TOWNSHIP OF PEQUANNOCK

OFFICE OF THE TOWNSHIP ENGINEER
PEQUANNOCK, NEW JERSEY 07044
(973) 835-5700 x. 188

CONTRACT SPECIFICATIONS & BID DOCUMENTS
FAIR & OPEN PUBLIC SOLICITATION

REQUIREMENTS FOR: **Ramapo Road Sidewalk Replacement**

BID OPENING DATE AND TIME: Thursday April 15, 2021 at 10:00 am

TOWNSHIP OF PEQUANNOCK
RAMAPO ROAD SIDEWALK REPLACEMENT

DOCUMENT CHECKLIST

(Items Preceded by an asterisk (*) are required at the time of bid submission by N.J.S.A. 40A:11-23.2 and if omitted may not be subsequently submitted and cured by the governing body)

Required by Township of Pequannock	*Item*	*Page*	*Initial each entry, and submit the required form if the box contains an ☒*
☒	Document Checklist – **COMPLETE AND SIGN**	i	M.A
☒	Legal Notice to Bidders – **READ**	iii	M.A
☒	Project Location, Project Contacts, Description of Work – **READ**	iv	M.A
☒	Insurance Requirements – **READ**	A-4	M.A
☒	Vendor Information Sheet – **COMPLETE**	A-14	M.A.
☒	Business Registration Certificate – **SUBMIT PRIOR TO AWARD**	A-15	M.A.
☒	Public Works Contractor Registration Certificate – **SUBMIT WITH BID**	A-15	M.A.
☒	Mandatory Equal Employment Opportunity Language Exhibit B - Construction Contract – **READ**	A-16	M.A.
☒	Affirmative Action Compliance Affidavit – Construction Contracts – **COMPLETE & SIGN**	A-19	M.A.
☒	New Jersey Anti-Discrimination Provisions – **COMPLETE & SIGN**	A-20	M.A.
☒	Americans with Disabilities Act of 1990 Language - **COMPLETE & SIGN**	A-21	M.A.
☒	*Ownership Disclosure Certification Form - **SIGN AND NOTARIZE**	A-22	M.A.
☒	Acknowledgement of Principal – **SIGN AND NOTARIZE**	A-26	M.A.
☒	*Principal Subcontractor Declaration – **COMPLETE & SIGN**	A-27	M.A.
☒	Principal Subcontractor(s) Business Registration Certificate (if applicable) – **SUBMIT PRIOR TO AWARD**	A-28	M.A.
☒	Principal Subcontractor(s) Public Works Contractor Registration Certificate (if applicable) – **SUBMIT WITH BID**	A-28	M.A.
☒	Non-Collusion Affidavit – **SIGN AND NOTARIZE**	A-29	M.A.
☒	Prevailing Wage Compliance Declaration - **COMPLETE & SIGN**	A-30	M.A.
☒	Disclosure of Investment Activities In Iran – **COMPLETE & SIGN**	A-31	M.A.
☒	*Bid Guarantee in the amount of 10% of total bid or as specified in the Legal Notice to Bidders – **COMPLETE, SIGN & NOTARIZE**	A-33	M.A
☒	*Consent of Surety – **COMPLETE, SIGN & NOTARIZE**	A-34	M.A
☒	Equipment Certification – **COMPLETE AND SIGN**	A-35	M.A.
☒	Performance Record to Accompany Form of Proposal – **COMPLETE**	A-36	M.A
☒	Certification of Bidder's Status on the State Treasurer's List of Debarred, Suspended and Disqualified Contractors – **COMPLETE, SIGN & NOTARIZE**	A-40	M.A
☒	*Acknowledgement of Receipt of Addenda – **COMPLETE & SIGN**	A-41	M.A
☒	Special Conditions and Exceptions to Instruction to Bidders/Statutory Requirements – **READ**	A-42	M.A

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

NOTE: Bidders must use this form or its legal equivalent, conforming to N.J.S.A. 40A:11-21. Submission of the AIA Document 310, or any other form limiting or potentially limiting the penal sum of the bond to any amount less than 10% of the bid price not to exceed $20,000 (such as forms of bond that limit the penal sum to the difference between damages or the bid price and the Owner's cost of the Work), SHALL be cause for rejection of the bid.

BID BOND FORM

(If used, must accompany proposal)

KNOW ALL MEN BY THESE PRESENTS:
That we, the undersigned, MIDWEST CONSTRUCTION INC. as Principal, and Bondex Insurance Company as Surety, are hereby held and firmly bound unto the TOWNSHIP OF PEQUANNOCK in the penal sum of Ten Percent of amount of bid, not to bid to exceed twenty thousand and 00/100 dollars (10% not to exceed $20,000) for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, That, **WHEREAS**, the Principal has submitted to the TOWNSHIP OF PEQUANNOCK a certain Bid attached hereto and hereby made a part hereof, to enter into a contract in writing for the supplying and furnishing of Ramapo Road Sidewalk Replacement.

NOW, THEREFORE,

(a) If said Bid shall be rejected, or, in the alternate

(b) If said Bid shall be accepted and the principal shall execute and deliver a contract properly completed in accordance with said Bid and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid,

THEN, this obligation shall be void; otherwise the same shall remain in force and effect, it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Obligee may accept such bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their CORPORATE SEALS to be hereto AFFIXED and these presents to be signed by their proper officers, this 15th day of April 2021.

MIDWEST CONSTRUCTION INC.
Principal/Company

By: Manuel Araujo
Title: President

Bondex Insurance Company
By: Brenda Turiello
Brenda Turiello, Attorney-in-Fact

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

CONSENT OF SURETY

A performance bond will be required from the successful contractor on this project, and consequently, all bidders shall submit, with their bid, a consent of surety in substantially the following form:

To: Township Of Pequannock
(Owner)

Re: MIDWEST CONSTRUCTION INC.
(Contractor)
Ramapo Road Sidewalk Replacement
(Project Description)

This is to certify that the Bondex Insurance Company
(Surety Company)

will provide to Township Of Pequannock (Owner) a performance bond in the full amount of awarded contract in the event that said contractor is awarded a contract for the above project.

MIDWEST CONSTRUCTION INC.
(CONTRACTOR)

Bondex Insurance Company
Brenda Turiello
(Authorized Agent of Surety Company)
Brenda Turiello, Attorney in Fact

Date: April 15, 2021

CONSENT OF SURETY MUST BE SIGNED BY AN AUTHORIZED AGENT OR REPRESENTATIVE OF A SURETY COMPANY AUTHORIZED TO DO BUSINESS IN NEW JERSEY AND NOT BY THE INDIVIDUAL OR COMPANY REPRESENTATIVE SUBMITTING THE BID.

This Power of Attorney is for Bid Bonds and Consents of Surety ONLY. **BOND #:** Bid

POWER OF ATTORNEY
Bondex Insurance Company

KNOW ALL MEN BY THESE PRESENTS:

That **Bondex Insurance Company**, a corporation duly organized under the laws of the State of New Jersey, and having a principal office in Florham Park, County of Morris, State of New Jersey, does hereby appoint: Claudia Pereira, Brenda Turiello, Jaclyn Murphy, and Brianne Vazquez

its true and lawful Attorney(s)-in Fact, with full power and authority to execute on its behalf bid bonds and consents of surety issued in the course of its business and to bind the Company thereby, in an Amount not to exceed Five Million and 00/100 Dollars ($5,000,000.00)**********

This Power Of Attorney is granted and is signed and sealed by the authority of the following Resolution adopted by the Board of Directors of Bondex Insurance Company at a meeting duly called and held on the 7th day of March, 2007.

