Repairs**

**Transverse Joints for PCC Pavement Repairs.** The work will be measured for payment as the number of feet of transverse joint supports satisfactorily installed within the repair boundary. Separate measurement will be made for drilling and anchoring dowels into concrete placed under a previous contract.

**Longitudinal Joints for PCC Pavement Repairs.** The work will be measured for payment as the number of feet of longitudinal joint ties satisfactorily installed between concrete placed under this contract. Separate measurement will be made for drilling and anchoring ties into concrete placed under a previous contract.

**BASIS OF PAYMENT.**

**Portland Cement Concrete, Unreinforced, All Classes.** The unit bid price shall include the cost of all labor, material, and equipment necessary to satisfactorily perform the work for Portland Cement Concrete, Unreinforced. No additional payment will be made for contractor requested mix substitutions or extra work required to repair damage to the adjacent pavement that occurred during any operation.

**Portland Cement Concrete, Mesh or Heavily Reinforced, All Classes.** The unit bid price shall include the cost of all labor, material, and equipment necessary to satisfactorily perform the work for Portland Cement Concrete, Mesh or Heavily Reinforced. No additional payment will be made for contractor requested mix substitutions or extra work required to repair damage to the adjacent pavement that occurred during any operation.

**Portland Cement Concrete Lift-Out.** The unit bid price shall include the cost of all labor, material, and equipment necessary to satisfactorily perform the work for Portland Cement Concrete Lift-Out. No additional payment will be made for extra work required to repair damage to the adjacent pavement that occurred during any operation or for additional saw cuts made inside the repair boundaries to facilitate lift-out. Additional payment will be made if the original repair area did not completely extend into sound concrete. Subbase removal and replacement or drainage enhancement are paid under separate items.

**Drill and Anchor Dowels for PCC Pavement Repairs.** The unit bid price shall include the cost of all labor, material, and equipment necessary to satisfactorily perform the work for Drill and Anchor Dowels for PCC Pavement Repairs. No additional payment will be made for extra work required to repair damage to the adjacent pavement that occurred during drilling.

**Drill and Anchor Ties for PCC Pavement Repairs.** The unit bid price shall include the cost of all labor, material, and equipment necessary to satisfactorily perform the work for Drill and Anchor Ties for PCC Pavement Repairs. No additional payment will be made for extra work required to repair damage to the adjacent pavement that occurred during drilling.

**Transverse Joints for PCC Pavement Repairs.** The unit bid price shall include the cost of all labor, material, and equipment necessary to satisfactorily perform the work for Transverse Joints for PCC Pavement Repairs. Drilling and anchoring dowels and joint sealing or filling will be paid under separate items.

- 510.0RCF0018 –Portland Cement Concrete for Full-Depth Pavement Repairs**
- 510.20000018- Portland Cement Concrete Lift-Out**
- 510.81000018 – Drill and Anchor Dowels for PCC Pavement Repairs**
- 510.81100018- Drill and Anchor Ties for PCC Pavement Repairs**
- 510.91000018- Transverse Joints for PCC Pavement Repairs**
- 510.91100018- Longitudinal Joints for PCC Pavement Repairs**

**Longitudinal Joints for PCC Pavement Repairs.** The unit bid price shall include the cost of all labor, material, and equipment necessary to satisfactorily perform the work for Longitudinal Joints for PCC Pavement Repairs. Drilling and anchoring ties and joint sealing or filling will be paid under separate items.

***Payment Will Be Made Under:***

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
510.0RCF0018	Portland Cement Concrete (PCC) for Full-Depth Pavement Repairs	Cubic Yard
	<u>R-Reinforcement</u> <u>C-Concrete Class</u> <u>F- Friction</u>	
	0-Unreinforced                      1-PEM                      1-Type 1	
	1-Mesh Reinforced                      2-HES                      2-Type 2	
	2-Heavily Reinforced                      3-Type 3	
		9- Type 9
510.20000018	Portland Cement Concrete (PCC) Pavement Lift Out	Square Yard
510.81000018	Drill and Anchor Dowels for PCC Pavement Repairs	Each
510.81100018	Drill and Anchor Ties for PCC Pavement Repairs	Each
510.91000018	Transverse Joints for PCC Pavement Repairs	Feet
510.91100018	Longitudinal Joints for PCC Pavement Repairs	Feet

## 511.M000018 – Partial Depth Repair of Portland Cement Concrete (PCC) Pavement

### DESCRIPTION

This work shall consist of performing a partial-depth repair of an existing Portland Cement Concrete (PCC) pavement using the materials specified by the contract documents.

### MATERIALS

Concrete Repair Material.....	701-04
Concrete Repair Material – Rapid Hardening.....	701-09
Concrete Repair Material- High Early Strength .....	701-12
Coarse Aggregate.....	703-02
Premolded Resilient Joint Filler.....	705-07
Portland Cement Mortar Bonding Grout .....	705-22
Water .....	712-01
Epoxy Resin System.....	721-01
Rapid Hardening Polymer Concrete.....	721-20

Provide the Engineer with the Manufacturer’s written documentation for the repair product to be used at least 7 days prior to beginning work. This information shall include Safety Data Sheets and written instructions for:

- Weather and temperature limitations
- Bonding agents if applicable and preparation required to ensure adequate bonding. Include the name, application instructions and set times prior to the application of the repair material for any required bonding agent.
- Mixing.
- Placement, including any special repair preparation near pavement joints, and any limitations on lift thickness.
- Finishing, curing, and opening to traffic.

Follow the Manufacturer’s instructions when performing Partial Depth Pavement Repairs. Extend repair materials with Department approved Coarse Aggregate having a Nominal Maximum Aggregate Size (as defined in ASTM C125) of ½ inch. Extension aggregates shall contain no moisture at the time of mixing. For Concrete and Rapid Hardening Concrete Repair Materials, use a maximum aggregate extension rate of 60% of the dry, prepackaged weight of the repair material. This may be increased to a maximum extension rate of 75% for Rapid Hardening Polymer Concrete.

High-Early Strength (HES) Concrete. Provide HES Concrete meeting the requirements of 502-2.02 except as modified herein:

- Use a maximum sized aggregate in the HES Concrete that does not exceed one-third the thickness of the placement.
- The producer may produce a 1.0 yd<sup>3</sup> minimum trial batch rather than a 4.0 yd<sup>3</sup> minimum trial batch when the mix will only be used for partial depth repairs.

Epoxy Resin System. Use an epoxy resin system from a stock lot accepted by the Materials Bureau. Provide the Engineer the Manufacturer’s written instructions for aggregate extension rates and type, substrate preparation, mixing, bonding, placing, and curing the material. Follow the Manufacturer’s instructions, including all aspects of the Manufacturer’s Safety Data Sheets when handling epoxy resin system. Extension aggregates must contain no moisture at the time of mixing.

## 511.M000018 – Partial Depth Repair of Portland Cement Concrete (PCC) Pavement

### CONSTRUCTION DETAILS

Meet with the Engineer 7 to 14 days before the planned start of removal to coordinate all aspects of removal, preparation and material placement including mixing, transport, and discharge, material requirements and testing, and personnel requirements. Perform all operations within the allowable work zone closure time frame included in the contract documents, if any.

Epoxy resin systems typically do not require sawing the repair boundary or removing concrete. This material is used at very small, shallow repairs with sound underlying concrete. An epoxy resin system is the only repair material that can be feathered to meet concrete to remain in place.

Equipment: Provide the Engineer with an equipment list and specifications at least 7 days prior to the planned start of repairs. Bring all equipment needed to saw cut, remove, place, consolidate, finish, texture, and cure Partial Depth Repairs to the job site a minimum of 1 full workday before its use to allow examination by the Engineer. Repair or replace any equipment found to be defective before or during its use. Discontinue any operation if unsatisfactory results are being obtained. Use of equipment other than described below is subject to the approval of the Director, Materials Bureau.

A. Coring Equipment. Use trailer or truck mounted core rigs with diamond impregnated bits capable of coring 4 inches into the pavement. Use a core rig shaft capable of moving in multiple directions to readily position the bit over the removal area. Use a bit of sufficient diameter to remove the entire repair area to sound concrete. Maintain equipment and supplies to ensure uninterrupted operation. Supply a template equal in diameter to the bit outer diameter to mark removal areas prior to coring. Supply a steel sleeve having an outer diameter equal to the core bit outer diameter that is inserted into the core to protect the surrounding pavement during Concrete Removal described below.

B. Saw Cutting Equipment. Use diamond blade saws capable of making straight, 4 inch deep, saw cuts. Use saws equipped with cutting guides, blade guards, water cooling systems, dust control, and cut depth control. Maintain equipment and supplies to ensure uninterrupted operation.

C. Chipping Hammers. Use chipping hammers weighing no more than 30 pounds (including bit and muffler) equipped with sharp spade bits. Provide the Engineer hammer specifications from the Manufacturer before sawing or coring. Use a maximum air pressure of 100 PSI (measured at the compressor) to power the hammer. Supply an air pressure gauge at the compressor that allows the Engineer to easily monitor air pressure. Maintain equipment and supplies to ensure uninterrupted operation. The Engineer may halt operations if concrete to remain in place is damaged by the hammers.

D. Milling Machines. Use a milling machine with a 12 inch (minimum) wide milling head and equipped with a mechanism that maintains the milling operation at a preset depth.

E. Vibrators. Use hand-held vibrators having a maximum diameter of 1 inch and capable of operating through a frequency range of 6000 - 9000 vibrations per minute.

