FOR INFORMATIONAL USE ONLY - DO NOT USE TO SUBMIT A BID

NASSAU COUNTY DEPARTMENT OF PUBLIC WORKS
BASE BID
Itemized Proposal for: PHASE 60 RESURFACING VARIOUS COUNTY ROADS
PIN 0761.17
ITEMIZED PROPOSAL

ITEM NUMBER	UNIT	QTY.	ITEMS OF WORK WITH UNIT PRICES WRITTEN IN WORDS				
201.06	LS	1	CLEARING AND GRUBBING FOR_____				
203.02	CY	1,550	UNCLASSIFIED EXCAVATION AND DISPOSAL FOR_____				
203.06	CY	70	SELECT FILL FOR_____				
206.03100010	LF	20	TRAFFIC SIGNAL CONDUIT EXCAVATION AND BACKFILL FOR_____				
209.11010024	EA	41	TEMPORARY CATCH BASIN INSERTS - TRASH, SEDIMENT AND DEBRIS REMOVAL FOR_____				
304.00010018	SF	38,375	FINE GRADING OF EXISTING SUBBASE FOR_____				
304.10119917	CY	760	SUBBASE COURSE, TYPE 1011-2 FOR_____				

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404.000011	QU	170	PLANT PRODUCTION QUALITY ADJUSTMENT TO ASPHALT ITEMS FOR_____				
404.018901	TON	20	TRUING & LEVELING F9, ASPHALT, 80 SERIES COMPACTION FOR_____				
404.098101	TON	860	9.5 F1 TOP COURSE ASPHALT, 80 SERIES COMPACTION FOR_____				
404.198901	TON	1,075	19 F9 BINDER COURSE ASPHALT, 80 SERIES COMPACTION FOR_____				
404.378901	TON	1,600	37.5 F9 BASE COURSE ASPHALT, 80 SERIES COMPACTION FOR_____				
407.0102	GAL	655	DILUTED TACK COAT FOR_____				
418.7603	LF	9,325	ASPHALT PAVEMENT JOINT ADHESIVE FOR_____				

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ITEM NUMBER	UNIT	QTY.	ITEMS OF WORK WITH UNIT PRICES WRITTEN IN WORDS				
490.10	SY	2,760	PRODUCTION COLD MILLING OF BITUMINOUS CONCRETE FOR_____				
490.30	SY	355	MISCELLANEOUS COLD MILLING OF BITUMINOUS CONCRETE FOR_____				
502.10010018	LS	1	PORTLAND CEMENT CONCRETE PAVEMENT REPAIR EVALUATION AND MARK-OUT FOR_____				
502.31010018	SY	6,650	FULL-DEPTH PORTLAND CEMENT CONCRETE (PCC) LIFT-OUT FOR_____				
502.32010010	EA	3,675	DRILL AND ANCHOR DOWELS FOR FULL-DEPTH PORTLAND CEMENT CONCRETE PAVEMENT FOR_____				
502.36130018	CY	830	PORTLAND CEMENT CONCRETE (PCC) PLACEMENT (W/ MESH) FOR FULL-DEPTH PAVEMENT REPAIRS FOR_____				
502.36230018	CY	20	PORTLAND CEMENT CONCRETE (PCC) PLACEMENT (HEAVY REINFORCED) FOR FULL-DEPTH PAVEMENT REPAIRS FOR_____				

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502.37010018	LF	2,040	TRANSVERSE JOINTS FOR_____				
502.38010018	LF	2,350	LONGITUDINAL JOINTS FOR_____				
502.44200018	SF	430	PCC PAVEMENT PARTIAL DEPTH REPAIRS USING RAPID SETTING CONCRETE REPAIR MATERIAL - SAW CUTTING METHOD FOR_____				
502.90010018	LF	20,300	CLEAN AND FILL CRACKS AND JOINTS IN PORTLAND CEMENT CONCRETE (PCC) PAVEMENT, ASTM D 6690 TYPE IV FOR_____				
502.9210	LF	5,510	SEALING TRANSVERSE JOINTS - HIGHWAY JOINT SEALANT FOR_____				
502.9310	LF	4,800	SEALING LONGITUDINALJOINTS - HIGHWAY JOINT SEALANT FOR_____				
505.0402	SY	23,650	PRODUCTION DIAMOND GRINDING - PAVEMENT PRESERVATION WITH SLURRY REMOVAL FOR_____				

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520.05000010	LF	6,400	SAWCUTTING PCC AND COMPOSITE PAVEMENT FOR_____				
520.09000010	LF	540	SAW CUTTING ASPHALT CONCRETE FOR_____				
604.07200110	EA	2	SETTING NEW DRAINAGE FRAMES ON EXISTING DRAINAGE STRUCTURES FOR_____				
604.07240110	EA	3	REBUILDING TOP OF EXISTING DRAINAGE STRUCTURE FOR_____				
608.01050010	CY	2	CONCRETE SIDEWALKS - UNREINFORCED (GRADING INCLUDED) FOR_____				
608.01050109	EA	6	CURB RAMP CONFIGURATION - TYPE 1 FOR_____				
608.01050509	EA	2	CURB RAMP CONFIGURATION - TYPE 5 FOR_____				

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608.01050909	EA	1	CURB RAMP CONFIGURATION - TYPE 9 FOR_____				
608.01051009	EA	2	CURB RAMP CONFIGURATION - TYPE 10 FOR_____				
608.01051309	EA	2	CURB RAMP CONFIGURATION - TYPE 13 FOR_____				
608.02010015	CY	28	UNCLASSIFIED EXCAVATION AND DISPOSAL FOR SIDEWALKS, CURB RAMPS AND CURBS FOR_____				
608.02020015	CY	28	OPTIONAL TYPE SUBBASE COURSE FOR SIDEWALKS, CURB RAMPS AND CURBS FOR_____				
608.20	SY	8	SURFACE APPLIED DETECTABLE WARNING UNITS FOR_____				
609.0401	LF	60	CAST-IN-PLACE CONCRETE CURB TYPE VF6 FOR_____				

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609.0501	LF	10	CAST-IN-PLACE CONCRETE CURB AND GUTTER TYPE VF6G FOR_____				
610.1402	CY	1	TOPSOIL - ROADSIDE FOR_____				
610.1601	SY	5	TURF ESTABLISHMENT - ROADSIDE FOR_____				
619.01	LS	1	BASIC WORK ZONE TRAFFIC CONTROL (5%) FOR_____				
619.04	EA	30	TYPE III CONSTRUCTION BARRICADE FOR_____				
619.0901	LF	9,450	TEMPORARY PAVEMENT MARKINGS, STRIPES (TRAFFIC PAINT) FOR_____				
619.110533	EA	4	(PVMS) STANDARD SIZE - FULL MATRIX (LED) CCTV CAMERA, CELLULAR COMMUNICATION WITH NTCIP COMPLIANCE FOR_____				
619.24*	LS	1	NIGHTTIME OPERATIONS (ENTIRE PROJECT) FOR_____				

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621.03	LF	650	CLEANING CLOSED DRAINAGE SYSTEMS FOR_____				
621.04	EA	13	CLEANING DRAINAGE STRUCTURES FOR_____				
624.31000003	SY	5	CONCRETE VALLEY GUTTER FOR_____				
625.01	LS	1	SURVEY OPERATIONS (3%) FOR_____				
633.12	LS	1	CLEANING, SEALING AND/OR FILLING CRACKS FOR_____				
635.0103	LF	550	CLEANING AND PREPARATION OF PAVEMENT SURFACES - LINES FOR_____				
637.13	MNTH	12	ENGINEER'S FIELD OFFICE - TYPE 3 FOR_____				

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ITEM NUMBER	UNIT	QTY.	ITEMS OF WORK WITH UNIT PRICES WRITTEN IN WORDS				
645.81	EA	9	TYPE A SIGN POST FOR_____				
647.31	EA	8	RELOCATE SIGN PANEL, SIGN PANEL ASSEMBLY SIZE I (UNDER 30 SF) FOR_____				
655.05020010	EA	6	FRAMES AND COVERS FOR SANITARY SEWER MANHOLES FOR_____				
655.1202	EA	2	MANHOLE FRAME AND COVER FOR_____				
656.01	LB	6,350	MISCELLANEOUS METALS FOR_____				
680.520203	LF	20	TRAFFIC SIGNAL CONDUIT , FLEXIBLE LIQUID TIGHT STEEL, 1" FOR_____				
680.54	LF	385	INDUCTANCE LOOP INSTALLATION FOR_____				

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680.72	LF	1,100	INDUCTANCE LOOP WIRE FOR_____				
685.03120018	EA	10	RAISED REFLECTORIZED SNOWPLOWABLE PAVEMENT MARKERS (TWO-WAY YELLOW) FOR_____				
685.07200110	LF	3,250	WHITE EPOXY REFLECTORIZED PAVEMENT STRIPES - 20 MILS (WET NIGHT VISIBILITY SPHERES) FOR_____				
685.07200210	EA	6	WHITE EPOXY REFLECTORIZED PAVEMENT LETTERS - 20 MILS (WET NIGHT VISIBILITY SPHERES) FOR_____				
685.07200310	EA	4	WHITE EPOXY REFLECTORIZED PAVEMENT SYMBOLS - 20 MILS (WET NIGHT VISIBILITY SPHERES) FOR_____				
685.07200410	LF	7,900	WHITE EPOXY REFLECTORIZED PAVEMENT STRIPES (CROSS HATCHING) - 20 MILS (WET NIGHT VISIBILITY SPHERES) FOR_____				
685.07200610	LF	9,800	YELLOW EPOXY REFLECTORIZED PAVEMENT STRIPES - 20 MILS (WET NIGHT VISIBILITY SPHERES) FOR_____				

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697.03	DC	250,000	FIELD CHANGE PAYMENT FOR_____				
698.04	DC	20,000	ASPHALT PRICE ADJUSTMENT FOR_____				
698.05	DC	8,000	FUEL PRICE ADJUSTMENT FOR_____				
699.040001	LS	1	MOBILIZATION (4%) FOR_____				

*CONTINGENCY ITEM

_____ _____			

CONTRACTOR: _____
ADDRESS: _____
BY: _____

NOTE: Nassau County reserves the right to increase or decrease quantity amounts prior to award or after award of bid.