**RESOLVED that the Chief Executive Officer, President or a Vice President, Secretary or Assistant Secretary, shall have the power and authority*

1. *To appoint Attorney(s)-in-Fact and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereto, bonds and undertakings, contracts of indemnity and other writing obligatory in the nature thereof and,*

2. *To remove, at any time, any such Attorney-in-Fact and revoke any authority given.*

"RESOLVED FURTHER, that the signatures of such officers and the seal of the Company may be affixed to any such Power of Attorney or certificate relating thereto by facsimile, and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by facsimile signatures and facsimile seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached as though manually affixed"

IN WITNESS WHEREOF, Bondex Insurance Company has caused its seal to be affixed hereto and executed by its President on the 25th day of October, 2018.

BONDEX INSURANCE COMPANY

BY _____
Philip S. Tobey, President

State of New Jersey
County of Morris ss.

On this 25th day of October, 2018, before me, a notary public, personally appeared Philip S. Tobey, personally known to me, who being duly sworn did say that he is the President of Bondex Insurance Company, the Corporation described in the foregoing instrument, and that the Seal affixed to said instrument is the said Corporate Seal and that he executed the same in his authorized capacity, and that said instrument was signed and sealed on behalf of said Corporation by authority of its Board of Directors.

In Testimony Whereof I have set my hand and affixed my official Seal, the day and year fits written above,

CAROL DeCAPUA
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires 6/2/2022

BY _____
Carol DeCapua, ***Notary Public***

I, Maureen Cupo, Secretary of Bondex Insurance Company, do hereby certify that the Power of Attorney and the resolution adopted by the Board of Directors of said company as set forth above, are true and correct transcripts thereof and that neither the said Power of Attorney nor the resolution have been revoked and they are now in full force and effect.

IN WITNESS HEREOF, I have hereunto set my hand this 15TH day of April, 2021

BY _____
Maureen Cupo, Secretary

Warning: Any person who knowingly and with intent to defraud any insurance company or other person, files an application for insurance of claim containing any materially false information, or conceals for the purpose of misleading, information concerning any fact material thereto, commits a fraudulent insurance act, which is a crime and subjects such person to criminal and civil penalties

BONDEX INSURANCE COMPANY

Statutory Financial Statement

December 31, 2020

ASSETS

Bonds	$ 2,710,146
Stocks	$ 1,052,429
Cash	$ 7,199,865
Interest due and accrued	$ 24,213
Uncollected premiums & agents' balances	$ 688,521
Net deferred taxes	$ 23,596
Net tax asset	$ -
Fixed Assets	$ -
Federal Tax Asset	$ -
Other assets	$ 322,486
Total Assets	**$ 12,021,256**

LIABILITIES & POLICYHOLDERS' SURPLUS

Liabilities

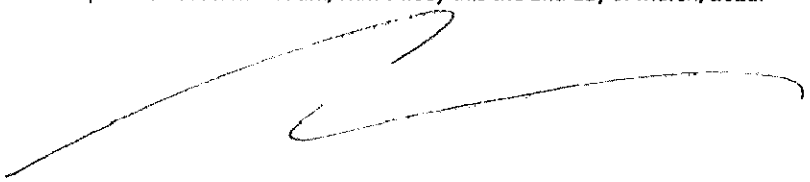
Loss & Loss Adjustment Expenses	$ 1,229,381
Commissions Payable	$ 221,872
Other Expenses (excluding taxes)	$ 75,000
Unearned premium	$ 1,920,787
Taxes, Licenses & Fees	$ 88,668
Amounts withheld for others	$ -
Ceded Reinsurance Payable	$ (141)
Aggregate Write-ins for liabilities	$ 3,357,794
Total Liabilities	**$ 6,893,361**

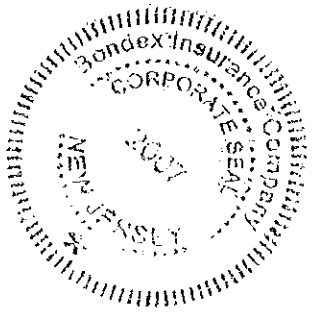
Surplus

Surplus	
Common Stock	$ 1,000,000
Unassigned surplus	$ 2,577,895
Gross paid-in and contributed surplus	$ 1,550,000
Total Surplus	**$ 5,127,895**
Total Liabilities & Policyholders' Surplus	**$ 12,021,256**

I, Philip S. Tobey, President of Bondex Insurance Company, do hereby certify that the foregoing is a true and correct statement of the statutory balance sheet of said Corporation as of December 31st, 2020 to the best of my knowledge and belief.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of said Corporation at Florham Park, New Jersey this the 2nd day of March, 2021.





Certificate Number
656229

Registration Date: 07/13/2019
Expiration Date: 07/12/2021

State of New Jersey

Department of Labor and Workforce Development
Division of Wage and Hour Compliance

Public Works Contractor Registration Act

Pursuant to N.J.S.A. 34:11-56.48, et seq. of the Public Works Contractor Registration Act, this certificate of registration is issued for purposes of bidding on any contract for public work or for engaging in the performance of any public work to:

Midwest Construction Inc

2019

Responsible Representative(s):
Manuel Araujo, President

Robert Asaro-Angelo, Commissioner
Department of Labor and Workforce Development

NON TRANSFERABLE

This certificate may not be transferred or assigned and may be revoked for cause by the Commissioner of Labor and Workforce Development.

STATE OF NEW JERSEY
BUSINESS REGISTRATION CERTIFICATE

Taxpayer Name:	MIDWEST CONSTRUCTION, INC.
Trade Name:	
Address:	23 DEADRIVER ROAD WARREN, NJ 07059
Certificate Number:	1064771
Effective Date:	May 26, 2004
Date of Issuance:	July 06, 2011

For Office Use Only:

20110706062944395

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 04/09/2021

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Schumacher Insurance Agency
491 Bloomfield Avenue
Suite 201
Montclair NJ 07042

CONTACT NAME: Bernadette Somma
PHONE (A/C, No, Ext): (973) 237-1000 **FAX (A/C, No):** (973) 812-1222
E-MAIL ADDRESS: bernadette@schins.net

INSURER(S) AFFORDING COVERAGE		NAIC #
INSURER A :	Ohio Security Insurance Company	24082
INSURER B :	The Ohio Casualty Insurance Company	24074
INSURER C :	AmGuard Insurance Company	42390
INSURER D :		
INSURER E :		
INSURER F :		