#### Weather Limitations.

A. Rain. Do not perform repairs when rain is expected. Securely cover any repair area exposed to rain that has not reached initial set or will be visibly affected by the rain.

## 511.M0000018 – Partial Depth Repair of Portland Cement Concrete (PCC) Pavement

- B. Cold Weather Place repair materials when the air temperature is 40°F and rising, or warmer and the surface temperature of the area to be repaired is 40°F or warmer. Cure times may increase with temperatures below 55°F. Refer to the product manufacturer's instructions for additional precautions when working in cold weather.

Determine Repair Boundary Sound the area surrounding the repair with a 2-3 pound hammer to identify delaminated areas and include them within the repair boundary. Extend repair areas 3-6 inches beyond the visible deterioration or delamination's, whichever is larger. Removal of snowplowable markers, when specified in a contract, and small repairs which can be completely removed through coring (generally less than 18" in diameter) should be repaired through the coring method. All other repairs should be performed with the sawcut method.

- A. Sawcut Method Keep repair areas square or rectangular for sawcut repairs. Avoid irregular repair shapes. Mark the repair boundary outline on the pavement. Combine repair areas within 12 inches of each other into one repair.

- B. Coring Method Determine the repair boundary by placing the template described above in "Coring Equipment" over the repair area. Position the template such that the repair boundary extends completely into sound concrete. If a joint or crack crosses the repair boundary, position the template such that the joint or crack crosses through the middle 1/3 of the repair boundary. If the template cannot be positioned such that the repair extends completely to sound concrete or the crack or joint cannot be accommodated in the middle 1/3 of the repair, the repair shall be made through saw cutting.

Cutting Repair Boundary. Do not saw cut or core until the Engineer approves the repair boundary. Saw cut or core the repair boundaries 2 – 4 inches deep. Cut at right angles to the pavement joints and the pavement surface. Over cut intersecting saw cuts such that the entire repair area is cut to the same depth.

Concrete Removal. Use chipping hammers or a combination of chipping hammers and milling machines to remove concrete within the saw cuts. For cored areas, use the steel sleeve described above in Coring Equipment and a chipping hammer to remove concrete within the core. Remove concrete, asphalt patching materials, and any wire mesh encountered during removal, such that the repair bottom is at a uniform depth of at least 2 inches, and sound concrete is exposed along all faces. Do not operate milling machines within 1 inch of the saw cuts. Use chipping hammers in these locations to establish the proper repair depth. Discontinue removal if:

- Pavement joint hardware is encountered.
- The required repair depth exceeds ½ the pavement thickness.
- The PCC surrounding or below the removal area is unsound.

In this instance the repair will be converted to a full-depth repair, as directed by the Engineer.

Clean the Repair. As close to repair material placement as possible, thoroughly abrasive blast all concrete surfaces that will be in contact with the repair material such that they are uniformly abraded and free of any dirt, laitance, oil, or other material that may prevent bond. Immediately before placement, air blast the repair to remove any remaining debris and moisture. The Engineer will check the: air stream with a

## **511.M000018 – Partial Depth Repair of Portland Cement Concrete (PCC) Pavement**

clean, white cloth to ensure no oil or contaminants are in the air blast and the repair surfaces for dust by wiping the repair faces with a dark cloth or glove.

Re-clean the repair if dust is found on the surfaces.

Some repair materials require a completely dry substrate to properly bond. Consult the Manufacturer's instructions and completely dry the substrate, if required, before placing the repair material.

Joint or Crack Preparation Fill joints or cracks that abut or cross the repair with a commercial caulk such that no repair material enters the joint or crack. Align premolded resilient joint filler or commercial waxed corrugated cardboard with joints or cracks that abut or cross the repair area such that the insert extends 1 inch into the existing joint or crack and 3 inches beyond the repair boundaries. Use an insert of the same thickness as the joint or crack width, +1/8 inch. Place inserts into the caulk before it sets such that no repair material enters the joint or crack. Leave the filler in place after the repair is complete.

Apply Bonding Agent. Use Portland Cement Mortar Bonding Grout if the repair material is HES concrete. Mix the grout in small quantities to ensure freshly mixed grout is routinely placed. Mix the grout to a consistency that can be applied to the prepared surfaces without running or puddling. Evenly apply a thin coat of grout with a stiff bristle brush or broom to all surfaces receiving the repair material such that all cavities are coated. Slightly overlap the surrounding pavement surfaces. Do not apply bonding agent to the joint filler.

Follow the Manufacturer's instructions regarding the type and application of bonding agent, including water. If water is used, blow excess from the repair such that no standing water remains.

Place the bonding agent such that all surfaces, including the bottom and sides of the repair are adequately coated.

Placement (HES Concrete). Use wheelbarrows, buggies, or other transporting vehicles to bring the repair material to the prepared area. Use shovels for very small patches. Place HES concrete before the bonding grout dries. Consolidate cementitious material with a hand-held vibrator.

Placement (All Other Materials). Refer to the Manufacturer's instructions for batching and placement instructions.

Finishing. Finish repairs flush with the surrounding pavement ( $\pm 1/8$  inch). Keep hand finishing to a minimum. Hand trowel from the center of the patch outward toward the edges. Force repair material into the intersecting over cuts. Waste any material that has undergone initial set prior to finishing. Do not add any additional water to the repair surface.

Curing. Immediately after finishing, thoroughly coat HES concrete with curing compound at a minimum rate of 80 FT<sup>2</sup>/Gal. Cure other repair materials in accordance with the Manufacturer's instructions.

Opening to Traffic. Open HES concrete in accordance with §502-3.16 *Opening to Traffic*. Open other repair materials as follows:

**511.M0000018 – Partial Depth Repair of Portland Cement Concrete (PCC) Pavement**

Material	Time to Opening
Concrete Repair Material (§701-04)	24 hours after placement
Concrete Repair Material – Rapid Hardening (§701-09)	3 hours after placement
Concrete Repair Material – High Early Strength (§701-12)	3 hours after placement
Rapid Hardening Polymer Concrete (§721-20)	3 hours after placement
Epoxy Resin System (§721-01)	See Manufacturer’s Instructions

Damaged and Defective Repairs. Remove and replace repairs exhibiting any of the following:

- A. Visible Cracking
- B. Shrinkage, including the breaking of the bond between patch and pavement
- C. Pop-outs

Diamond Grinding. When §505 diamond grinding items are specified, provide sufficient time for repairs to cure prior to grinding in accordance with the Manufacturer’s instructions.

**METHOD OF MEASUREMENT** The work will be measured for placement as the number of square feet of partial-depth repairs satisfactorily placed, measured to the nearest 0.1 feet<sup>2</sup>, based on the Engineer approved repair areas marked on the pavement prior to repair.

**BASIS OF PAYMENT** Include the cost of all labor, material, and equipment necessary to satisfactorily perform the work in the unit price bid for Partial-Depth Repair of Portland Cement Concrete Pavement. Thirty-three (33%) of the unit price bid will be paid if the Engineer changes the required repair after removal to a full-depth repair. No additional payment will be made for extra work required to repair damage to the adjacent pavement that occurred during any operation or for removal and replacement of damaged or defective repairs.

*Payment will be made under:*

Item No.	Item	Pay Unit
511.M0000018	Partial-Depth Repair of Portland Cement Concrete Pavement	Square Feet

M – Material

- 1-Concrete Repair Material
- 2-Rapid Hardening Concrete Repair Material
- 3-Rapid Hardening Polymer Concrete
- 4-Epoxy Resin System
- 6-Concrete Repair Material- High Early Strength
- 7- Class HES Concrete

**ITEM 520.05000010 - SAW CUTTING PORTLAND CEMENT CONCRETE AND COMPOSITE PAVEMENTS**

DESCRIPTION. This work shall consist of saw cutting existing reinforced or unreinforced portland cement concrete, including portland cement concrete pavement and sidewalk, and composite pavement (asphalt concrete on reinforced or unreinforced portland cement concrete), at the locations indicated on the plans or where directed by the Engineer.

MATERIALS. All equipment proposed for this work shall be subject to approval by the Engineer prior to actual use. Rotary rock saws shall not be used for cuts under this item.

CONSTRUCTION DETAILS. Saw cutting shall be along a neat line as indicated on the plans or where directed by the Engineer. The cuts shall be neat and true with no shatter. Saw cuts shall be made to the depth (s) indicated on the plans and as stated below.

When removing composite pavement the Contractor shall saw cut the existing pavement for the full depth of the concrete pavement. The total saw cut depth will be more, depending on the thickness of the asphalt. At the Contractor's option, the asphalt concrete may first be saw cut and removed before making a second cut through the portland cement concrete.

Any damage to material not indicated for removal, caused by the Contractor's operations, shall be repaired by the Contractor. All repair shall be done in a manner satisfactory to the Engineer.

METHOD OF MEASUREMENT. This work will be measured by the number of linear feet of saw cutting done. No allowance will be made for saw cuts of different depths.

Saw cutting which is done for the Contractor's convenience will not be measured for payment under this item.

BASIS OF PAYMENT. The unit price bid per linear foot of saw cutting shall include the cost of all labor, materials, and equipment necessary to complete the work.

Only one payment will be made for saw cutting when removing composite pavement regardless of the method chosen. The cost of saw cutting the asphalt concrete in the composite pavement is included in this item. No payment will be made for this saw cutting under the item for saw cutting asphalt concrete.