General Notes

1) Specifications and Standards

All work included in the contract shall be in accordance with the latest NYSDOT Standard Specifications (US Customary) and Drawings on the date of advertisement for bids, 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

a. At all times during the life of this contract, the Contractor shall maintain safe vehicular traffic and access to adjacent private properties located throughout the entire length of the contract.

b. The Contractor will provide a place for concrete test cylinders in proximity to the work so that the cylinders share the same curing conditions as the newly placed concrete. The Contractor will protect these cylinders for the three days they will be left on the job site.

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 New York State Department of Transportation (NYSDOT). Minor driveway 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 the Regional 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" as required for federal funding. Refer to this site for additional WZTC requirements or information https://www.nysdot.gov/main/business-center/engineering/cadd- info/drawings/standardsheets-us/619

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 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 619.110511 "Portable Variable Message Sign."

10) On all roads that the asphalt pavement is completely milled off, temporary traffic lines must be placed and paid for under Item No. 619.0901.
On all roads that new asphalt pavement has been placed, temporary reflectorized tape pavement marking 2'×4" white and/or yellow strips shall be placed fifty feet (50'±) on center to denote travel lanes. These temporary tape markings are to be removed at the time the permanent epoxy painted pavement marking are applied. The cost of placing and removing these temporary pavement markings shall be paid under Item No. 619.01

11) Work Hours
The standard working hours for this project are 9:00AM to 4:00PM unless otherwise specified or directed by the engineer. 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.
Nighttime operations are a possibility depending on how significant the impacts are on the surrounding community during the time of construction. This will be determined by Nassau County and the engineer in charge leading up to construction. Thirty days prior to the start of the nighttime operations, the Contractor shall submit a written Nighttime Operation and Lighting Plan to the Sponsor's Engineer for a review and approval. Refer to section 619-3.19A and 619-3.19B of the latest NYSDOT Standard Specifications on the date of advertisement for bids. Item 619.24 will be included in the contract as a contingency item for this situation. All costs associated with nighttime operations shall be included in the price bid for Item 619.24.

12) The Contractor shall have a full-time supervisor on the project at all times.

13) On all project roadways epoxy reflectorized pavement markings must be placed within 72 hours of final paving. A $1,000 penalty will be deducted from the various asphalt items per day until the pavement markings are placed. On all other roadways in this Contract, epoxy reflectorized pavement markings must be placed within one week of final paving. A $1,000 penalty will be deducted from the various asphalt items per day after one week until the pavement markings are placed.
NOTE: The county at their option may utilize epoxy reflectorized material in lieu of the materials and items stated on the plans for symbols, characters, stop bars and cross-walks or as ordered by the engineer (A.O.B.E.)

14) The Contractor must submit to the engineer a schedule of operations for when work will be starting and completed for each roadway to be resurfaced within the Contract one week after the Notice to Proceed is issued. The schedule shall be updated monthly until the project is completed. The monthly schedule update shall be submitted and approved as part of the monthly claim requisition.

All work shall be done during a normal eight (8) hour day and/or the hours specified for each roadway.

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.

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.

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 ADA, PROWAG, and NCDPW standards. Where NCDPW Standards are in conflict with the NYSDOT ADA Curb Ramp Standards NYSDOT Standards shall apply.
- 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 insure 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 the contractor.

17) Work is not permitted on any holidays unless prior County Approval is obtained.

For construction during the Fall of 2023, this includes Labor Day, Veterans Day, from 12:00 PM on the Wednesday before Thanksgiving Day through the following Sunday, Christmas Eve, Christmas Day, New Year's Eve, New Year's Day, and various Jewish Holidays including Rosh Hashana, Sukkot, Shmini Atzeret, Simchat Torah, Yom Kippur, Chanukah.

18) Schedule: The Contractor shall provide a schedule of operations for when work will be started and completed for each roadway to be resurfaced 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 utilities well in advance of his beginning work to allow them time to mark out their facilities.

b. The Contractor is directed to notify all privately owned utilities 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 Long Island Power Authority 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 Long Island Power Authority (LIPA) 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.

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.

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SPECIAL NOTES

TICK WARNING

Long Island is an area where Lyme disease is wide spread. This contract takes place in high risk exposure areas which increases the possibility of coming in contact with ticks that carry the disease. The contractor shall take positive steps to inform all employees of this danger, including holding safety meetings which cover this topic.

POISON IVY & OTHER HARMFUL PLANTS WARNING

This contract takes place in areas that may have high concentrations of poison ivy and other similar harmful plants. The Contractor shall take positive steps to inform all employees of this hazard, including holding safety meetings prior to working in the area. Removal of poison ivy and similar harmful plants may be necessary to perform clearing and grubbing and/or other items in the contract. No additional payment will be made for its removal; the cost shall be included in the price bid of the various contract items.

SUBBASE MATERIAL

Under Item 304.10119917 - Subbase Course Type 1011-2, Alternate C (Reclaimed Asphalt Pavement) specified for material Types 1, 3 and 4 under Subsection 304-2.02 of the Standard Specifications, shall not be used as a subbase material beneath Full Depth Asphalt pavement and/or Portland Cement Concrete pavement.

SPECIAL NOTE

PG BINDER AND MIX DESIGN LEVEL

Requirements of this note apply to all Section 404 Asphalt Pavement items in this contract.

PG BINDER

Use polymer or Terminal Blend Crumb Rubber modified **PG 64E-22** (Extreme) meeting the requirements of AASHTO M 332, *Standard Specification for Performance Graded Asphalt Binder using Multiple Stress Creep Recovery (MSCR),* for the production of asphalt mixtures for this project. In addition, the binder grade must also meet the **elastomeric** properties as indicated by one of the following equations for $\%R_{3.2}$:

1. **For $J_{nr3.2} \geq 0.1$, $\%R_{3.2} > 29.371 * J_{nr3.2}^{-0.2633}$**
2. **For $J_{nr3.2} < 0.1$, $\%R_{3.2} > 55$**

Where:
$R_{3.2}$ is % recovery at 3.2 kPa
$J_{nr\ 3.2}$ is the average non-recoverable creep compliance at 3.2 kPa

When terminal blend CRM PG binder is used, the following shall apply:

- Crumb rubber particles shall be finer than #30 sieve size.
- The CRM PG binder shall be storage-stable and homogeneous.
- The Dynamic Shear Rheometer (DSR) shall be set at 2-mm gap.
- The CRM PG binder shall be 99% free of particles retained on the 600 µm sieve as tested in accordance with Section 5.4 of M 332.

Use of poly-phosphoric acid (PPA) to modify the PG binder properties is prohibited for mixtures containing limestone, limestone as an aggregate blend component, limestone as a constituent in crushed gravel aggregate, or recycled asphalt pavement (RAP) that includes any limestone. This prohibition also applies to the use of PPA as a cross-linking agent for polymer modification.

MIX DESIGN

The mixture designs must be developed in accordance with the criteria specified in the asphalt pavement items that are appropriate for the Mixture Design Level of **75 Gyrations**.

Note: The PG binder for this project will be modified with polymer or CRM additives to meet the requirements stated above. Handling of the asphalt mixture shall be discussed at pre-construction and pre-paving meetings.

[Designer Note:
Designer shall check the website at the link below to ensure the most current PG Binder Note is being used.]
HMA Special Notes (ny.gov)

HIGH EARLY STRENGTH (HES) CONCRETE TESTING

During regular business hours and regional laboratory operating hours, fabricated HES samples shall be tested at the Regional lab or a lab as designated by Regional Technical Services. If HES Concrete samples are to be tested during hours other than regular business hours and non-regional laboratory operating hours, then compressive strength tests shall be performed by an agency accredited by the AASHTO Accreditation Program (AAP) in the field of construction materials testing of portland cement concrete to perform compressive strength testing. The Engineer, or the Engineer's representative, will complete the Concrete Cylinder Report as cylinders are cast and witness testing.