INSURED
Midwest Construction Inc
23 Dead River Rd
Warren NJ 07059

COVERAGES **CERTIFICATE NUMBER:** CL2111520425 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	[X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [X] POLICY [ ] PRO-JECT [ ] LOC [ ] OTHER:			BKS57670516	12/14/2020	12/14/2021	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG [ ]	$ 1,000,000 $ 300,000 $ 15,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $
A	AUTOMOBILE LIABILITY [ ] ANY AUTO [ ] OWNED AUTOS ONLY [X] SCHEDULED AUTOS [X] HIRED AUTOS ONLY [X] NON-OWNED AUTOS ONLY			BAS57670516	12/14/2020	12/14/2021	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) Uninsured motorist	$ 1,000,000 $ $ $ $ 300,000
B	[X] UMBRELLA LIAB [X] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [ ] RETENTION $			USO57670516	12/14/2020	12/14/2021	EACH OCCURRENCE AGGREGATE [ ]	$ 3,000,000 $ 3,000,000 $
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N [N] If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		MIWC163383	12/14/2020	12/14/2021	[X] PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Re: Ramapo Road Sidewalk Replacement

CERTIFICATE HOLDER

Township of Pequannock
530 Newark-Pompton Turnpike
Pompton Plains NJ 07444

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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MIDWEST CONSTRUCTION, INC.
23 DEAD RIVER ROAD
WARREN, NJ 07059

EXPERIENCE SHEET

OWNER	JOB DESCRIPTION	CONTRACT AMOUNT	CONTACT	CONTACT NUMBER
Borough of Florham Park 111 Ridgedale Avenue Florham Park, NJ 07932	Townsend Drive Road Improvements	$268,929.58	Michael Sgaramella	973-410-5473
Borough of Garwood 403 South Avenue Garwood NJ 07027	Garwood 2011DOT Project	$375,671.74	Donald Guarriello	908-620-1139
Township of Morris 50 Woodland Avenue Convent Station, NJ 07961	Bailey Hollow Road Improvements	$727,757.65	Bernard Senger	973-326-7442
Township of Springfield 100 Mountain Avenue Springfield, NJ 07081	Improvements to Wabeno Avenue	$201,233.79	Todd Hay	908-653-0889
Township of Verona 600 Bloomfield Avenue Verona, NJ 07044	Reconstruction of East West	$250.079.58	Jim Helb	973-857-4805
Borough of Florham Park 111 RidgedaleAvenue Florham Park, NJ 07932	2012 Sidewalk Replacement Project-Ridgedale Avenue	$153,649.19	Michael Agaramella	973-410-5473
Township of Morris 50 Woodland Avenue Convent Station, NJ 07961	Reconstruction of Locust Street and McKenzie Road	$336,775.00	Bernard Senger	973-326-7442
Township of Cedar Grove 525 Pompton Avenue Cedar Grove, NJ 07009	Reconstruction of Buena Vista Road	$236,027.50	Joseph Locasio	973 -239-1410 X:280
Borough of Mountainside 1385 Route 22 Mountainside, NJ 07092	Resurfacing of Wyoming Drive - Contract 2012-2	$409,662.00	Michael Disco	908-232-2400

Borough of Mountainside 1385 Route 22 Mountainside, NJ 07092	Paving Improvements on Whippoorwill Way	$243,260.91	Michael Disco	908-232-2400
Borough of Garwood 403 South Avenue Garwood, NJ 07027	Garwood 2012 DOT Project	$334,316.76	Donald Guariello	908-620-1139
Township of Verona 600 Bloomfield Avenue Verona, NJ 07044	Reconstruction of Brookside Terrace, Crane Terrace, Oak Lane, Birch Lane and Peckman Court	$567,578.34	Jim Helb	973-857-4805
Borough of Garwood 403 South Avenue Garwood, NJ 07027	Resurfacing of Oak Street and Drainage on Third Avenue	$238,849.60	Donald Guariello	908-620-1139
Township of Verona 600 Bloomfield Avenue Verona, NJ 07044	Reconstruction of Linden Avenue	$397,052.00	Jim Helb	973-857-4805
Borough of Mountainside 1385 Route 22 Mountainside, NJ 07092	Paving Improvements on Darby lane	$274,573.56	Mike Disco	908-232-2400
Borough of Mountainside 1385 Route 22 Mountainside, NJ 07092	Paving Improvements on Sunny Slope Drive	$389,975.66	Mike Disco	908-232-2400
Borough of Mountainside 1385 Route 22 Mountainside, NJ 0709	Paving Improvements on Sunny View Road	296,215.01	Mike Disco	908-232-2400
Township of Morris 50 Wood land Avenue Morris, NJ 07961	Mill Road Improvements	$794,075.20	Bernard Senger	973-326-7442
Borough of Bernardsville 166 Mine Brook Road Bernardsville, NJ 07929	Roundtop Road Improvements	$709,941.76	Bob Brightly	908-879-6209
Town of Dover 37 North Sussex Street Dover, NJ 07801	2014 Small Cities Project	$506,100.08	Bill Isselin	973-366-2200 X: 2152

Borough of Garwood 403 South Avenue Garwood, NJ 07027	Resurfacing of Beech Ave, Maple St, and Drainage construction on Hickory Ave, and Third Ave.	$278,200.90	Donald Guariello	908-620-1139
Township of Morris 50 Woodland Avenue Convent Station, NJ 07961	Roadway Improve. Project Fairchild Ave.	$615,958.95	Bernard Senger	973-326-7442
Township of Parsippany 1001 Parsippany Blvd. Parsippany, NJ 07054	Roadway Improve. Robin Hood Rd, Friar Rd, Exter St., Sherwood Rd, hastings Rd, Crawford Rd, Little John Rd.	$1,269,444.80	George Winter	973-409-7718
Borough of Mountainside 1385 Route 22 Mountainside, NJ 07092	Paving Improvements on Saddlebrook Road	$331,956.00`	Mike Disco	908-232-2400
Township of Parsippany 1001 Parsippany Blvd. Parsippany, NJ 07054	Reconstruction of Reynolds Ave Phase II	$607,377.00	George Winter	973-409-7718
Township of West Caldwell 30 Clinton Road West Caldwell, NJ 07066	Francine Avenue Roadway Reconstruction	$596,855.94	Ralph Tango	973-398-3110
Township of Morris 50 Woodland Avenue Convent Station, NJ 07961	Blackwell Avenue Roadway Improvements.	$313,769.42	Bernard Senger	973-326-7442
Borough of Roselle 210 Chestnut Street Roselle, NJ 07203	CDBG Year 41 - Roadway Improvements Project	$288,560.00	Carl o'Brien	973-398-3110
Borough of Roselle 210 Chestnut Street Roselle, NJ 07203	2015 NJDOT Roadway Improvements - Second Avenue(Thompson Avenue to Municipal Boundary)	$308,903.25	Carl O'Brien	973-398-3110