Any repairs made necessary by the Contractor's operations shall be done to the satisfaction of the Engineer at no additional cost to the State

**ITEM 520.09000010 - SAW CUTTING ASPHALT CONCRETE**

**DESCRIPTION.** This work shall consist of saw cutting existing asphalt concrete pavement or sidewalk at the locations indicated on the plans or where directed by the Engineer.

**MATERIALS.** All equipment proposed for this work shall be approved by the Engineer prior to actual use.

**CONSTRUCTION DETAILS.** Saw cutting shall be along a neat line as indicated on the plans or where directed by the Engineer. Saw cuts shall be made to the depth(s) indicated on the plans.

Any damage to material not indicated for removal, caused by the Contractor's operations shall be repaired by the Contractor. All repair shall be done in a manner satisfactory to the Engineer.

**METHOD OF MEASUREMENT.** This work will be measured by the number of linear feet of saw cutting done. No allowances will be made for saw cuts of different depths.

No saw cutting will be measured for payment under this item which the Contractor may choose to do for his own convenience.

**BASIS OF PAYMENT.** The unit price bid per linear foot of saw cutting shall include the cost of all labor, materials, and equipment necessary to complete the work.

Any repairs made necessary by the Contractor's operations shall be done to the satisfaction of the Engineer at no additional cost to the State.

**ITEM 604.07200110 - SETTING NEW DRAINAGE FRAMES ON EXISTING DRAINAGE STRUCTURES**

**DESCRIPTION**

This work shall consist of setting new drainage frames, complete with grates or covers, to grade on existing drainage structures and shall include removing, storing, and/or disposing of the existing frames, grates, covers, and appurtenances.

This item shall also include the setting of new drainage frames on existing drainage structures modified under the item, "Rebuilding Top of Existing Drainage Structures."

**MATERIALS**

The new drainage frames, grates, and covers will be furnished under separate items.

Materials shall meet the requirements of the following subsections of Section 700:

Concrete Repair Material	701-04
Concrete Grouting Material	701-05
Precast Concrete Pavers	704-13

Concrete shall be Class A meeting the requirements of Section 501.

**CONSTRUCTION DETAILS.**

The existing frames, grates, covers, and appurtenances shall be removed and, as indicated in the plans or directed by the Engineer, stored for pick up by others, used elsewhere on the contract, or disposed of off the work site.

The existing masonry adjustment collar, or a portion of it, shall be removed where necessary for setting of the new frame. The new frames shall be set to the line and grade as indicated in the plans or as directed by the Engineer, using precast concrete pavers and concrete grouting material and/or Class A concrete. The frames shall be set in a concrete grouting bed on the existing structure.

Any asphalt pavement and shoulder courses, subcourses, curbs, sidewalks, lawns and other top surfaces removed or damaged during the work of removing the existing frames and setting the new frames, shall be replaced in kind, unless otherwise directed by the Engineer. This shall include all sawcutting necessary for this removal.

Existing concrete/composite pavement shall be removed and restored as per the details given in the plans.

**METHOD OF MEASUREMENT**

**ITEM 604.07200110 - SETTING NEW DRAINAGE FRAMES ON EXISTING DRAINAGE STRUCTURES**

This work will be measured by the number of new drainage frames complete with grates or covers, set to grade on existing drainage structures or on existing drainage structures modified under the item, "Rebuilding Top of Existing Drainage Structures."

**BASIS OF PAYMENT**

The unit price bid for setting each drainage frame shall include the cost of all labor, materials, and equipment necessary to complete the work including any necessary sawcutting, removal and replacement of pavement and shoulder courses, subcourses, curbs, sidewalks, lawns and other top surfaces, unless otherwise indicated in the plans or proposal. Removal and restoration of concrete/composite pavement will be paid for separately.

New drainage frames, grates, and covers will be paid for under the appropriate items. Any frames, grates, covers or appurtenances broken thru carelessness on the part of the Contractor shall be replaced at the Contractor's expense.

**ITEM 604.07210110 - RESETTING EXISTING DRAINAGE FRAMES ON EXISTING DRAINAGE STRUCTURES**

**DESCRIPTION**

This work shall consist of removing, storing, and resetting existing drainage frames, complete with grates, covers, and appurtenances, to grade on existing structures or on existing drainage structures modified under the item, "Rebuilding Top of Existing Drainage Structures."

**MATERIALS**

Materials shall meet the requirements of the following subsections of Section 700:

Concrete Repair Material	701-04
Concrete Grouting Material	701-05
Precast Concrete Pavers	704-13

Concrete shall be Class A meeting the requirements of Section 501.

**CONSTRUCTION DETAILS**

The existing frames, grates, covers and appurtenances shall be removed, stored if necessary, cleaned and reset to the line and grade indicated in the Plans or as directed by the Engineer.

The existing masonry adjustment collar, or a portion of it, shall be removed where necessary for resetting of the existing frame. The existing frames shall be set to grade using precast concrete pavers and concrete grouting material and/or Class A concrete. The frames shall be set in a concrete grouting bed on the existing structure. If an adjustment frame or ring was removed from the structure, the collar shall be set at such grade that no adjustment frame or ring is needed.

Any asphalt pavement and shoulder courses, subcourses, curbs, sidewalks, lawns and other top surfaces removed or damaged during the work of removing the existing frames and setting the new frames, shall be replaced in kind, unless otherwise directed by the Engineer. This shall include all sawcutting necessary for this removal.

Existing concrete/composite pavement shall be removed and restored as per the details given in the plans.

**METHOD OF MEASUREMENT**

This work shall be measured by the number of existing drainage frames, complete with grates or covers, reset to grade on existing drainage structures or on existing drainage structures modified under the item, "Rebuilding Top of Existing Drainage Structures."

**BASIS OF PAYMENT**

The unit price bid for resetting each drainage frame shall include the cost of all labor, materials and equipment necessary to complete the work including any necessary sawcutting, removal and replacement of pavement and shoulder courses, subcourses, curbs, sidewalks, lawns and other top surfaces, unless otherwise indicated in the plans or proposal. Removal and restoration of concrete/composite pavement will be paid for separately.

Any frames, grates and covers broken through carelessness on the part of the Contractor shall be replaced at the Contractor's expense.

## **ITEM 604.07240110 - REBUILDING TOP OF EXISTING DRAINAGE STRUCTURES**

### **DESCRIPTION**

This work shall consist of rebuilding the top of existing drainage structures as shown in the plans or as directed by the Engineer.

### **MATERIALS**

Unless otherwise indicated in the plans or directed by the Engineer, the materials for rebuilding the top of existing drainage structures shall be the same type as used in the original construction, except that neither concrete brick nor concrete block shall be used.

Concrete shall be Class A meeting the requirement of Section 501. Other materials shall conform to the following subsections of Section 700:

Concrete Repair Material	701-04
Concrete Grouting Material	701-05
Precast Concrete Pavers	704-13
Precast Concrete Driveway and Sidewalk Pavers	704-13
Precast Concrete Drainage Units	706-04
Bar Reinforcement, Grade 420	709-01

### **CONSTRUCTION DETAILS**

The top slab and/or top portion of the walls shall be removed and rebuilt as indicated in the plans or as directed by the Engineer. Removed material shall be disposed of off the work site.

Excavation shall be performed in accordance with the requirements of Subsection 206-3. This work shall include all necessary sawcutting and removal of all overlaying material including asphalt pavement and shoulder, curb, turf, etc. Existing concrete/composite pavement shall be removed and restored as per the details given in the plans.

Concrete construction shall conform to the requirements of Section 555.

No structure shall be backfilled until all the mortar has completely set. The requirements of Subsection 203-3.13 shall apply.

Each structure shall be cleaned of any accumulation of silt, debris, or foreign matter of any kind and shall be kept clean of such accumulation until final acceptance of the work.

### **METHOD OF MEASUREMENT**

This work will be measured by the number of existing drainage structures for which the top is rebuilt as specified.

## **BASIS OF PAYMENT**

Except as noted below, the unit price bid for rebuilding each top of existing drainage structures shall include the cost of all labor, materials, and equipment, including sawcutting, excavation and removal of underlying materials necessary to complete the work. Removing and resetting existing drainage frames on existing drainage structures, furnishing new frames and grates, setting new drainage frames on existing drainage structures, and all necessary backfill and restoration will be paid for under the appropriate items. Removal and restoration of concrete/composite pavement will be paid for separately.

**ITEM 604.07260011 – CONNECTION TO EXISTING DRAINAGE FACILITIES**

Description:

Under this item, the Contractor shall remove portions of existing drainage facilities and connect new drainage facilities thereto at the locations shown on the plans as ordered by the Engineer.

Materials:

Concrete	Class A Section 501
Concrete Grouting Material	Section 701-05
Bar Reinforcement	Grade 60 Section 709-01

Construction Details:

The work under this item provides for connecting new pipe lines to existing pipe lines or structures. The Contractor shall maintain the existing pipe lines and structures in continuous service as required and/or directed by the Engineer.

The Contractor shall perform all excavation and backfill and dispose of all excess materials as required to complete the work. Backfilling shall be compacted in conformance with Section 203 of the Standard Specifications.

When connecting to the existing pipe line or structures, the existing facility shall be broken into and reinforcement cut back only as needed to accommodate the new pipe as indicated on the plans. The new pipe shall be set to required grade and the existing pipe wall shall be repaired and patched as required to provide a secure and waterproof connection. Ends of the new pipe projecting into the existing drainage facility shall be neatly cut off and trimmed flush with the inside face of the structure.

Method of Measurement:

The quantity to be paid for shall be the actual number of connections made in conformance with the plans and specifications and the orders of the Engineer.