When High Early Strength (HES) Cylinders are to be tested for opening to traffic during non-regular business hours and non-operating hours of Regional Lab, a second set of (4”X8”) cylinders shall be sent to and tested at the regional lab during next regular business hours for verification testing and acceptance for payment. NYS DOT lab testing will take place within 48 hours of opening to traffic.

RESURFACING VARIOUS COUNTY ROADS PHASE 60
NASSAU COUNTY, NY
CONTRACT NO H61587-60G
PIN .0761.17

LIST OF SPECIAL SPECIFICATIONS

GENERAL CONSTRUCTION PAYMENT ITEMS AND ITEM SPECIFICATIONS:
The General Construction Payment Items and Specifications as per New York State Department of transportation. Office of Engineering Standard Specification-Construction and materials (English units) as amended by the current additions and modifications there to.

ITEM	DESCRIPTION	UNIT
206.03100010	TRAFFIC SIGNAL CONDUIT EXCAVATION AND BACKFILL	LF
209.11010024	TEMPORARY CATCH BASIN INSERTS - TRASH, SEDIMENT AND DEBRIS REMOVAL	EA
304.00010018	FINE GRADING OF EXISTING SUBBASE	SF
304.10119917	SUBBASE COURSE, TYPE 1011-2	CY
502.10010018	PORTLAND CEMENT CONCRETE PAVEMENT REPAIR EVALUATION AND MARK-OUT	LS
502.31010018	FULL-DEPTH PORTLAND CEMENT CONCRETE (PCC) LIFT-OUT	SY
502.32010010	DRILL AND ANCHOR DOWELS FOR FULL-DEPTH PORTLAND CEMENT CONCRETE PAVEMENT	EA
502.36130018	PORTLAND CEMENT CONCRETE (PCC) PLACEMENT FOR FULL-DEPTH PAVEMENT REPAIRS	CY
502.36230018	PORTLAND CEMENT CONCRETE (PCC) PLACEMENTFOR FULL-DEPTH PAVEMENT REPAIRS	CY
502.37010018	TRANSVERSE JOINTS	LF
502.38010018	LONGITUDINAL JOINTS	LF
502.44200018	PCC PAVEMENT PARTIAL DEPTH REPAIRS USING RAPID SETTING CONCRETE REPAIR MATERIAL - SAW CUTTING METHOD	SF
502.90010018	CLEAN AND FILL CRACKS AND JOINTS IN PORTLAND CEMENT CONCRETE (PCC) PAVEMENT, ASTM D 6690 TYPE IV	LF
520.05000010	SAWCUTTING PCC AND COMPOSITE PAVEMENT	LF
520.09000010	SAWCUTTING ASPHALT CONCRETE	LF
604.07200110	SETTING NEW DRAINAGE FRAMES ON EXISTING DRAINAGE STRUCTURES	EA
604.07240110	REBUILDING TOP OF EXISTING DRAINAGE STRUCTURE	EA
608.01050010	CONCRETE SIDEWALKS - UNREINFORCED (GRADING INCLUDED)	CY
608.01050109	CURB RAMP CONFIGURATION - TYPE 1	EA
608.01050509	CURB RAMP CONFIGURATION - TYPE 5	EA
608.01050909	CURB RAMP CONFIGURATION - TYPE 9	EA
608.01051009	CURB RAMP CONFIGURATION - TYPE 10	EA
608.01051309	CURB RAMP CONFIGURATION - TYPE 13	EA
608.02010015	UNCLASSIFIED EXCAVATION AND DISPOSAL FOR SIDEWALKS, CURB RAMPS AND CURBS	CY
608.02020015	OPTIONAL TYPE SUBBASE COURSE FOR SIDEWALKS, CURB RAMPS AND CURBS	CY
624.31000003	CONCRETE VALLEY GUTTER	SY
655.05020010	FRAMES AND COVERS FOR SANITARY SEWER MANHOLES	EA
685.03120018	RAISED REFLECTORIZED SNOWPLOWABLE PAVEMENT MARKERS (TWO-WAY YELLOW)	EA
685.07200110	WHITE EPOXY REFLECTORIZED PAVEMENT STRIPES - 20 MILS (WET NIGHT VISIBILITY SPHERES)	LF
685.07200210	WHITE EPOXY REFLECTORIZED PAVEMENT LETTERS - 20 MILS (WET NIGHT VISIBILITY SPHERES)	EA
685.07200310	WHITE EPOXY REFLECTORIZED PAVEMENT SYMBOLS - 20 MILS (WET NIGHT VISIBILITY SPHERES)	EA
685.07200410	WHITE EPOXY REFLECTORIZED PAVEMENT STRIPES (CROSS HATCHING) - 20 MILS (WET NIGHT VISIBILITY SPHERES)	LF
685.07200610	YELLOW EPOXY REFLECTORIZED PAVEMENT STRIPES - 20 MILS (WET NIGHT VISIBILITY SPHERES)	LF

NO TEXT ON THIS PAGE

Nassau County Department of Public Works

RESURFACING VARIOUS COUNTY ROADS

LOCATION 1: BROADWAY (FROM NASSAU EXPRESSWAY, NY878 TO WESTON PLACE)
LOCATION 2: MILL ROAD (FROM WEST BROADWAY TO PENINSULA BOULEVARD)

SPECIAL SPECIFICATIONS

Prepared by: L.K. McLean Associates

ITEM 206.03100010 - TRAFFIC SIGNAL CONDUIT EXCAVATION AND BACKFILL

DESCRIPTION. This work shall consist of the excavation and necessary backfill required for traffic signal conduits. All such excavation shall be unclassified excavation as defined in subsection 203-1.01.

The work shall include saw cutting any existing portland cement concrete and asphalt concrete top surfaces and the restoration of any pavement, shoulder, and sidewalk courses, subcourses, curbs, drives, lawns and other top surfaces.

MATERIALS. Materials for the restoration of top surfaces shall be as indicated in the plans and as approved by the Engineer.

CONSTRUCTION DETAILS. The requirements of subsection 206-3 shall apply with the following additions:

When the Contractor is required to excavate through portland cement concrete and asphalt concrete pavement, sidewalk, curb, or other top surfaces, he shall saw cut along neat lines as shown in the plans or as ordered by the Engineer. An approved power saw shall be used to saw cut to the depth specified in the plans or as directed by the Engineer.

The conduit excavation and backfill, and the restoration of top surface courses shall also conform to the applicable Notes and Details shown in the plans.

Any damage to existing pavement, sidewalk, curb, or other facilities caused by the Contractor's operations shall be repaired by the Contractor to the satisfaction of the Engineer.

METHOD OF MEASUREMENT. Subsection 206-4.03 shall apply.

BASIS OF PAYMENT. The unit price bid per linear foot shall include the cost of furnishing all labor, materials and equipment necessary to complete the work including excavation, backfill, saw cutting, and restoring any pavement, shoulder, and sidewalk courses, subcourses, curbs, drives, lawns and other top surfaces.

Any repairs to existing pavement, sidewalk, curb, or other facilities made necessary by the Contractor's operations shall be done to the satisfaction of the Engineer at no additional cost to the State.

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:

Item Number	Description	Unit
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 304.00010018 - FINE GRADING OF EXISTING SUBBASE

DESCRIPTION. Prepare a fine grade on the existing subbase course to receive new pavement and/or shoulders. Clean, regrade, shape, and compact the subbase surface to the line and grade in the contract documents.

MATERIALS.

Cushion Sand ..... §703-06

CONSTRUCTION DETAILS.

Remove and dispose of sod, permeable base, concrete, and/or other loose, unsuitable or excess material.

Grade the existing surface to a uniform cross slope such that, after compaction, the top surface is at true grade and surface at any location, ± ¼ inch. Remove excess material where the existing subbase is high or has insufficient slope. Build up the existing subbase with cushion sand where the existing subbase is low or has excessive cross slope.

Compact the subbase to the satisfaction of the Engineer using equipment meeting §203-3.03C, Compaction.

Do not allow traffic on the exposed subbase.

METHOD OF MEASUREMENT. The work will be measured for payment as the number of square feet of subbase satisfactorily fine graded, measured to the nearest square foot.

BASIS OF PAYMENT. Include the cost of all labor, material, and equipment necessary to satisfactorily perform the work in the unit price bid for Fine Grading of Existing Subbase. No additional payment will be made for extra work required to repair damage to the adjacent pavement or subbase that occurred during any operation. Additional payment will be made if the original repair area did not completely extend into sound pavement or stable subbase. Pavement and shoulder removal are paid for under separate pay items.

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:

Sieve Size Designation	Percentage Passing by Weight
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:

Item No.	Item	Pay Unit
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 502.31010018 - FULL-DEPTH PORTLAND CEMENT CONCRETE (PCC) LIFT-OUT

DESCRIPTION. Mark the area to be lifted, saw cut, lift, and dispose of:

- PCC.
- Permeable base.
- PCC patched with hot mix asphalt (HMA).
- Full-depth HMA within the marked area.

MATERIALS.