Township of Parsippany 1001 Parsippany Blvd., Parsippany, NJ 07054	Reconstruction of Glencove Road and Medford Road	$748,854.62	Paul Niehoff	973-263-4350
Township of Parsippany 1001 Parsippany Blvd. Parsippany, NJ 07054	Reconstruction Of Troy Road	$685,978.35	Paul Niehoff	973-263-4350
Township of Morris 50 Woodland Avenue Convent Station, NJ 07961	Picatinny Road Roadway Improvements Project	$1,253,777.60	Bernard Senger	973-326-7442
Borough of Garwood 403 South Avenue Garwood, NJ 07027	NJDOT 2015 Road Improvements Program	$301,091.13	Donald Guariello	908-620-1139
Borough of Totowa 537 Totowa Road at Cherba Place Totowa, NJ 07512	Hobart Place Improvements	$198,366.15	Nordan Murphy	973.523.6200 ext. 202
Borough of Garwood 403 South Avenue Garwood, NJ 07027	NJDOT 2016 Road Improvements Program	$275,783.27	Donald Guariello	908-620-1139
Township of Parsippany 1001 Parsippany Blvd. Parsippany, NJ 07054	Road Reconstruction Project- Lake Parsippany	$1,193,228.50	Paul Niehoff	973-263-4350
Town of Harrison 218 Harrison Avenue Harrison, NJ 07029	Resurfacing of Wilhelm Street	$296,312.74	Rocco Russomanno	973-268-2446
Borough of Mountainside 1385 Route 22 Mountainside, NJ 07092	Paving Improvements on Longview Drive	$299,542.51	Mike Disco	908-232-2400
Borough of Fanwood 75 North Martine Avenue Fanwood, NJ 07023	2017 Curb & Sidewalk Program	$57,820.00	Antonios Panagopoulos	973-614-0005

Borough of Riverdale 91 Newark Pompton Turnpike Riverdale, NJ 07457	Oak Street Improvements	$184,400.34	Thomas Boorady	973-835-8300 X-112
Township of Parsippany- Troy Hills 1001 Parsippany Boulevard Parsippany, NJ 07054	Knoll Road Recontruction from Vail Rd. to Buckingham Rd	$ 780,972.70	Paul Niehoff	973-263-4350
Township of Montville 195 Changebridge Road Montville, NJ 07045	Jacksonville Road Sidewalk Replacement Project	$69,050.00	Nick Marucci	973-331-3321
Township of Parsippany Troy Hills 1001 Parsippany Blvd Parsippany, NJ 07054	Reconstruction of Sandra Drive and Sandra Court	$709,522.50	Paul Niehoff	973-263-4350
Township of Parsippany Troy Hills 1001 Parsippany Blvd Parsippany, NJ 07054	Improvements to Old Bloomfield Avenue Phase 2	$645,036.94	Paul Niehoff	973-263-4350
Borough of Mountainside 1385 Route 22 Mountainside, NJ 07092	Resurfacing of Partridge Run	$279,787.16	Mike Disco	908-232-2400
Township of Livingston 357 S. Livingston Avenue Livingston, NJ 07039	Memorial Park Sidewalk Improvements	$344,225.00	Jeannette Harduby	973-992-5000
Township of Montville 195 Changebridge Road Montville, NJ 07045	ASA Street Drainage Improvements	$156,185.00	Nick Marucci	973-331-3321
Town Of Dover 100 Princeton Avenue Dover, NJ 07801	2018 Small Cities Project	$ 432,870.00	Bill Isselin	973-366-2200
Borough of Madison 50 Kings Road Madison NJ 07940	Glenwild Road Reconstruction	$526,999.80	Robert Vogel	973-593-3061

Borough of Madison 50 Kings Road Madison NJ 07940	2020 Road Improvements	$782,990.45	Robert Vogel	973-593-3061
Township of Parsippany Troy Hills 1001 Parsippany Blvd Parsippany, NJ 07054	Greenbank Road Safety and Improvements	$679,105.10	Paul Niehoff	973-263-4350
Township of Parsippany Troy Hills 1001 Parsippany Blvd Parsippany, NJ 07054	New England Drive Milling and Resurfacing Program	$467,487.21	Paul Niehoff	973-263-4350
Township of Parsippany Troy Hills 1001 Parsippany Blvd Parsippany, NJ 07054	Replacement of Simpson Wall Avenue Retaining Wall	$66,780.00	Paul Niehoff	973-263-4350
City of Summit 512 Springfield Avenue Summit, NJ 07901	Pine Grove (Section 2) Improvements Project	$465,191.05	Rick Matias	908-273-6404

Equipment List

EQUIPMENT NAME:	YEAR
BACKHOE 416 B	1994
ESCAVATOR 315	1996
KOMATSU P.C 35	2006
BOBCAT 232 B	2006
F250 PICK UP	1995
FORD PICK UP F350	1999
F350 DUMP TRUCK	1993
VOLVO DUMP TRUCK	2003
TRAILER TAG ALONG	1988
DODGE RAM	2004
MACK FLATBED	1998
F350	2007
BACKHOE	2011
VOLVO DUMP TRUCK	1999
AUTOCAR DUMP TRUCK	1988
F350	2000
F350	2002
DOZER	2004
410 J BACKHOE	2004
410 G BACKHOE	2004
410 G BACKHOE	2006
MAC TRACTOR	1995
LOW BOY TRAILER	2005
DUMP TRAILER	2008
WESTERN STAR DUMP TRUCK	2015
WESTERN STAR DUMP TRUCK	2016

TOOLS / MACHINERY

BACKHOE CASE
JACK HAMMER
MASON HAND TOOLS
CONCRETE SAW, ROAD SIGNS ETC.

TOWNSHIP OF PEQUANNOCK
RAMAPO ROAD SIDEWALK REPLACEMENT

DOCUMENT CHECKLIST (CONTINUED)

Required by Township of Pequannock	*Item*	*Page*	*Initial each entry, and submit the required form if the box contains an* ☒
☒	Proposal Page – **COMPLETE, SIGN AND SEAL**	A-43	M.A
☐	Prevailing Wage Determination For Morris County/Statewide dated – **READ**	B	M.A.

AFTER AWARD OF CONTRACT			
☒	Signed Agreement – **SIGN & SEAL**		M.A.
☒	IRS Form W-9 – **COMPLETE & SIGN**		M.A.
☒	Certificate of Insurance – **SUBMIT WITH EXECUTED CONTRACT**		M.A
☒	Performance Bond		M.A.
☒	Labor and Materials (Payment) Bond		M.A.
☐	Maintenance Bond		

Corporate Name: Midwest Construction Inc

Signature: Manuel Araujo Date: 4/8/2021

Print Name: Manuel Araujo Title: President

TOWNSHIP OF PEQUANNOCK
LEGAL NOTICE
NOTICE TO BIDDERS

RAMAPO ROAD SIDEWALK REPLACEMENT

Sealed Proposals will be received by the Township of Pequannock, New Jersey, in the Manager's Office of the Municipal Building, 530 Newark-Pompton Turnpike, Pompton Plains, New Jersey, until 10:00 a.m. Prevailing Time, Thursday, April 15, 2021.

Due to the current COVID-19 state of emergency and in order to limit possible exposure to pathogens, it is preferred that all bids be submitted by either regular mail, Federal Express or United Parcel Service and received at the offices of the Township of Pequannock – Office of the Township Manager, located at 530 Newark-Pompton Turnpike, Pompton Plains, New Jersey, 07444 prior to the time of opening at 10:00 a.m. on Thursday, April 15, 2021. Bids received after the above time shall not be accepted and/or opened. All bids submitted shall be addressed exactly as follows:

Township Manager
Township of Pequannock
Municipal Building
530 Newark-Pompton Turnpike
Pompton Plains, NJ 07444
Attn: Bid Proposal – RAMAPO ROAD SIDEWALK REPLACEMENT

In accordance with Local Finance Notice 2020-10, bids shall be opened in a modified public format. In-person attendance by bidders and/or the general public shall not be permitted due to the current state of emergency. In lieu of same, all bidders shall be provided instructions for web-conference access prior to the opening. A live-stream link will also be posted on the Township's website prior to the opening for use by the general public. Following the opening of bids, the three lowest bids shall be available for review on the Township's website www.peqtwp.org.