Basis of Payment:

Payment will be made at the unit price bid for each connection which shall include the cost of all materials, labor and equipment necessary to complete the work except excavation and backfill which will be paid under Trench and Culvert Excavation Item 206.02 and the new pipe which shall be paid under the appropriate pipe item.

**ITEM 604.07290010 - REPAIR WALLS OF EXISTING DRAINAGE STRUCTURES**

DESCRIPTION. The work to be performed under this item shall consist of removal of deteriorated concrete block or brick walls and mortar joints on existing leaching basins, catch basins, drop inlets, and manholes; and replacement with mortared precast concrete pavers as shown on the contract plans or as ordered by the Engineer.

MATERIALS. Materials shall meet the requirements specified in the following subsections of Section 700:

Precast Concrete Pavers	704-13
Mortar for Concrete Masonry	705-21
Steps for Manholes	725-02

CONSTRUCTION DETAILS. The work to be performed under this item shall consist of removing deteriorated concrete block or brick walls and mortar joints and making the required repairs utilizing precast concrete pavers with mortared joints. All work shall be performed from inside the structure. When necessary, to insure safety of the workers, the Contractor shall provide temporary support of the structure walls while the repair work is being done.

The Contractor shall exercise care in the removal work so as not to damage remaining portions of the drainage structure walls. Any block that is not scheduled for removal under this item that is loosened by the removal operation shall be reset by the Contractor at his own expense to the satisfaction of the Engineer.

All damaged materials removed under this item, including debris, will become the property of the Contractor and shall be removed from the site of the work.

METHOD OF MEASUREMENT. This work will be measured by the actual number of square feet of wall area repaired at each structure measured on the plane of the interior walls of the structures so repaired.

BASIS OF PAYMENT. The unit price bid per square feet for this item shall include the cost of all labor, materials, and equipment required to complete the work, including the cost of removal of grate; removal and repair of structure walls to the required limits; replacement of steps if needed; resetting of grate; and temporary support of walls while the repair work is being performed.

Any damage to existing facilities caused by the Contractor's operations shall be repaired at the Contractor's expense.

**ITEM 608.01050010 - CONCRETE SIDEWALKS - UNREINFORCED**  
**(GRADING INCLUDED)**

**DESCRIPTION.**

The work shall consist of the construction of portland cement concrete sidewalks and necessary grading as shown on the plans.

**MATERIALS.**

The following requirements of Sections 203 and 608 shall apply: 203-2.02A, 608-2, and 608-2.01.

**CONSTRUCTION DETAILS.**

The requirements of Subsection 203-3.12 shall apply to the placement of embankment.

The requirements of Subsection 608-3.01 shall apply except that all references to driveways and wire fabric for reinforcement shall be disregarded. The sidewalk shall be constructed without wire fabric for concrete reinforcement.

The location of the sidewalks shall be properly graded to conform with the sidewalk cross-section and line and grade. The graded area shall be firm and dry before placing the concrete and all organic or unsuitable materials, existing curbs, sidewalks, and driveways shall be removed.

**METHOD OF MEASUREMENT.**

Concrete sidewalks will be measured by the number of cubic yards of cement concrete computed from payment lines shown on the plans.

**BASIS OF PAYMENT.**

The unit price bid per cubic yard will include all excavation, embankment, preparation of subgrade, and all other materials, equipment, and labor necessary to complete the work as called for on the plans and to the satisfaction of the Engineer.

No separate payment will be made for excavation or embankment above, below, or within the volume of sidewalk placed.

Payment at the unit bid price will be made after the concrete sidewalks and curing application have been properly placed.

## **ITEM 608.0105NN09 –CURB RAMP**

### **DESCRIPTION**

The work shall consist of constructing curb ramps, turning spaces, and associated curbing in accordance with the applicable Standard Sheets and Specifications, and in accordance with the Contract Documents.

The fifth and sixth number to the right of the decimal place (NN), in the item number, is a serialized number to match the different types of curb ramp configurations depicted in the US Customary Standard Sheets 608-01.

The work shall include demolition, saw cutting, disposal, fill, compaction, construction of the new curb ramps, turning spaces and associated curbing. Also included are detectable warning units (supplied and installed where required), repairs to affected asphalt and concrete (as necessary), topsoil, establishing turf (on disturbed areas), and finish work. All material and labor required to perform these tasks is included. Any required adjustments to utilities shall be performed under the specifications for that work.

### **MATERIAL**

Materials required for this work shall comply with, but are not limited to, the following Sections: 402-2, 502-2, 503-2, 608-2, 609-2, and 610-2.

### **CONSTRUCTION DETAILS**

The work shall be in conformance with the US Customary Standard Sheets 608-01 and 608-03. The work performed shall comply with, but is not limited to, the following Sections of the Standard Specifications: 401-3, 402-3, 502-3, 503-3, 608-3, 609-3, and 610-3.

Any existing utility facilities not indicated to be removed that are damaged by the Contractor's operations performing this work, shall be repaired by the Contractor, to the satisfaction of the Engineer, at no additional cost.

### **Survey Requirements**

The contractor shall be responsible for field verifying all elevations, slopes, and dimensions to ensure that the final layout of sidewalks and curb ramps meet ADA requirements prior to pouring concrete or placing asphalt or pavers. A Contract Control Plan is not necessary for work limited to sidewalks and curb ramps.

### **METHOD OF MEASUREMENT**

Payment will be made at the unit price bid for each type of curb ramp (as shown in the US Customary Standard Sheets 608-01), satisfactorily installed, in accordance with the Contract Documents.

### **BASIS OF PAYMENT**

The unit price bid shall include the cost of furnishing all labor, material, and equipment necessary to satisfactorily complete the work, to the satisfaction of the Engineer. Excavation and disposal under curb ramps and subbase course under curb ramps will be paid for separately. Sidewalk

**ITEM 608.0105NN09 –CURB RAMP**

beyond the upper grade break or turning space, as shown in the US Customary Standard Sheets 608-01, will be paid for separately. Any required Survey shall be paid for separately under the lump sum price bid for survey operations. Any incidental asphalt and concrete materials shall be included in work and not paid separately.

*Payment will be made under:*

<b><u>Item Number</u></b>	<b><u>Description</u></b>	<b><u>Pay unit</u></b>
608.01050009	Curb Ramp as shown in project details	Each
608.01050109	Curb Ramp Configuration Type 1	Each
608.01050209	Curb Ramp Configuration Type 2	Each
608.01050309	Curb Ramp Configuration Type 3	Each
608.01050409	Curb Ramp Configuration Type 4	Each
608.01050509	Curb Ramp Configuration Type 5	Each
608.01050609	Curb Ramp Configuration Type 6	Each
608.01050709	Curb Ramp Configuration Type 7	Each
608.01050809	Curb Ramp Configuration Type 8	Each
608.01050909	Curb Ramp Configuration Type 9	Each
608.01051009	Curb Ramp Configuration Type 10	Each
608.01051109	Curb Ramp Configuration Type 11	Each
608.01051209	Curb Ramp Configuration Type 12	Each
608.01051309	Curb Ramp Configuration Type 13	Each
608.01051409	Curb Ramp Configuration Type 14	Each

**ITEM 609.04010510 - CAST-IN-PLACE CONCRETE CURB (GRADING INCLUDED) TYPE VF6**  
**ITEM 609.04020510 - CAST-IN-PLACE CONCRETE CURB (GRADING INCLUDED) TYPE VF6A**  
**ITEM 609.04030510 - CAST-IN-PLACE CONCRETE CURB (GRADING INCLUDED) TYPE M6**  
**ITEM 609.04040510 - CAST-IN-PLACE CONCRETE CURB (GRADING INCLUDED) TYPE M6A**  
**ITEM 609.04050510 - CAST-IN-PLACE CONCRETE CURB (GRADING INCLUDED) TYPE M4**  
**ITEM 609.04060510 - CAST-IN-PLACE CONCRETE CURB (GRADING INCLUDED) TYPE M4A**  
**ITEM 609.04070510 - CAST-IN-PLACE CONCRETE CURB (GRADING INCLUDED) TYPE T4**  
**ITEM 609.05010510 - CAST-IN-PLACE CONCRETE CURB AND GUTTER (GRADING INCLUDED)**  
**TYPE VF6G**  
**ITEM 609.05020510 - CAST-IN-PLACE CONCRETE CURB AND GUTTER (GRADING INCLUDED)**  
**TYPE M4G**

## **DESCRIPTION**

The work shall consist of the construction of concrete curb or curb and gutter and necessary grading as shown on the plans or as specified by the Engineer.

## **MATERIALS**

The requirements of Subsection 609-2 shall apply. The curb or curb and gutter shall conform to the dimensions shown on the standard sheets, except that the depth of the curb shall be as shown on the plans.

## **CONSTRUCTION DETAILS**

The requirements of Subsections 609-3.01 and 609-3.04 shall apply.

The location of the concrete curb or curb and gutter shall be properly graded to conform to the curb line and grade. The graded area shall be firm and dry before placing concrete and all organic or unstable materials, existing curbs, sidewalks, and driveways shall be removed.

## **METHOD OF MEASUREMENT**

Concrete curb or curb and gutter placed under these specifications will be measured by the number of linear feet, measured to the nearest foot. The measurement will be taken along the top front arris line of the curb or curb and gutter.