Anchoring Material and Dispensing Equipment. Use a pourable, 2 component, 100% solids structural epoxy meeting §701-07, Anchoring Materials - Chemically Curing, dispensed:

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

CONSTRUCTION DETAILS. Schedule all full-depth repair operations (from lift-out to concrete placement) to minimize the total time to complete any individual repair. As the time frame from saw cutting to placement increases, the potential for damage to the surrounding pavement scheduled to remain in place also increases, particularly in hot weather or as the temperature rises. No time frame to completion is specified in this item due to contract variability.

Mark the boundaries of the area to be lifted out. Do not cut until the Engineer approves the marked boundaries. Saw cut full-depth around the removal area at the approved boundaries, including through the permeable base, if any. These cuts will become the transverse and longitudinal joints that define the repair. Use a diamond blade saw equipped with cutting guides, blade guards, water cooling systems, dust controls, and cut depth control. Set the cut depth to minimize subbase disturbance. Make straight saw cuts around the repair perimeter that result in smooth faces that are perpendicular to the pavement surface. Make transverse cuts perpendicular to the longitudinal joint.

Over cut the saw cut intersections a distance equal to the pavement thickness, including the permeable base, if any. After lift-out and before placing the full-depth repair material, fill the over cuts in concrete to remain in place with anchoring material. Place the anchoring material as deep as possible into the over cut, starting at the deepest portion of the over cut and proceeding to the shallowest portion. Block the deepest portion of the over cut such that the anchoring material does not enter into the lift-out area. Finish the anchoring material flush to the pavement surface. When using new cartridges of anchoring material, ensure that the initial material exiting the nozzle appears uniformly mixed. If it is not uniformly mixed, waste the material until uniformly mixed material extrudes.

Additional saw cuts within the repair boundaries to facilitate lift-out without damaging the repair boundaries are permitted. Use any saw for these cuts. Set the cut depth to minimize subbase disturbance. Do not over cut into adjacent concrete that is not scheduled for removal. (Be advised that the longer partial-width cuts remain in place without removal and replacement, the greater the potential for damaging the surrounding concrete scheduled to remain in place, particularly in hot weather or as temperatures are rising. No payment will be made for repairing damage to the surrounding pavement scheduled to remain in place.) Over cutting is allowed if the adjacent concrete is scheduled for removal.

If traffic is to be maintained on the pavement after cutting, remove all debris from the pavement before traffic is restored.

ITEM 502.31010018 - FULL-DEPTH PORTLAND CEMENT CONCRETE (PCC) LIFT-OUT

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 subbase.
- No damage to any adjacent curb, drainage structure, or utility.

Pavement sections too deteriorated to lift-out as determined by the Engineer and full-depth HMA 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.

METHOD OF MEASUREMENT. The work will be measured for payment as the number of square yards of pavement satisfactorily lift-out or excavated, measured to the nearest 0.1 yd^2 based on the Engineer-approved removal areas marked on the pavement prior to saw cutting.

BASIS OF PAYMENT. Include the cost of all labor, material, and equipment necessary to satisfactorily perform the work in the unit price bid for Full-Depth PCC Lift-Out. No additional payment will be made for:

- Extra work required to repair damage to the adjacent pavement that occurred during any operation.
- 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 identified before or after removal are paid under separate items.

ITEM 502.32010010 - DRILL AND ANCHOR DOWELS FOR FULL-DEPTH PORTLAND CEMENT CONCRETE PAVEMENT REPAIRS

DESCRIPTION

Drill holes and anchor dowels into full-depth saw cut concrete faces that will become transverse joints.

MATERIALS AND EQUIPMENT

Dowels. Obtain dowels from a supplier appearing on the Approved List for §705-15, Transverse Joint Supports. Use 18 inch long, 1-½ inch diameter, smooth, epoxy-coated, Grade 60 steel dowels coated with a bond breaker. Use an epoxy coating appearing on the Approved List for "Epoxy Coatings for Longitudinal Joint Ties" or "Epoxy Coatings for Steel Reinforcing Bars" that is applied by an applicator appearing on the Approved List for "Applicators for Steel Reinforcing Bars". At least 7 days prior to drilling, provide the Engineer:

- The name and address of the joint support assembly supplier.
- Material certification from the supplier that dowels meet the "Tests" and "Material Requirements " portions of §705-15, except Grade 60 steel is supplied.
- Material certification from the rolling mill as to the type and grade of steel used.
- The brand of epoxy coating and the name and address of the Manufacturer.
- The name and address of the epoxy coating applicator.
- The brand of bond breaker and the name and address of the Manufacturer.
- Material certification from the epoxy coating applicator that the bars have been coated, tested, and meet the requirements of §705-14, Longitudinal Joint Ties.

Epoxy coating field repairs are not permitted. The Department may perform supplementary sampling and testing of the dowels to ensure conformance with §705-14 and §705-15.

Anchoring Material and Dispensing Equipment. Use a pourable, 2 component, 100% solids structural epoxy meeting§ 701-07, Anchoring Materials - Chemically Curing, dispensed:

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

Drills. Use hydraulic gang drills with a minimum of 2 independently powered and driven drills. Use tungsten carbide drill bits. Control the forward and reverse travel of the drills by mechanically applied pressure. Mount the drill on a suitable piece of equipment such that it is quickly transported and positioned. Rest and reference the drill rig frame on and to the pavement surface such that the drilled holes are cylindrical, perpendicular to the surface being drilled, and repeatable in terms of position and alignment on the surface being drilled. Hand-held drills are not permitted.

Grout Retention Disk. 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.

CONSTRUCTION DETAILS

Drilling Holes. Drill holes 12 inch apart on center across the full width of the repair. Locate end holes 6 -12 inch from the longitudinal repair boundaries.

ITEM 502.32010010 - DRILL AND ANCHOR DOWELS FOR FULL-DEPTH PORTLAND CEMENT CONCRETE PAVEMENT REPAIRS

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 inch of the surface being drilled, drill the outer holes 3 – 4 inch from the end of the tie.
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 9 inch (+3/8in- 0 in).
- When the dowels are anchored, the longitudinal axes of the protruding dowels are parallel to the pavement centerline, the pavement surface, and each other, ± 1/8 in, measured at the saw cut face and the dowel end.
- When the dowels are anchored, they protrude 8-21/32 inch – 9 inch from the saw cut face.

Extend the full depth repair boundaries as indicated in the contract documents if drilling cracks or damages pavement to remain in place. Replace worn bits when necessary to ensure the proper hole diameter is drilled.

Cleaning Holes. Follow the anchoring material Manufacturer's written recommendations for cleaning the holes. Provide those recommendations to the Engineer. As a minimum, clean the drilled holes with oil-free and moisture-free compressed air. The Engineer will check the compressed air stream purity with a clean white cloth. Use a compressor that delivers air at a minimum of 120 ft^3 per minute and develops a minimum nozzle pressure of 90psi. Insert the nozzle to the back of the hole to force out all dust and debris.

Dowel Installation. When using new cartridges of anchoring material, ensure that 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 at the back of the hole using a nozzle of sufficient length. 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 dowel. Use sufficient amounts of anchoring material such that it slightly extrudes out the hole as the dowel 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.

METHOD OF MEASUREMENT

The work will be measured for payment as the number of dowels satisfactorily anchored.

BASIS OF PAYMENT

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

ITEM 502.35010018 - PORTLAND CEMENT TREATED PERMEABLE BASE
ITEM 502.36RC0018 - PORTLAND CEMENT CONCRETE (PCC) PLACEMENT FOR FULL-DEPTH PAVEMENT REPAIRS
ITEM 502.37010018 - TRANSVERSE JOINTS
ITEM 502.38010018 - LONGITUDINAL JOINTS

DESCRIPTION. Place Class C, Class F, or High-Early-Strength (HES) PCC as indicated in the contract documents in a previously prepared full-depth repair area.

MATERIALS AND EQUIPMENT.

Portland Cement Concrete (Class C and Class F) 501
High-Early-Strength (HES) Concrete 502-2.02
Portland Cement Treated Permeable Base 502-2.03
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 Covers (White Opaque) 711-04
Membrane Curing Compound 711-05
Form Insulating Materials for Winter Concreting 711-07
Water 712-01

HES concrete mix design and all details related to HES concrete production and discharge must be approved by the Regional Materials Engineer before placement.

Transit Mix HES Concrete. Accelerating admixtures may be batched into the concrete at the plant in accordance with §501-2.03F, Admixture Dispensing Systems, or added at the site depending on the amount of acceleration required and the haul time. When adding accelerating admixtures at the site, equip truck mixers with an air pressurized tank that:

- Contains the correct volume of admixture (for the volume of concrete in the truck) dispensed through the plant's Admixture Dispensing System.
- Discharges the required admixture quantity into the truck mixer drum in less than 1 minute.
- Has a clear plastic tank output hose that leads into the truck mixer drum.
- Has a properly working relief valve.