The Township will not be responsible for Proposal submissions that are lost in transit or delivered late by the USPS or any other carrier service. All Proposals must be received in and stamped "RECEIVED" by the Township Manager's office prior to the date and time of bid opening. All Proposals not received on time will be returned unopened to the bidder.

In general, work consists of the removal and replacement of existing sidewalks, ADA accessible curb ramps and reinforced concrete driveway aprons along Ramapo Road, as shown on the construction plans and as described in the bid technical specifications.

Beginning on Monday, March 15, 2021, Prescribed Bid Documents, Plans and Specifications, and other proposed Contract Documents may be obtained at the office of the Township Clerk between the hours of 9:00 a.m. and 4:30 p.m., Monday through Friday, excluding legal holidays **for a non-refundable fee of $50.00 or the cost of reproduction, whichever is lower. Payment must be in the form of cash, certified check or money order made payable to the Township of Pequannock.**

Each Proposal will be made upon the prescribed forms furnished with the Specifications, and will be accompanied by a Bidder's Certified or Cashier's Check drawn on a solvent bank, in the sum of ten percent (10%) of the amount bid, but in no case in excess of Twenty Thousand Dollars ($20,000.00), or in lieu of a Certified or Cashier's Check, a Bid Bond in the same amount prepared on the form of Bid Bond attached hereto, duly executed by the Bidder as principal and having as surety thereon a Surety Company approved by the Township of Pequannock. Such checks or Bid Bonds will be made payable to the Township of Pequannock, and will be by it held as a guaranty that in the event the bid is accepted and a Contract awarded to the Bidder, the Contract will be duly executed, and its performance properly secured, and in default thereof, said check or Bid Bond and the amount represented thereby will be retained by the aforesaid Township of Pequannock as liquidated damages.

Proposals will be accompanied, in the case of corporations not chartered in New Jersey, by proper certificate that such corporation is authorized to do business in the State of New Jersey.

Each Proposal will be enclosed in a sealed envelope bearing the name and address of the Bidder will be addressed as previously noted.

The Bidder to whom the Contract is awarded will be required to furnish a Performance Bond and a Payment Bond acceptable to the Township of Pequannock, each in the amount of one hundred percent (100%) of the contract, in conformity with the requirements of the Contract Documents.

In accordance with the requirements of the State of New Jersey Affirmative Action Program, Bidders are required to comply with the requirements of P.L. 1975, C127.

All Bidders must submit to the Township a Business Registration Certificate issued by the New Jersey Division of Revenue, PL 2004 c.57 (NJSA 52:32-44) and NJSA 40A:11-23.2. BRCs may be submitted with Bids but must be submitted prior to the execution of a contract.

Simultaneously with the submission of bids, the corporation or partnership so bidding will furnish a statement setting forth the names and addresses of all stockholders in the corporation or partnership who own ten percent (10%) or greater therein pursuant to Chapter 33, P.L. 1977. Bids will be REJECTED if they do not contain this disclosure statement.

Bidders are notified that they must pay workmen the prevailing wage rate as determined by the New Jersey Department of Labor and Industry for the project, pursuant to the "New Jersey Prevailing Wage Act" - Chapter 150 of the Laws of 1963.

The right is hereby reserved to reject any and all bids or any part thereof or to waive any minor informalities or irregularities and to accept any bid or bids if deemed in the best interest of the Township of Pequannock to do so.

TOWNSHIP OF PEQUANNOCK

Adam W. Brewer, Township Manager

PROJECT LOCATION

The site of work to be performed under this Contract is located within the public rights of way for Ramapo Road, Newark Pompton Turnpike and Boulevard, in the County of Morris, New Jersey as designated in these Specifications and accompanying plans.

PROJECT CONTACTS

Purchasing Contact (Contracting Agent)

Adam W. Brewer, QPA
Township Manager
530 Newark-Pompton Turnpike
Pompton Plains, NJ 07444
(973) 835-5700 ext. 133
abrewer@peqtwp.org

Engineering Contact

Frank Russo, PE, PP
Township Engineer
99 Alexander Avenue
Pompton Plains, NJ 07444
frusso@peqtwp.org
(973) 835-5700 ext. 188

DESCRIPTION OF WORK

The Township of Pequannock intends to remove and replace the existing deteriorated asphalt and concrete sidewalks, and asphalt driveway aprons an ADA Accessible curb ramps along Ramapo Road, including all roadway, driveway and landscape restoration activities associated with the project.

The extent of the project is the entire length of Ramapo Road, including the curb returns with the Morris County roadways, the activities are to encompass both sides of the roadway.

All work shall be performed in accordance with the Project Plans of these bid documents.

The contractor shall provide all labor, materials and equipment necessary to complete the work in accordance with the Project Plans, and the other requirements of these bid documents.

SECTION A
INSTRUCTIONS TO BIDDERS AND STATUTORY REQUIREMENTS

I. SUBMISSION OF BIDS

A. Sealed bids shall be received by the Township of Pequannock, hereinafter referred to as "Owner," in accordance with public advertisement as required by the laws of the State of New Jersey, with a copy of said Legal Notice being attached hereto and made a part of these specifications.

B. Sealed bids will be received by the Township Manager as stated in the Legal Notice to Bidders, and at such time and place will be publicly opened and read aloud.

C. One (1) original and one (1) copy of the bid shall be submitted in a sealed envelope: (1) addressed to the Township Manager's Office, 530 Newark-Pompton Turnpike, Pompton Plains, New Jersey 07444, (2) bearing the name and address of the bidder written on the face of the envelope, and (3) clearly marked "SEALED BID" with the contract title being bid, as fully described in the Notice to Bidders.

D. It is the bidder's responsibility to present bids to the owner prior to or at the time and at the place designated. Bids must mailed; however, the owner disclaims any responsibility for bids forwarded by regular or overnight mail. Bids sent by express mail or delivery service must either 1) include the designation in sub-section C, above on the outside of the express mail or service envelope; or 2) must be in a separate envelope inside the delivery envelope and the envelope marked as required above. Bids received after the designated time and date will be returned unopened.

E. Sealed bids forwarded to the Owner before the time of opening of bids may be withdrawn upon written application of the bidder who shall be required to produce evidence showing that the individual is or represents the principal or principals involved in the bid. Once bids have been opened, they shall remain firm for a period of sixty (60) calendar days.

F. More than one bid from an individual, a firm or partnership, a corporation or association under the same names shall not be considered.

G. All prices and amounts must be written in ink or preferably machine-printed. Bids containing any conditions, omissions, unexplained erasures or alterations, items not called for in the bid proposal form, attachment of additive information not required by the specifications, or irregularities of any kind, may be cause for rejection by the owner in accordance with applicable law. Any changes, whiteouts, strikeouts, etc. in the bid must be initialed in ink by the person signing the bid.