## **BASIS OF PAYMENT**

The unit price bid per foot shall include all excavation, embankment, preparation of subgrade, curb anchors, and all other materials, equipment and labor necessary to complete the work as called for on the plans or as specified by the Engineer. The unit price bid shall also include: replacement of curb and curb and gutter that was produced out of tolerance; cleaning of curb, or curb and gutter found to be dirty prior to final acceptance; and repair or replacement of curb and curb and gutter damaged by the Contractor's operations.

No separate payment will be made for excavation or embankment above, below, or within the volume of curb placed

**ITEM 640.25000010 - BLUE REFLECTORIZED PAVEMENT MARKING PAINT  
FOR HANDICAPPED PARKING SPACES**

All of the provisions of Section 640 pertaining to White Paint Reflectorized Pavement Stripes shall apply except for the following:

The pavement marking paint shall be tinted blue prior to application. The color of the paint shall be such that a prepared color chip shall be a reasonable visual match to Federal Color Standard No. 595B, Color 15180. Viewing shall be done under normal daylight.

Application of the blue reflectorized pavement marking paint will be restricted to parking and passenger loading zones and other marking which are specifically intended for accessibility by handicapped persons, as detailed in the plans.

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**ITEM 655.07010010 - CAST FRAME F1, WITHOUT CURB BOX AND WITH RETICULINE GRATE G1**

**ITEM 655.07020010 - CAST FRAME F2, WITHOUT CURB BOX AND WITH RETICULINE GRATE G2**

**ITEM 655.07030010 - CAST FRAME F3, WITHOUT CURB BOX AND WITH RETICULINE GRATE G3**

All conditions and requirements of Items 655.0701, 655.0702, and 655.0703 of the Standard Specifications shall apply except for the following modifications:

These shall be cast frame without curb box and with reticuline grate as detailed on the plans.

**ITEM 680.51000010 - ALTER ELEVATION OF PULL BOXES**

**DESCRIPTION:**

Under this item the Contractor shall alter the elevation of existing pull boxes in accordance with this specification, the details included in the contract plans, and the directions of the Engineer.

**MATERIALS:**

Existing pull box frames and covers shall be reused.

Concrete shall meet the material requirements for Portland Cement Concrete, Class A, as outlined under Section 501 of the Standard Specifications.

**CONSTRUCTION DETAILS:**

The Contractor shall exercise care in removing and reinstalling pull box frames and covers so as not to damage any part thereof. Any component parts damaged by the Contractor shall be repaired or replaced at the Contractor's expense to the satisfaction of the Engineer.

Pull box walls shall be reconstructed as shown on the contract plans.

**METHOD OF MEASUREMENT:**

This work will be measured as the number of pull boxes altered in accordance with the plans, specifications, and directions of the Engineer.

**BASIS OF PAYMENT:**

The unit price bid for this item shall include the cost of all labor, equipment, and materials necessary to complete the work.

**ITEM 680.51111010 - SLIP RESISTANT SURFACE FOR CAST IRON PULL  
BOX COVERS**

**DESCRIPTION**

This work shall consist of blast cleaning traffic signal pull box (TSPB) covers, coating them with slip resistant material and a bonding agent capable of bonding to cast iron, and reinstalling the TSPB covers in the field as indicated in the table of TSPB covers and where directed by the Engineer.

**MATERIALS**

Contractor shall provide temporary traffic signal pull box covers to replace any covers removed from site for abrasive blast cleaning and applying a bonding agent. Traffic Signal Pullbox Covers are cast iron and approximately 26 inches long, 18 inches wide, and 1.5 inches deep. See table of TSPB covers for exact measurements.

Material for abrasive blast cleaning may be selected by the Contractor.

The bonding agent shall be an epoxy/amine binder or elastomeric polyurethane with a proven history of adhering to cast iron surfaces. The bonding agent shall be capable of holding a slip resistant material securely to the TSPB cover through repeated freeze/thaw cycles. Key physical properties of the bonding agent as follows:

- Ultimate Tensile Strength per ASTM D412 Rubber 2000 – 2200 psi, or D638 Plastics 2500 psi
- Elongation at break point per ASTM D412 Rubber 150%, or D638 Plastics 30% min 54% max

The Aggregate shall be clean, dry, and free from foreign matter. The Aggregate shall exhibit a Skid Resistance of 2 ½” to 2 ¾” as per ASTM E303-93. Aggregate shall not exceed No. 6 sieve size. Bauxite/ Garnet blends or other materials with a high coefficient of friction are acceptable. Aggregate should be in natural colors of grey and buff. The surface coefficient of friction shall not be significantly reduced by repeated wear, use or weathering over time.

**CONSTRUCTION DETAILS**

The Contractor shall exercise care in removing and reinstalling TSPB covers so as not to damage any frames, adjoining pavement or components housed therein. Any component parts of the TSPB damaged by the Contractor shall be repaired or replaced at the Contractor's expense. Section 680-3.01 Equipment List and Drawings applies. The cover stamp “NYS TRAFFIC SIGNAL” or other text, shall remain legible. The TSPB shall remain covered at all times and pedestrians shall be protected from unsafe conditions such as gaps or openings. Temporary cover shall not reduce accessibility.

Existing TSPB covers shall be abrasive blast cleaned to bare metal in accordance with SSPCSP6 by the Contractor. If vacuum-shrouded blasting equipment is used on site, measures shall be taken to ensure that no dust or abrasive escapes during operation. Refer to Section 570-3.07 Class B Containment of the Standard Specifications. The Contractor shall remove all dirt, rust and rust scale, mill scale, and other corrosion producing contaminants. All equipment and compressors used in the cleaning operation shall be equipped with all necessary filters and traps

**ITEM 680.51111010 - SLIP RESISTANT SURFACE FOR CAST IRON PULL  
BOX COVERS**

to prevent moisture, oil, and other contaminants from being deposited on clean surfaces. The Contractor shall abrasive blast clean no more than 4 hrs prior to slip resistant coating application.

If blast cleaning is completed on-site, all residue generated by the cleaning work shall be removed by vacuuming using HEPA filtered vacuums by the Contractor. The Contractor shall remove all debris associated with this work from the TSPB vault after coating operations are complete. A HEPA filter shall be defined as a filter that is at least 99.97% efficient for particles that are 0.3  $\mu$ m in diameter, or larger.

Contractor shall coat TSPB with the bonding agent no more than 4 hrs after abrasive blast cleaning. The bonding agent shall be applied by brush only to the top surface of the cover such that it fits back smoothly in the frame and flush with surrounding pavement. The Contractor shall not coat the sides or bottom of the cover.

The Contractor shall broadcast slip resistant aggregate over the bonding agent immediately after bonding agent application. Coating shall not increase the thickness of the TSPB beyond 3/16" above sidewalk grade. The Contractor shall allow the treatment to cure over 2 hours or according to manufacturer recommendations. Contractor shall remove all excess bonding agent or aggregate on the edges or bottom of the TSPB cover by hand or suction sweeping before installing in the field. The TSPB cover shall fit in the pull box frame as originally manufactured to the satisfaction of the Engineer.

**METHOD OF MEASUREMENT**

This work will be measured as the number pull box covers satisfactorily coated with a slip resistant surface and reinstalled in the field.

**BASIS OF PAYMENT**

The unit price bid for each TSPB cover shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work. Payment will be made for only those existing TSPB covers designated to be coated. Only one payment for each existing TSPB cover will be made regardless of the number of times it is coated. No separate payments will be made for traffic signal pull boxes or covers damaged by the Contractor's operations.

**ITEM 685.03XX0018 - RAISED REFLECTORIZED SNOWPLOWABLE PAVEMENT MARKERS**

**DESCRIPTION**

Under this work, the Contractor shall furnish and install new raised reflectORIZED snowplowable pavement markers and replacement retroreflectors in existing snowplowable pavement marker castings, at the locations and in accordance with the patterns indicated in the plans or as directed by the Engineer.

A raised reflectORIZED snowplowable pavement marker shall consist of a one-way or a two-way plastic prismatic retroreflector that is mounted in a durable iron casting. The raised reflectORIZED snowplowable pavement marker shall be designed to provide nighttime visibility in wet weather conditions and to resist damage from snowplowing operations.

Replacement retroreflectors for existing raised reflectORIZED snowplowable pavement markers shall meet the requirements of these specifications and shall be designed for use with the iron castings in which they will be installed.

**MATERIALS**

1. **Raised ReflectORIZED Snowplowable Pavement Marker.** Raised reflectORIZED snowplowable pavement markers shall be furnished by the manufacturer as complete units which shall consist of a one-way or two-way retroreflector that is firmly adhered to a snowplow resistant iron casting. The iron casting shall be designed to protect the retroreflector from damage by snowplowing operations. The raised reflectORIZED snowplowable pavement marker shall be designed so that the lower portion of the iron casting is installed below the pavement surface and adhered with an epoxy resin adhesive.

Materials for raised reflectORIZED snowplowable pavement markers and for replacement retroreflectors shall meet the following requirements.

- a. **Retroreflector.** Retroreflectors shall be a prismatic type, molded of acrylic plastic, polycarbonate, or other suitable material designed to provide strength, abrasion resistance, impact resistance, resilience, and adhesion. The retroreflector shall be a transparent, ultraviolet stabilized grade material that provides resistance to color change over long periods of outdoor exposure.

The retroreflector shall contain one or two prismatic reflective face(s) to reflect incident light from one or two directions. The surface of the reflective face(s) shall be protected by a permanently bonded glass face or other transparent, abrasion-resistant material.

The minimum required reflective surface area of each reflective face shall be 1.43 in<sup>2</sup>.