Twice daily, or more frequently if weather conditions change significantly as determined by the Engineer, determine the fine and coarse aggregate moisture contents. Compute the corresponding water added to the concrete in the truck from aggregate moisture. Subtract that quantity, as well as the water portion of the admixture in the tank and water added at the plant, from the design water for the truck. Submit these calculations to the NYSDOT plant inspector for approval. Upon approval, write the maximum volume of water to be added to the truck at the site on the delivery ticket. Upon arrival at the site, provide the delivery ticket to the Engineer.

Discharge the accelerating admixture into the truck mixer drum during or after any water additions at the site. Do not add more water than the maximum volume indicated on the delivery ticket. Add all of the

accelerating admixture in 1 uninterrupted operation in 1 minute or less. Apply a maximum of 200 total mixing revolutions before discharge.

Truck Mix HES Concrete. Add the accelerating admixture and water at the site. Equip trucks with an air pressurized tank for accelerating admixtures as described above in Transit Mix HES Concrete and an in-line water flow meter that:

- Resets easily to "0".
- Is mounted to allow easy reading.
- Withstands water temperatures up to 200°F.
- Is equipped with air strainers capable of removing entrapped air within the system.
- Has a batching delivery tolerance of 1% by weight or volume.
- Has a manufacturer's certified flow rate capacity of 70 gpm.
- Has a minimum actual flow rate of 50 gpm.

The Regional Materials Engineer will measure the actual flow rate and inspect the flow meter prior to use. Do not place any concrete without the Regional Materials Engineer's approval.

Twice daily, or more frequently if weather conditions change significantly as determined by the Engineer, determine the fine and coarse aggregate moisture contents. Compute the corresponding water added to the concrete in the truck from aggregate moisture. Subtract that quantity, as well as the water portion of the admixture in the tank, from the design water for the truck. Submit these calculations to the NYSDOT plant inspector for approval. Upon approval, write the exact volume of water to be added to the truck at the site on the delivery ticket. Upon arrival at the site, provide the delivery ticket to the Engineer.

Before adding water into the truck mixer, execute twenty dry revolutions at 12 to 18 rpm and reset the flow meter to 0. Add water in 1 uninterrupted operation. No water is to be removed from the truck mixer for any purpose while water is being added to the drum. After the required water designated on the delivery ticket has been added to the concrete in the truck, add all the accelerating admixture in 1 uninterrupted operation in 1 minute or less. Apply a maximum of 200 mixing revolutions before discharge.

Use equipment meeting:

Forms ..... §502-2.04B1
Paving Irregular Areas .. .. §502-2.04B3
Vibrators ..... §502-2.04C
Permeable Base Paving Equipment ..... §502-2.04D
Saw Cutting Equipment ..... §502-2.04E
Curing Compound Applicators .. .. §502-2.04F

CONSTRUCTION DETAILS. Apply the following from Section 502, Portland Cement Concrete Pavement, as modified herein:

ITEM 502.35010018 - PORTLAND CEMENT TREATED PERMEABLE BASE
ITEM 502.36RC0018 - PORTLAND CEMENT CONCRETE (PCC) PLACEMENT FOR FULL-DEPTH PAVEMENT REPAIRS
ITEM 502.37010018 - TRANSVERSE JOINTS
ITEM 502.38010018 - LONGITUDINAL JOINTS

Weather Limitations..... §502-3.01
Portland Cement Treated Permeable Base..... §502-3.03
Use permeable base if the pavement being repaired was constructed with permeable base or if shown in the contract documents. Place permeable base 4 inches thick. Apply fixed form paving requirements.
Fixed Form Paving..... §502-3.05
Consider full-depth repairs to be irregular areas.
Joint Construction..... §502-3.06
Apply a bond breaker, such as form oil, to untied longitudinal joints immediately before placing concrete.
Finishing..... §502-3.09
Finish short repairs (those less than the length of the finishing equipment) transversely.
Texturing..... §502-3.10
Do not texture the plastic concrete if it will be diamond ground. The Engineer may require longitudinal astroturf drag if that was the original pavement texture.
Curing..... §502-3.11
Pavement Protection..... §502-3.13
Damaged or Defective Concrete..... §502-3.14
Hardened Surface Test..... §502-3.15
If the pavement is to be diamond ground, the maximum deviation is 3/8 inch in 10 feet. If the pavement will not be diamond ground, the maximum deviation is 1/8 inch in 10 feet.
Opening to Traffic..... §502-3.18
When determining concrete strength for opening to traffic, apply the following rather than §502-3.18C, Project Strength Determination:

Project Strength Determination. Provide an ACI Certified Concrete Field Testing Technician, Grade I, or higher, to cast all cylinders. Unless otherwise noted in the contract documents, use an agency accredited by the AASHTO Accreditation Program (AAP) in the field of construction materials testing of portland cement concrete to perform compressive strength testing. Cast and test in the presence of the Engineer, or the Engineer's representative. Provide acceptable proof of ACI Certification and AASHTO Accreditation to the Engineer before placing any concrete. The Engineer, or the Engineer's representative, will complete the Concrete Cylinder Report as cylinders are cast and tested.

Cast a minimum of 3 cylinder pairs (6 total) from each scheduled placement operation in accordance with Materials Method 9.2, Field Inspection of Portland Cement Concrete. Cast each pair from different delivery trucks with 1 of the 3 pairs cast from the last truck of the operation. Develop an Engineer-approved marking system that allows a cylinder to be readily associated with the corresponding placement location and placement time. Mark the cylinders and place them adjacent to the pavement under similar curing conditions. Determine the concrete compressive strength in accordance with ASTM C39, Standard Test Method for Compressive

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Strength of Cylindrical Concrete Specimens. Test all cylinder pairs at the same time relative to when they were cast. The testing time must be within the time frame needed to open the last concrete placed in the operation to traffic. The placement may be opened to traffic if all the following apply:

- Average compressive strength of all cylinder pairs exceed 2500 PSI.
- Average compressive strength of each cylinder pair exceeds 2000 PSI.
- Appropriate time frame has elapsed for the entire area to be opened.

If these conditions are not met, test 3 additional cylinder pairs at a later time, provided the appropriate number of additional cylinders were cast and the placement has not been opened to traffic. If the above conditions are not met after additional testing, or, if the required number of additional cylinders were not cast, open the placement to traffic after 5 days, or when directed by the Engineer, provided this time frame is not in conflict with the work zone closure time restrictions stipulated in the contract documents. If the placement is opened to traffic (in accordance with the work zone closure time restrictions stipulated in the contract documents) before it has achieved the required strength, the placement will be considered Damaged or Defective Concrete and will be replaced at no additional cost to the State.

Contract testing for 28 day compressive strength is not required. If subsequent trial batches are required, the Engineer may waive the 28 day compressive strength testing.

METHOD OF MEASUREMENT.

Portland Cement Treated Permeable Base. The work will be measured for payment as the number of cubic yards of permeable base satisfactorily placed, measured to the nearest 0.1 $yard^3$, based on the Engineer-approved repair area marked on the pavement prior to repair and the thickness of permeable base placed.

Portland Cement Concrete, Unreinforced, All Classes. The work will be measured for payment as the number of cubic yards of concrete satisfactorily placed, measured to nearest 0.1 $yard^3$, based on the Engineer-approved repair area marked on the pavement prior to repair and the thickness of concrete placed. Deductions, and separate payment, will be made for catch basins, manholes, or other similar pavement obstructions requiring either mesh reinforced 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 $yard^3$, 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.

Transverse Joints. The work will be measured for payment as the number of feet of transverse joints satisfactorily constructed within the repair boundary, measured to the nearest 0.1 foot. Separate

measurement will be made for transverse joints that define the repair boundary and drilling and anchoring dowels into those joints.

Constructing Longitudinal Joints. The work will be measured for payment as the number of feet of longitudinal joints satisfactorily constructed within the repair boundary, measured to the nearest 0.1 foot. Separate measurement will be made for longitudinal joints that define the repair boundary and drilling and anchoring longitudinal joint ties in those joints.

BASIS OF PAYMENT.

Portland Cement Treated Permeable Base. Include the cost of all labor, material, and equipment necessary to satisfactorily perform the work in the unit price bid for Portland Cement Treated Permeable Base. No additional payment will be made for extra work required to repair damage to the adjacent permeable base or pavement that occurred during any operation. Additional payment will be made if the original repair area did not completely extend into sound concrete.

Portland Cement Concrete, Unreinforced, All Classes. Include the cost of all labor, material, and equipment necessary to satisfactorily perform the work in the unit price bid for Portland Cement Concrete, Unreinforced, All Classes. No additional payment will be made for Contractor-requested HES concrete mixes or extra work required to repair damage to the adjacent pavement that occurred during any operation. Additional payment will be made if the original repair area did not completely extend into sound concrete.

Portland Cement Concrete, Mesh or Heavily Reinforced, All Classes. Include the cost of all labor, material, and equipment necessary to satisfactorily perform the work in the unit price bid for Portland Cement Concrete, Mesh or Heavily Reinforced, All Classes. No additional payment will be made for Contractor-requested HES concrete mixes or extra work required to repair damage to the adjacent pavement that occurred during any operation. Additional payment will be made if the original repair area did not completely extend into sound concrete.