H. Each bid proposal form must give the full business address, business phone, fax, e-mail, the contact person of the bidder, and be signed by an authorized representative as follows:

- Bids by partnerships must be signed in the partnership name by one of the members of the partnership or by an authorized representative, followed by the signature and designation of the person signing.
- Bids by corporations must be signed in the legal name of the corporation, followed by the name of the State in which incorporated and must contain the signature and designation of the president, secretary or other person authorized to bind the corporation in the matter.
- Bids by sole-proprietorship shall be signed by the proprietor.
- When requested, satisfactory evidence of the authority of the officer signing shall be furnished.

I. Bidder should be aware of the following statutes that represent "Truth in Contracting" laws:

- *N.J.S.A. 2C:21-34 et seq.* governs false claims and representations by bidders. It is a serious crime for the bidder to knowingly submit a false claim and/or knowingly make material misrepresentation.
- *N.J.S.A. 2C:27-10* provides that a person commits a crime if said person offers a benefit to a public servant for an official act performed or to be performed by a public servant, which is a violation of official duty.
- *N.J.S.A. 2C:27-11* provides that a bidder commits a crime if said person, directly or indirectly, confers or agrees to confer any benefit not allowed by law to a public servant.
- Bidder should consult the statutes or legal counsel for further information.

J. Pay-to-Play Disclosure - Business entities are advised of their responsibility to file an annual disclosure statement of political contributions with the New Jersey Election Law Enforcement Commission (ELEC)

pursuant to *N.J.S.A. 19:44A-20.27* if they receive contracts in excess of $50,000 from public entities in a calendar year. Business entities are responsible for determining if filing is necessary, Additional information on this requirement is available from ELEC at 888-313-3532 or at www.elec.nj.gov.

K. Bid packages are available from the Office of the Township Manager unless otherwise indicated in the Notice to Bidders.

II. BID SECURITY AND BONDING REQUIREMENTS

The following provisions if indicated by an ☒ on the submission checklist, shall be applicable to this bid and be made a part of the bid documents:

A. BID GUARANTEE

If required, Bidder shall submit with the bid a certified check, cashier's check or bid bond in the amount of ten percent (10%) of the total price bid, but not in excess of $20,000, payable unconditionally to the owner. When submitting a Bid Bond, it shall contain Power of Attorney for full amount of Bid Bond from a surety company authorized to do business in the State of New Jersey and acceptable to the Owner. The check or bond of the unsuccessful bidder(s) shall be returned pursuant to *N.J.S.A. 40A:11-24a.* The check or bond of the bidder to whom the contract is awarded shall be retained until a contract is executed and the required performance bond or other security is submitted. The check or bond of the successful bidder shall be forfeited if the bidder fails to enter into a contract pursuant to *N.J.S.A. 40A:11-21.*

The Bid Bond shall include a valid Power of Attorney authorizing the Attorney-in-Fact to execute the documents. Failure to submit a bid guarantee shall result in rejection of the bid. **Submission of the AIA Document 310, or any other form limiting or potentially limiting the penal sum of the bond to any amount less than 10% of the bid price not to exceed $20,000 (such as forms of bond that limit the penal sum to the difference between damages or the bid price and the Owner's cost of the Work), do not meet the statutory requirements of *N.J.S.A. 40A:11-21*and shall be cause for rejection of the bid.**

B. CONSENT OF SURETY

If required, Bidder shall submit with the bid a Certificate (Consent) of Surety with Power of Attorney for full amount of bid price from a Surety Company authorized to do business in the State of New Jersey, and acceptable to the Owner stating that it will provide said bidder with a Performance Bond in the full amount of the bid. This certificate shall be obtained in order to confirm that the bidder to whom the contract is awarded will furnish Performance and Payment Bonds from an acceptable surety company on behalf of said bidder, any or all subcontractors or by each respective subcontractor or by any combination thereof which results in performance security equal to the total amount of the contract, pursuant to *N.J.S.A. 40A:11-22.*

The Consent of Surety shall include a valid Power of Attorney authorizing the Attorney-in-Fact to execute the documents. Failure to submit a Consent of Surety form shall result in rejection of the bid.

C. PERFORMANCE BOND

If required, the successful bidder shall simultaneously with the delivery of the executed contract, submit an executed bond in the amount of one hundred percent (100%) of the acceptable bid as security for the faithful performance of this contract.

The Performance Bond provided shall not be released until final acceptance of the whole work and then only if any liens or claims have been satisfied. The surety on such bond or bonds shall be a duly authorized surety company authorized to do business in the State of New Jersey pursuant to *N.J.S.A. 17:31-5.* For multi-year contracts, the Performance Bond may be resubmitted each year on the Contract Anniversary Date for the amount remaining on the contract.

Failure to submit this with the executed contract shall be cause for declaring the contract null and void pursuant to *N.J.S.A. 40A:11-22.*

D. LABOR AND MATERIAL (PAYMENT) BOND

If required, the successful bidder shall with the delivery of the performance bond submit an executed payment bond to guarantee payment to laborers and suppliers for the labor and material used in the work performed under the contract.

Failure to submit a Labor and Material (Payment) Bond with the Performance Bond shall be cause for declaring the contract null and void.

E. MAINTENANCE BOND

If required, upon acceptance of the work by the Owner and prior to release of the Performance Bond and any retainage held by the Owner, the contractor shall submit a Maintenance Bond, pursuant to *N.J.S.A. 40A:11-16.3*, in an amount not to exceed 15 % of the project costs guaranteeing against defective quality of work or materials for the period of: ___ 1 year or __X_ 2 years.

III. INTERPRETATION, ADDENDA AND DISCREPANCIES

A. The bidder understands and agrees that its bid is submitted on the basis of the specifications prepared by the owner. The bidder accepts the obligation to become familiar with these specifications.

B. Bidders are expected to examine the specifications and related bid documents with care and observe all their requirements. Ambiguities, errors or omissions noted by bidders should be promptly reported in writing to the appropriate official. Any prospective bidder who wishes to challenge a bid specification shall file such challenges in writing with the Contracting Agent with a copy to the Engineer/Architect no less than three business days prior to the opening of the bids. Challenges filed after that time shall be considered void and have no impact on the contracting unit or the award of a contract pursuant to *N.J.S.A. 40A:11-13*. In the event the bidder fails to notify the Owner of such ambiguities, errors or omissions, the bidder shall be bound by the requirements of the specifications and the bidder's submitted bid.

C. No oral interpretation and or clarification of the meaning of the specifications for any goods and services will be made to any bidder. Such request shall be in writing, addressed to the Contracting Agent. In order to be given consideration, a written request must be received at least three (3) business days prior to the date fixed for the opening of the bid for goods and services.

D. All interpretations, clarifications and any supplemental instructions will be in the form of written addenda to the specifications and will be distributed to all prospective bidders. All addenda so issued shall become part of the specification and bid documents and shall be acknowledged by the bidder in the bid by completing the Acknowledgement of Receipt of Addenda form. The owner's interpretations or corrections thereof shall be final.