**ITEM 685.03XX0018 - RAISED REFLECTORIZED SNOWPLOWABLE PAVEMENT**

**MARKERS**

The initial minimum coefficient of luminous intensity ( $R_i$ ) of each retroreflector shall be as shown in Table 1. Measurements shall be conducted in accordance with ASTM D 4383 or the following test procedure:

The retroreflector to be tested shall be located with the center of the reflective face at a distance of 5 ft from a uniformly bright light source having an effective diameter of 0.20 inches. The return of light shall be measured using an annular ring photocell having a 0.37 in I.D. x 0.47 in O.D. The photocell shall be shielded to eliminate stray light. The distance from the light source center to the center of the photo active area shall be 0.21 inches. If a test distance of other than 5 ft is used, the source and receiver dimensions and the distance between the source and receiver shall be modified in the same proportion as the test distance.

**Table 1**  
**Coefficient Of Luminous Intensity ( $R_i$ )**  
**Minimum Values (cd/fc)**

Entrance Angle	Observation Angle	White	Yellow	Red
0°	0.2°	3.0	1.8	0.75
20°	0.2°	1.2	0.72	0.30

When tested in accordance with ASTM D4383, the coefficient of luminous intensity ( $R_i$ ) of the retroreflective face(s), after abrasion and when measured in accordance with this specification, shall not be less than the values in Table 1.

When tested in accordance with ASTM D4383 the lens impact strength of the prismatic retroreflector face(s) shall show no more than two radial cracks longer than ¼ in. There shall be no radial cracks extending to the edge of the abrasion resistant area. There shall be no delamination.

The finished retroreflector shall be laminated to an approximately 40 mils thick elastomeric pad which is designed to absorb impact and to permit attachment of the retroreflector to the raised reflectORIZED snowplowable pavement marker iron casting.

- b. **Iron Casting.** The iron casting shall be ductile iron hardened to Rockwell Hardness 51-55

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**MARKERS**

HRC. The iron casting shall be designed so that the final installation height of the top of the iron casting is a maximum 1/3 inches above the pavement surface, and the leading edges of the iron casting are installed below the pavement surface. Iron castings with ramps shall have a maximum 4 1/2° ramp angle. The ramp angle shall be the angle formed by the pavement surface and a straight line drawn from the intersection of the ramp with the pavement surface to the top of the ramp.

- c. **Epoxy Resin Adhesive.** Adhesive for bonding the iron casting to the pavement surface shall be a two-component epoxy resin which meets the requirements of AASHTO M 237, Type IV, or ASTM D 4383. Containers of epoxy resin adhesive in storage shall be protected from moisture and direct sunlight, and maintained at a temperature above 40 °F.
- d. **Replacement Retroreflector Adhesive.** Adhesive for bonding the replacement retroreflector to the existing iron casting shall meet the requirements of ASTM D 3498, or the adhesive shall be as recommended by the manufacturer of the replacement retroreflector.

**2. Basis of Acceptance.**

- a. **Raised ReflectORIZED Snowplowable Pavement Markers.** Raised reflectORIZED snowplowable pavement markers shall be considered for acceptance at the project site based on the appearance of the product on the Department's Approved List. The retroreflector and iron casting shall be identified with the manufacturer's name and product name.

The manufacturer shall certify that the raised reflectORIZED snowplowable pavement marker meets the requirements of these specifications.

Raised reflectORIZED snowplowable pavement markers shall be approved by the Materials Bureau based on laboratory and field testing. Detailed requirements and procedures for the approval of raised reflectORIZED snowplowable pavement markers are available from the Materials Bureau.

- b. **Replacement Retroreflectors.** Replacement retroreflectors shall be considered for acceptance at the project site based on the appearance of the product on the Department's Approved List. Replacement retroreflectors shall be identified with the manufacturer's name and product name.

The manufacturer shall certify that the replacement retroreflector(s) meet the requirements of this specification.

Replacement retroreflectors shall be approved by the Materials Bureau based on laboratory and field testing. Detailed requirements and procedures for the approval of

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**MARKERS**

replacement retroreflectors are available from the Materials Bureau.

Adhesive for bonding replacement retroreflectors to existing iron castings shall be accepted based on the manufacturer's certification that the product meets the requirements of these specifications.

- c. **Epoxy Resin Adhesive.** Epoxy resin adhesives shall be considered for acceptance at the project site on the basis of the manufacturer's certification that the adhesive meets the requirements of AASHTO M 237, Type IV or ASTM D 4383. Containers of epoxy resin adhesive shall be labeled with the manufacturer's name, the product name, the date of manufacture, and the shelf life.

**CONSTRUCTION DETAILS**

- 1. **General.** Before work begins, the Contractor shall submit a schedule of operations for approval by the Engineer. In addition, the Contractor shall supply the Engineer with the manufacturer's written installation and usage instructions for all materials to be used on the project.

All raised reflectorized snowplowable pavement markers and replacement retroreflectors shall be installed and located as shown in the contract documents or as directed by the Engineer and in accordance with the Manual of Uniform Traffic Control Devices (MUTCD).

When raised reflectorized snowplowable pavement markers and replacement retroreflectors are installed under traffic, the Contractor shall provide all necessary traffic control devices including flaggers, signs, channelizing devices, mobile construction zone impact attenuators, shadow vehicles with flashing arrow boards, flashing arrow boards, etc. to maintain and protect traffic, to protect the work operation, and to protect raised reflectorized snowplowable pavement markers or retroreflectors until thoroughly serviceable. No additional payment will be made for this work.

The installation of raised reflectorized snowplowable pavement markers and replacement retroreflectors shall be performed in such a manner so as not to cause damage to the surrounding pavement. The Contractor shall be responsible for repairing damaged pavement surfaces that result from improper installation, or installation of raised reflectorized snowplowable pavement markers in unauthorized areas. Removal and repair work shall be done as directed by and to the satisfaction of the Engineer, at no cost to the State.

- 2. **Installation of Raised Reflectorized Snowplowable Pavement Markers.** All raised reflectorized snowplowable pavement markers shall be installed in accordance with the manufacturer's written instructions for installation, in accordance with these specifications, and as directed by the Engineer.

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Raised reflectorized snowplowable pavement markers installed in broken line patterns shall be placed in the gaps between the existing broken lines and in the same longitudinal alignment as the existing broken lines.

Raised reflectorized snowplowable pavement markers installed in full or partial barrier line patterns shall be installed between the two existing full or partial barrier lines except that raised reflectorized snowplowable pavement markers shall not be installed across longitudinal or transverse pavement joints. If a longitudinal pavement joint exists between full or partial barrier lines, two raised reflectorized snowplowable pavement markers shall be placed opposite each other, located on the outside of and 2 inches away from each of the double yellow lines. A pavement joint shall be defined as either a sawed or formed joint in a concrete pavement that separates two pavement slabs or lanes, or as a construction (paving) joint or sawed and sealed joint in an asphalt pavement.

When possible, the edges of the raised reflectorized snowplowable pavement marker shall be located 4 to 6 inches away from pavement joints and cracks.

Raised reflectorized snowplowable pavement markers shall not be installed at locations that show visible evidence of pavement deterioration such as cracking and spalling. If the typical longitudinal spacing of the raised reflectorized snowplowable pavement marker falls at a location of pavement deterioration the raised reflectorized snowplowable pavement marker shall be relocated to another location as directed by the Engineer. In general, the distance that the raised reflectorized snowplowable pavement marker may be relocated away from the original location should not exceed  $\pm 10\%$  of the specified longitudinal spacing. If the raised reflectorized snowplowable pavement marker cannot be relocated within the  $\pm 10\%$  tolerance, the raised reflectorized snowplowable pavement marker should not be installed.

Raised reflectorized snowplowable pavement markers shall be installed by the following operation:

- a. **Pavement Cutting and Cleaning.** The pavement shall be cut to the dimensions and depth recommended by the manufacturer of the raised reflectorized snowplowable pavement marker. The Contractor shall conduct pavement cutting operations and pavement cleaning work in such a manner as to minimize airborne dust and similar debris so as to prevent a hazard to workers, motor vehicle operation, or nuisance to property. On new portland cement concrete pavements, pavement cutting operations shall not begin until a minimum of 30 days after placement of the concrete, unless otherwise allowed by the Engineer.

All debris resulting from the pavement cutting operation shall be collected by vacuuming the pavement cut and adjacent pavement surface. Collected debris shall be disposed of uncontaminated solid waste or construction and demolition debris. The Contractor shall ensure that all operations associated with the handling, transporting, and disposal of the construction and demolition debris are in compliance with the New York State Solid Waste Management Regulations 6 NYCRR, Part 360 as well as all applicable Federal,

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PAVEMENT MARKERS**

State and local regulations.

- b. **Installation of Raised ReflectORIZED Snowplowable Pavement Marker.** No raised reflectORIZED snowplowable pavement markers shall be installed when the ambient or pavement temperatures are below 50°F.

At the time of installation, the cut pavement shall be clean, dry, and free of loose material. The minimum surface temperature of the iron casting shall be 50°F and surfaces of the iron casting shall be substantially free of scale, dirt, rust, oil, grease, or any other contaminant which may reduce the bond between the iron casting and the epoxy adhesive. Iron castings that require removal of contaminants shall be cleaned as directed by and to the satisfaction of the Engineer.

If necessary, to facilitate installation of the epoxy resin adhesive the two components (Part A and Part B) may be heated, by indirect heat, in accordance with the manufacturer's written recommendations. The minimum temperature of the epoxy resin adhesive shall be 50 °F.