Transverse Joints. Include the cost of all labor, material, equipment, and labor necessary to satisfactorily perform the work in the unit price bid for Transverse Joints. Separate payment will be made for constructing transverse joints that define the repair boundary and drilling and anchoring dowels into those joints. Separate payment will be made for joint sealing or joint filling.

Longitudinal Joints. Include the cost of all labor, material, and equipment necessary to satisfactorily perform the work in the unit price bid for Longitudinal Joints. Separate payment will be made for constructing longitudinal joints that define the repair boundary and drilling and anchoring ties into those joints. Separate payment will be made for joint sealing or joint filling.

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Payment Will Be Made Under:

Item No.	Item	Pay Unit
502.35010018	Portland Cement Treated Permeable Base	Cubic Yard
502.36RC0018	Portland Cement Concrete (PCC) Placement for Full-Depth Repair	Cubic Yard
	R - Reinforcement *0 - Unreinforced* *1 - Isolated, Mesh Reinforced* *2 - Isolated, Heavily Reinforced*	*C - Concrete Class* *1 - Class C* *2 - Class F* *3 - HES*
502.37010018	Transverse Joints	Foot
502.38010018	Longitudinal Joints	Foot

ITEM 502.4MR00018 - PORTLAND CEMENT CONCRETE PAVEMENT PARTIAL-DEPTH REPAIRS
ITEM 502.46010018 - PORTLAND CEMENT CONCRETE PAVEMENT PARTIAL-DEPTH REPAIRS USING EPOXY RESIN SYSTEMS

DESCRIPTION. Remove 2 – 4 inches of portland cement concrete (PCC) pavement, prepare the removal area, and repair it using Class D concrete, High-Early-Strength (HES) concrete, Concrete Repair Material, Rapid Hardening Concrete Repair Material, Rapid Hardening Polymer Concrete, or Epoxy Resin System as required by the contract documents.

MATERIALS AND EQUIPMENT.

Portland Cement Concrete, Class D..... 501
Concrete Repair Material..... 701-04
Rapid Hardening Concrete Repair Material..... 701-09
Coarse Aggregate..... 703-02
Premoulded Resilient Joint Filler..... 705-07
Portland Cement Mortar Bonding Grout 705-22
Membrane Curing Compound 711-05
Admixtures..... 711-08
Water 712-01
Epoxy Resin Systems.... 721-01
Rapid Hardening Polymer Concrete 721-20
Non-Chloride Accelerator Admixture .... Approved List

HES Concrete. Apply §502-2.02, High-Early-Strength (HES) Concrete, except:

- Design the HES mix to satisfy the opening to traffic time requirements of the contract and Table 1, High-Early-Strength Concrete Mix Requirements, rather than Table 502-1.
- Use coarse aggregate having a 1A gradation.
- Produce and place a 1.0 yard^3 (minimum) trial batch rather than a 4.0 yard^3 trial batch.

TABLE 1 - HIGH-EARLY-STRENGTH CONCRETE MIX REQUIREMENTS

Property	Minimum	Desired	Maximum
28 Day Compressive Strength (Trial Batch Only)	4,350 PSI	-	-
Opening Compressive Strength	3,000 PSI[1]	-	-
Plastic Air Content	5.0%	6.5%	8.0%
Slump	1½ inch	-	4 inch

[1] See Opening to Traffic below.

Determine the compressive strength of the trial batch concrete at the desired time as discussed below in Project Strength Determination. Mix design approval does not relieve the Contractor's responsibility of achieving the specified requirements during the contract.

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HES concrete mix design and all details related to HES concrete production and discharge must be approved by the Regional Materials Engineer before placement.

Transit Mix HES Concrete. Accelerating admixtures may be batched into the concrete at the plant in accordance with §501-2.03F, Admixture Dispensing Systems, or added at the site depending on the amount of acceleration required and the haul time. When adding accelerating admixtures at the site, equip truck mixers with an air pressurized tank that:

- Contains the correct volume of admixture (for the volume of concrete in the truck) dispensed through the plant's Admixture Dispensing System.
- Discharges the required admixture quantity into the truck mixer drum in less than 1 minute.
- Has a clear plastic tank output hose that leads into the truck mixer drum.
- Has a properly working relief valve.

Twice daily, or more frequently if weather conditions change significantly as determined by the Engineer, determine the fine and coarse aggregate moisture contents. Compute the corresponding water added to the concrete in the truck from aggregate moisture. Subtract that quantity, as well as the water portion of the admixture in the tank and water added at the plant, from the design water for the truck. Submit these calculations to the NYSDOT plant inspector for approval. Upon approval, write the maximum volume of water to be added to the truck at the site on the delivery ticket. Upon arrival at the site, provide the delivery ticket to the Engineer.

Discharge the accelerating admixture into the truck mixer drum during or after any water additions at the site. Do not add more water than the maximum volume indicated on the delivery ticket. Add all of the accelerating admixture in 1 uninterrupted operation in 1 minute or less. Apply a maximum of 200 total mixing revolutions before discharge.

Truck Mix HES Concrete. Add the accelerating admixture and water at the site. Equip trucks with an air pressurized tank for accelerating admixtures as described above in Transit Mix HES Concrete and an in-line water flow meter that:

- Resets easily to "0".
- Is mounted to allow easy reading.
- Withstands water temperatures up to 195°F.
- Is equipped with air strainers capable of removing entrapped air within the system.
- Has a batching delivery tolerance of 1% by weight or volume.
- Has a manufacturers certified flow rate capacity of 70 gpm.
- Has a minimum actual flow rate of 50 gpm.

The Regional Materials Engineer will measure the actual flow rate and inspect the flow meter prior to use. Do not place any concrete without the Regional Materials Engineer's approval.

Twice daily, or more frequently if weather conditions change significantly as determined by the Engineer, determine the fine and coarse aggregate moisture contents. Compute the corresponding water added to the concrete in the truck from aggregate moisture. Subtract that quantity, as well as the water portion of the

admixture in the tank, from the design water for the truck. Submit these calculations to the NYSDOT plant inspector for approval. Upon approval, write the exact volume of water to be added to the truck at the site on the delivery ticket. Upon arrival at the site, provide the delivery ticket to the Engineer.
Before adding water into the truck mixer, execute twenty dry revolutions at 12 to 18 rpm and reset the flow meter to 0. Add water in 1 uninterrupted operation. No water is to be removed from the truck mixer for any purpose while water is being added to the drum. After the required water designated on the delivery ticket has been added to the concrete in the truck, add all the accelerating admixture in 1 uninterrupted operation in 1 minute or less. Apply a maximum of 200 mixing revolutions before discharge.

Concrete Repair Material or Rapid Hardening Concrete Repair Material. Use only cementitious repair materials appearing on the Approved List. Provide the Engineer the Manufacturer's written instructions for mixing, bonding, placing, and curing the material. Follow the Manufacturer's instructions. Do not exceed the prescribed water amount. Extend concrete repair materials with coarse aggregate having a 1A gradation. Use a maximum aggregate extension rate of 60% of the dry, pre-packaged weight of repair material.

Rapid Hardening Polymer Concrete. Use rapid hardening polymer concrete appearing on the Approved List. Provide the Engineer the Manufacturer's written instructions for mixing, bonding, placing, and curing the material. Follow the Manufacturer's instructions, including all aspects of the Manufacturer's Safety Data Sheets when handling rapid hardening polymer concrete and their primers.

Extend rapid hardening polymer concrete with coarse aggregate having a 1A gradation. Use a maximum aggregate extension rate of 75% of the dry component weight of the repair material. Extension aggregates must contain no moisture at the time of mixing.

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.

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.

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.

Chipping Hammers. Use chipping hammers weighing no more than 30 pound (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.

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.

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.

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 coring or 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.

Determine Repair Boundary - Coring Method. Determine the repair boundary by placing the template described above in Coring Equipment over the repair area and marking the boundary. 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 ⅓ of the repair boundary. If the template can not be positioned such that the repair boundary extends completely into sound concrete, or a joint or crack can not be accommodated in the middle ⅓, determine the repair area in accordance with Determine Repair Boundaries - Saw Cut Method.

Determine Repair Boundary - Saw Cut Method. 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 delaminations, whichever is larger. Combine repair areas within 6 inches of each other into one repair. Keep repair areas as square as possible. Avoid irregular repair shapes. Mark the repair boundary outlines.

Core Repair Boundary. Do not core until the Engineer approves the repair boundary. Core 2 – 4 inches into the pavement. Core sufficiently deep to ensure sound concrete is reached and new concrete faces are exposed.

Saw Cut Repair Boundary. Do not saw cut until the Engineer approves the repair boundary. Diamond blade saw cut 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 - Coring Method. Use the steel sleeve described above in Coring Equipment and a chipping hammer to remove concrete within the core. Remove concrete such that the repair bottom is at a uniform depth, ± 1 inch, and sound concrete is exposed along all faces. Discontinue removal if:

- Pavement joint hardware is encountered.
- The required repair depth exceeds 4 inches.
- The PCC surrounding or below the removal area is unsound.