E. Pursuant to *N.J.S.A. 40A:11-23(c)(1)* when issuing addenda, the owner shall provide required notice prior to the official receipt of bids to any person who has submitted a bid or who has received a bid package. They will be sent from an email at the @peqtwp.org domain and/or confirmed facsimile transmission. It is recommended that bidders include this domain in the recipient email's contact list to ensure it is not routed to a junk or spam email folder.

F. Discrepancies in Bids

If the amount shown in words and its equivalent in figures do not agree, the written words shall be binding. Ditto marks are not considered writing or printing and shall not be used.

In the event that there is a discrepancy between the unit prices and the extended totals, the unit prices shall prevail. In the event there is an error of the summation of the extended totals, the computation by the Owner of the extended totals shall govern.

G. Alternate Bids and Unit Prices for the various portions of work or Contracts shall be as stated in other Sections of the Specifications.

1. The Owner reserves the right to award a Contract based upon the possible inclusion of one or more alternate bids. The amounts of the alternate bids shall include any and all modifications to related, adjacent or surrounding work made necessary by use of such alternate bids. No conditions, limitations or provision may be placed on a bid.

H. Optional Pre-Bid Conference

If stated in the Notice to Bidders and checked below:

☒ A Pre-Bid Conference will not be held. Bidders may familiarize themselves with the site at their convenience.

☐ A pre-bid conference for this proposal will be held on _____.

Attendance is not mandatory, but is strongly recommended. Failure to attend does not relieve the bidder of any obligations or requirements.

IV. BRAND NAMES, STANDARDS OF QUALITY AND PERFORMANCE

A. Brand names and/or descriptions used in these specifications are to acquaint bidders with the types of goods and services desired and will be used as a standard by which goods and services offered as equivalent will be evaluated.

B. When a specification uses "brand name or equivalent," the listed brand name shall serve as a reference or point of comparison for the functional or operational characteristic desired for the good or service being requested. Where a bidder submits an equivalent, it shall be the responsibility of the bidder to document the equivalence claim. Failure to submit such documentation shall be grounds for rejection of the claim of equivalence.

C. In submitting its bid, the bidder certifies that the goods and services to be furnished will not infringe upon any valid patent or trademark and that the successful bidder shall, at its own expense, defend any and all actions or suits charging such infringement, and will save the owner harmless from any damages resulting from such infringement.

D. The contractor shall guarantee any or all goods and services supplied under these specifications. Defective or inferior goods shall be replaced at the expense of the contractor. The contractor will be responsible for return freight or restocking charges.

V. INSURANCE AND INDEMNIFICATION

The insurance documents indicated by an ☒ shall include but are not limited to the following coverages. The successful bidder shall provide coverage so that all insurance coverage must be in effect no later than 12:01 A.M. EST at the start of the day of the contract and remain in effect for the duration of the contract, including any extensions. Coverage shall not be terminated unless and until the Owner shall have acknowledged in writing to the Contractor that the Owner's insured have placed permanent insurance for the facility. All other policies required under this Contract shall remain in effect in full force and effect until the Contractor's Maintenance Bond, if required, has been released.

A. INSURANCE REQUIREMENTS

☒ 1. Worker's Compensation Insurance

Worker's Compensation insurance shall be maintained in full force during the life of the contract, covering all employees engaged in performance of the contract pursuant to *N.J.S.A. 34:15-12(a)* and *N.J.A.C. 12:235-1.6.* Policy shall ensure coverage for all of the Contractor's employees directly or indirectly engaged in the performance of this contract. This insurance shall have an Employer's Liability Insurance limit of not less than $1,000,000 for Bodily Injury by accident, $1,000,000 for occupational disease and $1,000,000 aggregate limit.

☒ 2. Comprehensive General Liability Insurance

General Liability insurance shall be provided with limits of not less than $1,000,000 for any one person and $1,000,000 for any one accident for bodily injury and $2,000,000 general aggregate for property damage, and shall be maintained in full force during the life of the contract. The Commercial General Liability Insurance shall include the Broad Form Property Damage Liability Endorsement, as well as coverage for explosion, collapse and underground (XCU) hazards as completed operations and products liability coverage. Blanket Contractual Liability Insurance must include, expressing insuring the Contractor's liability for occurrences assumed by the Contractor under this Contract.

☒ 3. Automotive Liability Insurance

Automotive Liability insurance covering contractor for claims arising from owned, hired and non-owned vehicles with limits of not less than $1,000,000 for any one person and $1,000,000 for any one accident for bodily injury and $1,000,000 each accident for property damage, shall be maintained in full force during the life of the contract.

☒ 4. Owner's and Contractors' Protective Liability Insurance

Liability Insurance with a limit of not less than $1,000,000 combined single limit for bodily injury and property damage.

☒ 5. Umbrella Liability Insurance

Umbrella Liability Insurance coverage of at least as broad as that provided by the Commercial General Liability Insurance and Comprehensive Automobile Liability Insurance required above, with a limit of not less than $5,000,000 combined single limit for bodily injury and property damage.

☒ 6. Builder's Risk Insurance

Builder's Risk Insurance covering the project under construction in an amount equal to the accepted bid price of the Contract. The insurance shall cover all risks of physical loss and damage including but not limited to theft, vandalism and malicious mischief, collapse, earthquake, flood and water damage, and shall include damages, losses of expenses arising out of or resulting from any insured loss incurred in the repair or replacement of any insured property (including but not limited to the fees and charges of engineers, architects, attorneys, and other professionals). The insurance may have a deductible not to exceed $5,000 which may be borne by the Contractor.

☐ 7. Other Forms of Insurance required in these bid specifications.

B. CERTIFICATES OF THE REQUIRED INSURANCE

Certificates of Insurance for those policies required above shall be submitted with the contract. Such coverage shall be with an insurance company authorized to do business in the State of New Jersey and shall name the Owner as a Certificate Holder and as an Additional Insured.

Self-insured contractors shall submit an affidavit attesting to their self-insured coverage and shall name the Owner as an additional insured.

C. INDEMNIFICATION

The contractor shall indemnify and hold harmless the Owner, its officers, agents, servants, and employees from all claims, suits or actions, and damages or costs of every name and description to which the owner may be subjected or put by reason of injury to the person or property of another, or the property of the owner, resulting from a) negligent acts or omissions on the part of the contractor, the contractor's agents, servants or subcontractors in the delivery of goods and services, or in the performance of the work under the contract; and, b) the use of any copyrighted or copyrighted composition, valid trademark, secret process, patented or unpatented invention or article furnished or used in the performance of this contract.

D. Subcontractor's shall be required by the Contractor to provide the same type of insurance as required of the principal Contractor, but within the limits as follows:

1) Worker's Compensation and Employer's Liability Insurance - $500,000

2) Commercial General Liability Insurance - $1,000,000,

3) Comprehensive Automobile Liability Insurance - $1,000,000

The contractor shall not allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained submitted and approved by the Township. Approval of the insurance by the Township shall not relieve or decrease the liability of the Contractor hereunder. Certificates and policies of insurance covering each subcontractor shall also be filed with the Township before any work is begun by a subcontractor and shall expressly state the same indemnification language as indicated above.

VI. PRICING INFORMATION FOR PREPARATION OF BIDS

A. The Owner is exempt from any local, state or federal sales, use or excise tax. The owner will not pay for New Jersey State Sales and Use Tax that are included in any invoices.