The epoxy resin adhesive shall be proportioned and mixed in accordance with the epoxy resin adhesive manufacturer's written recommendations. The mixed epoxy resin adhesive shall be dispensed into the pavement cut in such quantity that the cavity is filled with epoxy resin adhesive to within approximately ½ inch of the pavement surface.

The raised reflectORIZED snowplowable pavement marker shall be immediately placed into the filled pavement cut. Extreme care shall be taken to ensure that the tabs located on the sides of the iron casting are in direct contact with the pavement surface, and the leading edges of the iron casting are below the pavement surface.

That portion of the iron casting installed in the pavement cavity shall be completely encased in the epoxy resin adhesive. Additional epoxy adhesive shall be added as necessary so that the adhesive is approximately flush with the pavement surface. Excess epoxy shall not be allowed to remain in front of the retroreflector or on the face of the retroreflector.

The installed raised reflectORIZED snowplowable pavement marker shall be protected from traffic until the epoxy resin adhesive has hardened to a condition that will not allow the iron casting to move.

3. **Installation of Replacement Retroreflectors for Existing Raised ReflectORIZED Snowplowable Pavement Markers.** No replacement retroreflectors shall be installed when the ambient temperature is less than 50 °F, when the surface temperature of the iron casting is less than 50 °F, when the iron casting is wet, or during periods of rain.

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Prior to installing replacement retroreflectors, the Contractor shall remove existing retroreflectors and clean the existing iron castings. Retroreflectors that are removed from existing iron castings shall be collected and disposed of in a manner approved by the Engineer. All visible adhesive residue, salt, dirt, rust, and other contaminants that are detrimental to the adhesion of the replacement retroreflector shall be removed from the existing iron casting by either abrasive blasting, hand and power wire brushing, or by other methods approved by the Engineer. Surfaces of the iron casting shall be clean and dry at the time of installation of the replacement retroreflector and adhesive.

If present, the release paper or protective liner shall be removed from the laminated elastomeric pad on the bottom of the new retroreflector. If recommended by the manufacturer of the replacement retroreflector, adhesive (approximate ½ inch diameter bead) shall be applied lengthwise to the center of the elastomeric pad or to the center of the iron casting surface that will receive the retroreflector. The replacement retroreflector shall be immediately installed into the iron casting and a minimum load of 100 lb shall be applied to the top of the retroreflector to seat and secure the replacement retroreflector.

Properly applied adhesive shall cover the entire contact area of the bottom of the retroreflector and a slight excess of adhesive will be evident around the edges of the retroreflector. The Contractor shall remove excess adhesive from the retroreflector face or excess build up of adhesive on the iron casting in front of the retroreflector face.

**METHOD OF MEASUREMENT**

Raised reflectorized snowplowable pavement markers will be measured as the number of complete raised reflectorized snowplowable pavement marker units satisfactorily furnished and installed.

Replacement retroreflectors will be measured as the number of retroreflector units satisfactorily furnished and installed.

**BASIS OF PAYMENT**

The accepted quantities of raised reflectorized snowplowable pavement markers and replacement retroreflectors will be paid for at the contract unit price, which shall include the cost of furnishing all labor, materials and equipment to satisfactorily complete the work. The cost for maintenance and protection of traffic, construction signs, mobile construction zone impact attenuators, shadow vehicles with flashing arrow boards, flashing arrow boards, etc. shall be included in the price bid under this item. The cost of collection and disposal of uncontaminated solid waste and existing retroreflectors shall be included in the price bid under this item.

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PAVEMENT MARKERS**

Payment will be made under:

<u>Item No.</u>	<u>Item</u>	<u>Pay Unit</u>
685.03100018	Raised Reflectorized Snowplowable Pavement Marker (One-way White)	Each
685.03110018	Raised Reflectorized Snowplowable Pavement Marker (One-way Yellow)	Each
685.03120018	Raised Reflectorized Snowplowable Pavement Marker (Two-way Yellow)	Each
685.03130018	Raised Reflectorized Snowplowable Pavement Marker (Two-way White/Red)	Each
685.03140018	Raised Reflectorized Snowplowable Pavement Marker (Two-way Yellow/Red)	Each
685.03150018	Replacement Retroreflector for Existing Raised Reflectorized Snowplowable Pavement Marker (One-way White)	Each
685.03160018	Replacement Retroreflector for Existing Raised Reflectorized Snowplowable Pavement Marker (One-way Yellow)	Each
685.03170018	Replacement Retroreflector for Existing Raised Reflectorized Snowplowable Pavement Marker (Two-way Yellow)	Each
685.03180018	Replacement Retroreflector for Existing Raised Reflectorized Snowplowable Pavement Marker (Two-way White/Red)	Each
685.03190018	Replacement Retroreflector for Existing Raised Reflectorized Snowplowable Pavement Marker (Two-way Yellow/Red)	Each

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**ITEM 685.0720XXNA – HIGHLY REFLECTORIZED EPOXY PAVEMENT MARKINGS, 20 MILS (TRIPLE DROP)**

**DESCRIPTION:**

Under this work the contractor shall furnish and apply highly reflectORIZED epoxy pavement markings in accordance with these specifications, the Contract Documents, the MUTCD with the NYS Supplement, or as ordered by the Engineer.

Items for Special Markings include stop bars and crosswalks.

Yield line symbols are isosceles triangles with height equaling 1.5 times the base dimension:

- A small yield line symbol shall have a base dimension of one foot.
- A large yield line symbol shall have a base dimension of two feet.
- Yield line symbols are to be installed with the Apex of the triangle oriented towards oncoming traffic.

The epoxy marking material shall be hot-applied by spray methods onto bituminous and portland cement concrete pavement surfaces at the thickness and width shown on the Contract Documents. The triple drop system shall consist of a combination of highly reflective composite optics, defined as a structural center core surrounded by high index microcrystalline ceramic beads, wet/night visibility beads, and standard glass beads. The cured epoxy marking shall be an adherent, highly reflectORIZED stripe that will provide wet night retro-reflectivity.

**MATERIALS REQUIREMENTS:**

White and Yellow Epoxy ReflectORIZED Pavement Markings	727-03
Glass Beads for Pavement Markings	727-05

**Microcrystalline Ceramic Beads.** The Microcrystalline Ceramic Beads must meet the following requirements:

- Composed of highly reflective particles having a structural center core surrounded by high refractive index microcrystalline ceramic beads and designed to be applied to epoxy pavement marking paint.
- Refractive index of 2.30 minimum when tested using the liquid oil immersion method.
- Either white or yellow tinted as required.
- Appearance in Table 1, below or approved equal.

<b>Product Name</b>	<b>Manufacturer Location</b>
3M Series 70E-White	3M Traffic Control
3M Series 71E-Yellow	Materials Division Brownwood, TX

**Packaging and Shipment.** Shipped and packaged in accordance with commercially accepted standards. Clearly display the name of the product, the name and address of the manufacturer, the quantity of material, the date of manufacture, and the date of expiration or the shelf life, on each container or on the shipping invoice.

**ITEM 685.0720XXNA – HIGHLY REFLECTORIZED EPOXY PAVEMENT MARKINGS, 20 MILS  
(TRIPLE DROP)**

**Basis of Approval.** Approvals will be based upon independent lab analysis and field testing in accordance to this specification and Department directives. The Contractor shall submit independent lab analysis to Director of Materials and arrange for field testing through the General Engineering Section of the Materials Bureau. If the product passes the requirements of this specification, it will be added to the Department's Approved List.

**Basis of Acceptance.** Epoxy Paint and Glass Beads for Pavement markings will be accepted on the basis of the appearance of the product on the Department's Approved List. Wet-Night Reflective Elements will be accepted based on manufacturer's certification that the product meets the requirements of this specification.

**EPOXY PAINT APPLICATION EQUIPMENT**

In general, a mobile applicator shall be a truck mounted, self-contained pavement marking machine, specifically designed to apply epoxy resin materials and reflective glass spheres in continuous line patterns. The applying equipment shall be maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc. In addition, the truck mounted unit shall be provided with accessories to allow for the marking of cross hatching and other special patterns as directed by the Engineer.

At any time throughout the duration of the project, the Contractor shall provide free access to his epoxy applying equipment for inspection by the Engineer or his authorized representative.

The Engineer may approve the use of a portable applicator in lieu of mobile truck mounted accessories for use in applying special markings only, provided such equipment can demonstrate satisfactory application of reflectorized epoxy markings in accordance with these specifications.

Mobile applying equipment shall be capable of installing up to 19 miles of epoxy reflectorized pavement markings in an eight hour day and shall include the following features:

1. Individual tanks for the storage of Part A and Part B of the epoxy resin.
2. Individual tanks for the storage of Standard Glass beads, Wet-Night Visibility Spheres, and Microcrystalline Ceramic Beads. Each tank shall have a minimum capacity of 3000 lbs.
3. Heating equipment of sufficient capacity to maintain the individual epoxy resin components at the manufacturer's recommended temperature for spray application.
4. Individual dispensers for the simultaneous application of Standard Glass Beads, Wet-Night Visibility Spheres, and Microcrystalline Ceramic Beads.
5. Metering devices or pressure gauges on the proportioning pumps, positioned to be readily visible to the Engineer.
6. All necessary spray equipment, mixers, compressors, and other appurtenances for

**ITEM 685.0720XXNA – HIGHLY REFLECTORIZED EPOXY PAVEMENT MARKINGS, 20 MILS  
(TRIPLE DROP)**

the placement of epoxy reflectorized pavement markings in a simultaneous sequence of operations as described in the Construction Details of this specification.