In this instance the Engineer will determine the required repair, typically full-depth removal and replacement or partial-depth removal by the saw cutting method.

Concrete Removal - Saw Cuts. Use chipping hammers or a combination of chipping hammers and milling machines to remove concrete within the saw cuts. Remove concrete such that the repair bottom is at a uniform depth, ± 1 inch, and sound concrete is exposed along all faces. Do not operate milling machines within 25 mm 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 4 inches.
- The PCC surrounding or below the removal area is unsound.

In this instance the Engineer will determine the required repair, typically full-depth removal and replacement.

Clean the Repair Bottom and Vertical Faces. 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 clean, white cloth to ensure no oil or contaminants are in the air blast.
- 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.

Place Joint or Crack Insert. 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 premoulded resilient joint filler or commercial waxed corrugated cardboard with joints or cracks that abut or cross the repair area. 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 Class D concrete or 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.

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

Placement. Small construction mixers or paddle mixers may be used, provided the proper slump and air is obtained and all Manufacturer's instructions are followed. Ready mix trucks may be used if quantities are sufficient. Use wheelbarrows, buggies, or other transporting vehicles to bring the repair material to the prepared area. Use shovels for very small patches. Place Class D concrete or HES concrete before the bonding grout dries. Consolidate cementitious material with a hand-held vibrator.

Finishing. Finish repairs flush with the surrounding pavement. 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. Do not add any additional water to the repair surface.

Curing. Immediately after finishing, thoroughly coat Class D and HES concrete with a double coat of curing compound meeting §711-05, Membrane Curing Compound at a minimum rate of 80 FT^2/Gal. Cure other materials in accordance with the Manufacturer's instructions.

Opening Class D or HES Concrete to Traffic. If no opening to traffic time frame is specified in the contract documents, open Class D concrete to traffic 5 days after placement. If an opening to traffic time frame is specified in the contract documents, open Class D or HES concrete to traffic after it has achieved a compressive strength of 3,000 PSI as discussed below in Project Strength Determination. The 5 day opening to traffic time frame may also be reduced if cylinders cast and tested as discussed below in Project Strength Determination indicate a compressive strength of 3,000 PSI has been achieved and the joints and cracks are sealed or filled in accordance with the contract documents.

Project Strength Determination. Provide an ACI Certified Concrete Field Testing Technician, Grade I, or higher, to cast all cylinders. Unless otherwise noted in the contract documents, use an agency accredited by the AASHTO Accreditation Program (AAP) in the field of construction materials testing of portland cement concrete to perform compressive strength testing. Cast and test in the presence of the Engineer, or the Engineer's representative. Provide acceptable proof of ACI Certification and AASHTO Accreditation to the Engineer before placing any concrete. The Engineer, or the Engineer's representative, will complete the Concrete Cylinder Report as cylinders are cast and tested.

Cast a minimum of 3 cylinder pairs (6 total) from each scheduled placement operation in accordance with Materials Method 9.2, Field Inspection of Portland Cement Concrete. Cast each pair from different delivery trucks with 1 of the 3 pairs cast from the last truck of the operation. Develop an Engineer-approved marking system that allows a cylinder to be readily associated with the corresponding placement location and placement time. Mark the cylinders and place them adjacent to the pavement under similar curing conditions. Determine the concrete compressive strength in accordance with ASTM C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens. Test all cylinder pairs at the same time relative to when they were cast. The testing time must be within the time frame needed to open the last concrete placed in the operation to traffic. The placement may be opened to traffic if all the following apply:

- Average compressive strength of all cylinder pairs exceed 2,500 PSI.

- Average compressive strength of each cylinder pair exceeds 2,000 PSI.
- Appropriate time frame has elapsed for the entire area to be opened.

If these conditions are not met, test 3 additional cylinder pairs at a later time, provided the appropriate number of additional cylinders were cast and the placement has not been opened to traffic. If the above conditions are not met after additional testing, or, if the required number of additional cylinders were not cast, open the placement to traffic after 5 days, or when directed by the Engineer, provided this time frame is not in conflict with the work zone closure time restrictions stipulated in the contract documents. If the placement is opened to traffic (in accordance with the work zone closure time restrictions stipulated in the contract documents) before it has achieved the required strength, the placement will be considered Damaged or Defective Concrete and will be replaced at no additional cost to the State.

Contract testing for 28 day compressive strength is not required. If subsequent trial batches are required, the Engineer may waive the 28 day compressive strength testing.

Opening Other Materials to Traffic. Open other repair materials as follows:

Material	Time to Opening
Concrete Repair Material (701-04)	24 hours after placement
Rapid Hardening Concrete Repair Material (701-09)	3 hours after placement
Rapid Hardening Polymer Concrete (721-20)	3 hours after placement
Epoxy Resin System (721-01)	See 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^2, 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 Portland Cement Concrete Pavement Partial-Depth Repairs. 50% 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.

Payment will be made under:

Item No.	**Item**	**Pay Unit**
502.4MR00018	Portland Cement Concrete Pavement Partial-Depth Repairs	Square Feet

M - Material
1 - Class D Concrete
2 - HES Concrete

R - Repair Method
1 - Coring Method
2 - Saw Cutting Method

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3 - Concrete Repair Material
4 - Rapid Hardening Concrete Repair Material
5 - Rapid Hardening Polymer Concrete

502.46010018	Portland Cement Concrete Pavement Partial-Depth Repairs Using Epoxy Resin Systems	Square Feet

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

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 10ºF below the Manufacturer's designated safe heating temperature, with an allowable variation of ± 10ºF. 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 40ºF 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.

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 604.07240110 - 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 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

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:

Item Number	***Description***	***Pay unit***
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 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.

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ITEM 608.02010015 - Unclassified Excavation and Disposal for Sidewalks, Curb Ramps and Curbs
ITEM 608.02020015 - Optional Type Subbase Course for Sidewalks, Curb Ramps and Curbs

All the provisions of *Unclassified Excavation and Disposal* under Section 203 shall apply.

All the provisions of *Subbase Course, Optional Type* under Section 304 shall apply.

Payment shall be made under:

ITEM NO.	ITEM DESCRIPTION	PAY UNIT
608.02010015	Unclassified Excavation and Disposal for Sidewalks, Curb Ramps and Curbs	Cubic Yards
608.02020015	Optional Type Subbase Course for Sidewalks, Curb Ramps and Curbs	Cubic Yards

ITEM 624.31000003 - CONCRETE VALLEY GUTTER

Description

This work shall consist of the construction of conventionally formed or machine formed Portland Cement concrete valley gutter in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans or established by the Engineer.

Materials

A. The concrete shall be in accordance with Section 624-2.02 Conventionally Formed Concrete Gutter or Section 624-2.05 Machine Formed Concrete Gutter of the Standard Specifications.

B. Bar reinforcement shall meet the requirements of Section 709-01 Bar Reinforcement, Grade 420 of the Standard Specifications.

C. Wire reinforcement shall meet the requirements of Section 709-02 Wire Fabric for Concrete Reinforcement of the Standard Specifications.

Construction Details

Section 624-3.02 Conventionally Formed or Machine Formed Concrete Gutter shall apply.

Method of Measurement

Section 624-4.02 of the Standard Specifications shall apply.

Basis of Payment

Section 624-5.02 of the Standard Specifications shall apply.

March 4, 1992
August 20, 1997 M
March 7, 2007 E

ITEM 655.05020010 – FRAMES AND COVERS FOR SANITARY SEWER MANHOLES

DESCRIPTION:
This work shall consist of furnishing and installing frames, covers and appurtenances for sanitary sewer manholes in accordance with these specifications and details shown on the contract plans.

MATERIALS:
Materials shall conform to the following:

Cast iron for manhole frames and covers, and all special cast iron fixture entering into the construction of the work shall be made of tough, close-grained, gray iron without the admixture of any cinder iron or metal of inferior quality. Iron shall conform to ASTM Designation A48, Class 30B.

Manhole frames and covers shall be coated with coal tar epoxy of approved quality applied by the hot-dip process.

The acceptance of the frames and covers for sanitary sewer manholes will be based on the manufacturer's certification of compliance.

All manhole frames, covers and appurtenances shall be similar in detail to those existing in the adjacent area, and all elements shall be interchangeable.

The Contractor shall submit to the Engineer, with such promptness as to cause no delay in the work, or in the work of any other contractor, seven (7) copies of all shop drawings and no work shall be fabricated until the Engineer's approval has been given. All shop drawings, cuts, catalogs or other data requiring approval must be submitted to the Engineer by the Contractor and must bear his stamp of approval evidencing that the data have been checked. Drawings, cuts, catalogs or other data submitted without this stamp of approval will not be considered by the Engineer and will be returned to the Contractor. Likewise, all questions concerning the plans and specifications which require clarification or interpretation shall be submitted in writing to the Engineer through the Contractors.

The Contractor shall make any corrections in the drawings required by the Engineer and shall file with the Engineer (7) corrected copies. Approval by the Engineer of such drawings shall not relieve the Contractor from responsibility for errors of any sort in shop drawings or deviations from plans and specifications unless the Contractor, at the time of submission of said drawings, has given notice to the Engineer of any such deviations.

CONSTRUCTION DETAILS:
Construction details shall conform with the details shown on the plan and shall conform to the requirements of Subsection 655-3 in addition to the following:

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ITEM 655.05020010 – FRAMES AND COVERS FOR SANITARY SEWER MANHOLES

All manholes will be provided with a Type "F" Manhole Frame and Cover (Adjustable Frame). The frame cover, without the use of any filler rings, shall be set to a top frame elevation 1-9/16 inch below finished grade. At the time of final paving, the frame and cover shall be raised to the correct grade by insertion of one 1 inch and one 19/32 inch filler rings. In the event the Engineer, at any time during the Contract Period, directs the removal of either or both filler rings, the Contractor shall remove them and deliver the same to the Engineer.

METHOD OF MEASUREMENT:

The quantity to be measured under this work will be the number of frames, covers and appurtenance materials furnished and placed in accordance with the plans and specifications. The measurement shall be made for the frame containing the cover and appurtenance.

BASIS OF PAYMENT:

The unit prices bid per frame and cover shall include the cost of furnishing all labor, materials an equipment necessary to satisfactorily complete the work, including the cost of any field repair work to render the frame and cover non-rocking.

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^2.

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

HRC. The iron casting shall be designed so that the final installation height of the top of the iron casting is a maximum ⅓ 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 4½° 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

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.

ITEM 685.03XX0018 - RAISED REFLECTORIZED SNOWPLOWABLE PAVEMENT MARKERS

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 ± 10% of the specified longitudinal spacing. If the raised reflectorized snowplowable pavement marker cannot be relocated within the ± 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,

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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Payment will be made under:

Item No.	Item	Pay Unit
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 685.0715XX10 - EPOXY REFLECTORIZED PAVEMENT MARKINGS 15 MILS THICK (WET NIGHT VISIBILITY SPHERES)
ITEM 685.0720XX10 - EPOXY REFLECTORIZED PAVEMENT MARKINGS 20 MILS THICK (WET NIGHT VISIBILITY SPHERES)

DESCRIPTION:

Under this work the contractor shall furnish and apply epoxy reflectorized pavement markings in accordance with these specifications, the Contract Documents, the NYSMUTCD, 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. Following a simultaneous application of Standard Glass Beads (Type 2) and Wet/Night Visibility Beads (Type 1), the cured epoxy marking shall be an adherent reflectorized stripe that will provide wet night retro-reflectivity.

MATERIALS REQUIREMENTS:

Epoxy Paint	727-03
Glass Beads for Pavement Markings	727-05

Reflective Glass Spheres

Retro-reflective beads shall be a double drop system of glass spheres consisting of Standard Beads (Type 2) and Wet/Night Visibility Beads (Type 1) as defined in §727-05 Glass Beads for Pavement Markings.

EPOXY APPLICATING 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 applicating 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 applicating 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.

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Mobile applicating 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 (Type 2) and Wet/Night Visibility (Type 1) glass spheres. 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 (Type 2) and Wet/Night Visibility (Type 1) glass spheres. Each dispenser shall be capable of applying spheres at a minimum rate of 10 lbs/gal of epoxy resin composition.

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 the placement of epoxy reflectorized pavement markings in a simultaneous sequence of operations as described in Construction Details, D. Application of Epoxy Reflectorized Pavement Markings.

CONSTRUCTION DETAILS

A. General

All pavement markings shall be placed as shown on the Contract Documents and in accordance with the New York State, Manual of Uniform Traffic Control Devices (MUTCD).

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

At least five (5) days prior to starting striping, the Contractor shall provide the Engineer with the epoxy manufacturer's written instructions for use. These instructions shall include, but not be limited to, material mixing ratios and application temperatures.

When pavement markings are applied 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.

The application of pavement markings shall be done in the general direction of traffic. Striping against the direction of traffic flow shall not be allowed.

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.

When necessary the Contractor shall establish marking line points at 30 foot intervals throughout the length of the pavement or as directed by the Engineer.

B. Atmospheric Conditions

Epoxy pavement markings shall only be applied during conditions of dry weather and on substantially 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.

C. Surface Preparation

The Contractor shall clean the pavement and existing durable markings to the satisfaction of the Engineer.

Surface cleaning and preparation work shall be performed only in the area of the epoxy markings application.

At the time of application all pavement surfaces and existing durable markings shall be free of oil, dirt, dust, grease and similar foreign materials. The cost of cleaning these contaminants shall be included in the bid price of this item.

In addition, concrete curing compounds on new portland cement concrete surfaces and existing painted pavement markings on both concrete and bituminous pavement surfaces shall be cleaned and paid for in accordance with §635 Cleaning and Preparation of Pavement Surfaces for Pavement Markings.

D. Application of Epoxy Reflectorized Pavement Markings

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

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.

3. Standard (Type 2) and Wet/Night Visibilty (Type 1) reflective glass spheres are injected into or dropped onto the liquid epoxy marking. Standard beads (Type 2) shall be applied first immediately followed by the application of Wet/Night Visibilty beads (Type 1). Each type shall be applied at a minimum rate of 10 lbs/gal of epoxy resin (minimum total application = 20 lbs/gal).

E. Defective Epoxy Pavement Markings

Epoxy reflectorized pavement markings, which after application and curing are determined by the Engineer to be defective and not in conformance with this specification, shall be repaired. Repair of defective markings shall be the responsibility of the Contractor and shall be performed to the satisfaction of the Engineer as follows:

1. Insufficient film thickness and line width; insufficient glass bead coverage or inadequate glass bead retention.

   Repair Method. 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.

   Immediately after surface preparation remove loose particles and foreign debris by brooming or blasting with compressed air.

   Repair shall be made by restriping over the cleaned surface in accordance with the requirements of this specification and at the full thickness indicated on the Contract Documents.

2. Uncured or discolored epoxy*; insufficient bond (to pavement surface or existing durable marking).

   Repair Method. 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 three feet 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.

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*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.

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 State.

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:

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

BASIS OF PAYMENT

The accepted quantities of markings 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 maintaining and protecting traffic during the marking operations shall be included in the price bid. The cost of removal of concrete curing compounds and existing pavement markings will be paid under separate items and are not included in this item.

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

PAY ITEM NO.	***DESCRIPTION***	***PAY UNIT***
685.07150110	White Epoxy Reflectorized Pavement Stripes – 15 mils	Foot

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	(Wet Night Visibility Spheres)	
685.07150210	White Epoxy Reflectorized Pavement Letters - 15 mils (Wet Night Visibility Spheres)	Each
685.07150310	White Epoxy Reflectorized Pavement Symbols – 15 mils (Wet Night Visibility Spheres)	Each
685.07150410	White Epoxy Reflectorized Cross Hatching -15 mils Thick (Wet Night Visibility Spheres)	Foot
685.07150510	White Epoxy Reflectorized Pavement Stripes (Special Markings) 15 mils Thick (Wet Night Visibility Spheres)	Foot
685.07150610	Yellow Epoxy Reflectorized Pavement Stripes – 15 mils (Wet Night Visibility Spheres)	Foot
685.07150710	Yellow Epoxy Reflectorized Pavement Stripes (Cross Hatching) 15 mils Thick (Wet Night Visibility Spheres)	Foot
685.07150810	White Epoxy Reflectorized Pavement Yield Line Symbols - Small - 15 mils (Wet Night Visibility Spheres)	Each
685.07150910	White Epoxy Reflectorized Pavement Yield Line Symbols - Large - 15 mils (Wet Night Visibility Spheres)	Each
685.07200110	White Epoxy Reflectorized Pavement Stripes – 20 mils (Wet Night Visibility Spheres)	Foot
685.07200210	White Epoxy Reflectorized Pavement Letters – 20 mils (Wet Night Visibility Spheres)	Each
685.07200310	White Epoxy Reflectorized Pavement Symbols – 20 mils (Wet Night Visibility Spheres)	Each
685.07200410	White Epoxy Reflectorized Pavement Stripes (Cross Hatching) 20 mils Thick (Wet Night Visibility Spheres)	Foot
685.07200510	White Epoxy Reflectorized Pavement Stripes (Special Markings) 20 mils Thick (Wet Night Visibility Spheres)	Foot

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ITEM 685.0720XX10 - EPOXY REFLECTORIZED PAVEMENT MARKINGS 20 MILS THICK (WET NIGHT VISIBILITY SPHERES)

685.07200610	Yellow Epoxy Reflectorized Pavement Stripes – 20 mils (Wet Night Visibility Spheres)	Foot
685.07200710	Yellow Epoxy Reflectorized Pavement Stripes (Cross Hatching) 20 mils Thick (Wet Night Visibility Spheres)	Foot
685.07200810	White Epoxy Reflectorized Pavement Yield Line Symbols - Small - 20 mils (Wet Night Visibility Spheres)	Each
685.07200910	White Epoxy Reflectorized Pavement Yield Line Symbols - Large - 20 mils (Wet Night Visibility Spheres)	Each