**CONSTRUCTION DETAILS**

**General**

Before any pavement marking work is begun, contractor shall submit a schedule of operations for the approval of the Engineer.

At least five (5) days prior to the start of work, the Contractor shall provide the Engineer with the manufacturer's written instructions for:

- Applying epoxy paint with Microcrystalline Ceramic Beads including but not be limited to, material mixing ratios and application temperatures

The Contractor shall provide and retain an on site manufacturer's representative to provide guidance regarding construction methods, and oversight of Microcrystalline Ceramic Beads application. The services of the manufacturer's representative shall be retained by the Contractor until the release by the Engineer.

When pavement markings operations are carried out under traffic, the Contractor shall provide all necessary flags, markers, signs, etc. in accordance with the MUTCD to maintain and protect traffic, and to protect marking operations and the markings until thoroughly set as per manufacturer's procedures.

**Epoxy Paint Application**

Pavement markings shall be applied in the general direction of traffic. Applications against the direction of traffic flow shall not be allowed.

**Atmospheric Conditions.** Epoxy pavement markings shall only be applied during conditions of dry weather and on thoroughly dry pavement surfaces. At the time of installation, the pavement surface temperature shall be a minimum of 50°F and the ambient temperature shall be a minimum of 50°F and rising. The Engineer shall be the sole determiner as to when atmospheric conditions and pavement surface conditions are such to produce satisfactory results.

**Surface Preparation.** The Contractor shall clean all surfaces by air blasting to remove all loose residues. Include power brooming or manual brooming, if necessary, to remove all loose residue. Make sure all pavement surfaces are free of oil, dirt, dust, grease, salt, and similar foreign materials at the time of application. The cost of cleaning these contaminants shall be included in the bid price of this item. If water blasting is used, allow the surface to thoroughly dry to the satisfaction of the Engineer, before application of any epoxy paint.

**Application of Epoxy Reflectorized Pavement Markings**

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(TRIPLE DROP)**

Epoxy reflectorized pavement markings shall be applied at the width, thickness, and pattern designated in the Contract Documents.

**New PCC Surfaces:** Do not apply permanent epoxy pavement markings on new PCC surfaces until at least 30 days after placement, or such time as determined by the Engineer, to allow adequate cure of the PCC.

**New Asphalt Surfaces:** Do not apply permanent epoxy pavement markings on new asphalt pavement surfaces until at least 14 days after placement.

Marking operations shall not begin until applicable surface preparation work is completed and approved by the Engineer, and the atmospheric conditions are acceptable to the Engineer.

Pavement markings shall be applied by the following simultaneous operation:

1. The pavement surface is air-blasted to remove dirt and residues.
2. The epoxy resin, mixed and heated in accordance with the manufacturer's recommendations, is uniformly hot-sprayed onto the pavement surface at the minimum specified thickness. Epoxy paint shall be applied at the wet film thickness specified in the contract documents.
3. Standard Glass Beads, Wet-Night Visibility Spheres, and Microcrystalline Ceramic Beads are injected into or dropped onto the liquid epoxy marking. The first drop shall be Microcrystalline Ceramic Beads at a rate per manufacturer's recommendation; the second drop shall be Wet-Night Visibility Spheres at a rate of 5 pounds per gallon; and the third drop shall be Standard Glass Beads at a rate of 8 pounds per gallon.
4. The Contractor shall be responsible for removing, to the satisfaction of the Engineer, all tracking marks, spilled epoxy, and epoxy markings applied in unauthorized areas.

**Defective Epoxy Pavement Markings**

Repair defective markings, as determined by the Engineer and at no additional cost to the County, as follows:

1. Repair Method for insufficient film thickness; insufficient line width; and inadequate Standard Glass Bead, Wet-Night Visibility Sphere, and Microcrystalline Ceramic Bead coverage and/or retention:

Prepare the surface of the defective epoxy marking by grinding or blast cleaning. No other cleaning methods will be allowed. Surface preparation shall be performed to the extent that a substantial amount of the reflective glass spheres are removed and a roughened epoxy marking surface remains as determined by the Engineer.

Remove loose particles and foreign debris by brooming or blasting with compressed air

**ITEM 685.0720XXNA – HIGHLY REFLECTORIZED EPOXY PAVEMENT MARKINGS, 20 MILS (TRIPLE DROP)**

just prior to reapplication of markings in accordance with this specification.

2. Repair Method for uncured or discolored epoxy and/or insufficient bond to pavement surface or existing durable marking:

Uncured epoxy shall be defined as applied material that fails to cure (dry) in accordance with the requirements of §727-03 Epoxy Paint or applied material that fails to cure (dry) within a reasonable time period under actual field conditions, as defined by the Engineer.

Discoloration shall be defined as localized areas or patches of brown, grayish or black colored epoxy marking material. These areas often occur in a cyclic pattern and often are not visible until several days or weeks after markings are applied.

The defective epoxy marking shall be completely removed and cleaned to the underlying pavement surface in accordance with the requirements of Section 635 - Cleaning and Preparation of Pavement Surfaces, at the Contractor's expense.

The extent of removal shall be the defective area plus any adjacent epoxy pavement marking material extending one meter in any direction.

After surface preparation work is complete, repair shall be made by reapplying epoxy over the cleaned pavement surface in accordance with the requirements of this specification.

Other defects not noted above, but determined by the Engineer to need repair, shall be repaired or replaced as directed by and to the satisfaction of the Engineer. All work in conjunction with the repair or replacement of defective epoxy reflectORIZED pavement markings shall be performed by the Contractor at no additional cost to the County.

**METHOD OF MEASUREMENT**

Pavement striping (regular lines, cross hatching and special markings) will be measured in feet along the centerline of the pavement stripe and will be based on a 4 inch wide stripe. Measurement for striping with a width greater than the basic 4 inches, as shown on the plans or directed by the Engineer, will be made by the following method:

$$\frac{\text{Plan Width of Striping (inches)} \times \text{Feet 4 inches}}{\text{Feet 4 inches}}$$

This includes stripes 6 inches and wider, such as hatch lines, crosswalk bars and stop bars.

Letters and symbols will be measured by each unit applied. A unit will consist of one letter or one symbol. Example: "SCHOOL" would be paid as six units. Double and triple headed arrows will be measured as a single unit, but the "X" in railroad grade crossing markings (M.U.T.C.D. figure 8B-7) will be measured by linear feet of 4-inch stripe.

**BASIS OF PAYMENT**

**ITEM 685.0720XXNA – HIGHLY REFLECTORIZED EPOXY PAVEMENT MARKINGS, 20 MILS  
(TRIPLE DROP)**

The unit bid price, shall include all labor, materials, and equipment to complete the work including the cost of cleaning and waste disposal associated with the preparation, installation and application of epoxy paint with standard glass beads and Microcrystalline Ceramic Beads. The cost for maintaining and protecting traffic during the marking operations shall be included in the price bid.

No payment will be made for the repair or replacement of defective epoxy reflectorized pavement markings.

<b><u>PAY ITEM NO.</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>PAY UNIT</u></b>
685.072001NA	Highly Reflectorized White Epoxy Pavement Stripes – 20 mils (Triple Drop)	Foot
685.072002NA	Highly Reflectorized White Epoxy Pavement Letters – 20 mils (Triple Drop)	Each
685.072003NA	Highly Reflectorized White Epoxy Pavement Symbols – 20 mils (Triple Drop)	Each
685.072004NA	Highly Reflectorized White Epoxy Cross Hatching -20 mils (Triple Drop)	Foot
685.072005NA	Highly Reflectorized White Epoxy Pavement Stripes (Special Markings) 20 mils (Triple Drop)	Foot
685.072006NA	Highly Reflectorized Yellow Epoxy Pavement Stripes – 20 mils (Triple Drop)	Foot
685.072007NA	Highly Reflectorized Yellow Epoxy Pavement Stripes (Cross Hatching) 20 mils (Triple Drop)	Foot
685.072008NA	Highly Reflectorized White Epoxy Pavement Yield Line Symbols - Small - 20 mils (Triple Drop)	Each
685.072009NA	Highly Reflectorized White Epoxy Pavement Yield Line Symbols - Large - 20 mils (Triple Drop)	Each

**(On Construction firms letterhead)**

Date Issued: \_\_\_\_\_

Dear Resident:

We are sorry to inconvenience you, but in order to proceed with construction for \_\_\_\_\_ we must close and/or limit your access to your driveway. As work progresses, you will be notified on a daily basis when and how your particular residence will be affected. We assure you that every effort will be made to minimize the impact to you relative to this construction.

Our current schedule calls for the project related work to be performed in your area during the week of \_\_\_\_\_. A copy of this letter with specific dates and time for this work will be delivered at least twenty-four (24) hours in advance in order that you will have sufficient opportunity to plan for accessibility to your vehicles.

If additional information is necessary, you may contact any of the representatives listed below.

Thank you for your patience.

Contractor	_____	Phone:	_____
Inspector	_____	Phone:	_____
Project Manager	_____	Phone:	_____

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**(On Construction firms letterhead)**

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Date Issued: \_\_\_\_\_

CONSTRUCTION NOTIFICATION  
24 HOUR NOTICE

Date & Type of Construction: \_\_\_\_\_  
How will residence be affected: \_\_\_\_\_  
Approximate time of  
Construction: \_\_\_\_\_

Driveway access (will) (will not) be permitted.