B. Estimated Quantities (Open-End Contracts): The Owner has attempted to identify the item(s) and the estimated amounts of each item bid to cover its requirements; however, past experience shows that the amount ordered may be different than that submitted for bidding. The right is reserved to decrease or increase the quantities specified in the specifications pursuant to *N.J.A.C. 5:30-11.2* and *11.10*. NO MINIMUM PURCHASE IS IMPLIED OR GUARANTEED.

C. Contractor shall be responsible for obtaining any applicable permits or licenses from any government entity that has jurisdiction to require the same. All bids submitted shall have included this cost.

D. Bidders shall insert prices for furnishing goods and services required by these specifications. Prices shall be net, including any charges for packing, crating, containers, etc. All transportation charges shall be fully prepaid by the contractor, F.O.B. destination and placement at locations specified by the Owner. As specified, placement may require inside deliveries. No additional charges will be allowed for any transportation costs resulting from partial shipments made for the contractor's convenience.

E. In the event of a public emergency declared at the local, state or federal level prior to the expiration of the contract, if the Owner opts to extend terms and conditions of the contract, the contractor agrees to extend the terms and conditions of this specification, whether existing or expiring for no longer than six months, for goods and/or services for the duration of the emergency.

VII. STATUTORY AND OTHER REQUIREMENTS

The following are mandatory requirements of this bid and contract.

A. MANDATORY AFFIRMATIVE ACTION CERTIFICATION

No firm may be issued a contract unless it complies with the affirmative action provisions of *N.J.S.A. 10:5-31 et seq.* and *N.J.A.C. 17:27-1 et seq.* as administered by the Division of Purchase & Property Contract Compliance and Audit Unit (hereafter "Division") and provided below. The contract will include the language included in this specification.

1. Construction Contracts

Upon award of a construction contract, the contractor must access Form AA-201, the Initial Project Workforce Report. The Division of Public Contracts Equal Employment Opportunity Compliance has web-enabled Form AA-202, Monthly Project Workforce Report for Construction Contractors. Vendors and contractors may obtain these forms directly from the Division by accessing the following: www.nj.gov/treasury/contract_compliance. Contractors and vendors are responsible for sending copies of the forms to the Owner and the Division.

Proper completion and submission of these reports shall constitute evidence of the contractor's compliance with the regulations. Failure to submit these forms may result in the contract being terminated. The contractor also agrees to submit a copy of the Monthly Project Workforce Report, Form AA-202 once a month thereafter for the duration of the contract to the Owner and the Division. After notification of award, but prior to signing a construction contract the EEO/AA evidence must be submitted. The Owner shall retain the Affirmative Action evidence in the bid file for review by the Division.

All successful Construction Contractors must submit the following as evidence:

i. Complete Form AA-201 (Initial Project Workforce Report).

ii. This report must be submitted to the Owner after notification of award but prior to signing a contract.

iii. The contractor shall submit Form AA-202 (Monthly Project Workforce Report) to the Owner and to the Division of Public Contracts Equal Employment Opportunity Compliance once a month thereafter for the duration of the contract.

B. NEW JERSEY ANTI-DISCRIMINATION

The contract for this bid shall require that the contractor agrees not to discriminate in employment and agrees to abide by all anti-discrimination laws including but not limited to *N.J.S.A. 10:2-1* as included in this document.

C. AMERICANS WITH DISABILITIES ACT OF 1990

Discrimination on the basis of disability in contracting for the purchase of goods and services is prohibited. If awarded the contract, the contractor is required to comply with requirements related to the Americans with Disabilities Act as provided in this specification. The contractor is obligated to comply with the Act and to hold the Owner harmless for any violations committed under the contract.

D. STATEMENT OF OWNERSHIP

N.J.S.A. 52:25-24.2 provide that no business organization, regardless of form of ownership shall be awarded any contract for the performance of any work or the furnishing of any goods and services, unless, **prior to the receipt of the bid or accompanying the bid** of said business organization, bidders shall submit a statement setting forth the names and addresses of all persons and entities that own ten percent or more of its stock or interest of any type at all levels of ownership. The disclosure shall be continued until names and addresses of every non-corporate stockholder, and individual partner, and member exceeding the ten percent ownership, has been listed.

The included Statement of Ownership shall be completed and attached to the bid proposal. This requirement applies to all forms of business organizations, including, but not limited to, corporations and partnerships, publicly-owned corporations, limited partnerships, limited liability corporations, limited liability partnerships, sole proprietorship, and Subchapter S corporations. Failure to submit a disclosure document shall result in rejection of the bid as it cannot be remedied after bids have been opened.

Not-for-profit entities should fill in their name, check the not-for-profit box, and certify the form. No other information is necessary.

E. PROOF OF BUSINESS REGISTRATION

Pursuant to *N.J.S.A. 52:32-44*, the Owner ("Contracting Agency") is prohibited from entering into a contract with an entity unless the bidder/proposer/contractor, and each subcontractor that is required by law to be named in a bid/proposal/contract has a valid Business Registration Certificate on file with the Division of Revenue and Enterprise Services within the Department of the Treasury.

Prior to contract award or authorization, the contractor shall provide the Contracting Agency with its proof of business registration and that of any named subcontractor(s). Subcontractors named in a bid or other proposal shall provide proof of business registration to the bidder, who in turn, shall provide it to the Contracting Agency prior to the time a contract, purchase order, or other contracting document is awarded or authorized.

During the course of contract performance:

1. the contractor shall not enter into a contract with a subcontractor unless the subcontractor first provides the contractor with a valid proof of business registration.
2. the contractor shall maintain and submit to the Contracting Agency a list of subcontractors and their addresses that may be updated from time to time.
3. the contractor and any subcontractor providing goods or performing services under the contract, and each of their affiliates, shall collect and remit to the Director of the Division of Taxation in the Department of the Treasury, the use tax due pursuant to the Sales and Use Tax Act, (*N.J.S.A. 54:32B-1 et seq.*) on all sales of tangible personal property delivered into the State. Any questions in this regard can be directed to the Division of Taxation at 609-292-6400. Form NJ-REG can be filed online at www.state.nj.us/treasury/revenue/busregcert.shtml.

Before final payment is made under the contract, the contractor shall submit to the Contracting Agency a complete and accurate list of all subcontractors used and their addresses.

Pursuant to *N.J.S.A. 54:49-4.1*, a business organization that fails to provide a copy of a business registration as required, or that provides false business registration information, shall be liable for a penalty of $25 for each day of violation, not to exceed $50,000, for each proof of business registration not properly provided under a contract with a contracting agency.

Emergency Purchases or Contracts. For purchases of an emergent nature, the contractor shall provide its Business Registration Certificate within two weeks from the date of purchase or execution of the contract or prior to payment for goods or services, whichever is earlier.

F. DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN

N.J.S.A. 52:32-55 prohibits State and local public contracts with persons or entities engaging in certain investment activities in energy or finance sectors of Iran. Bidders must indicate if they comply with the law by certifying the form. Pursuant to *N.J.S.A. 40A:11-2.1* the owner is required to notify the New Jersey Attorney General if it determines a false certification has been submitted.

G. AMERICAN GOODS AND PRODUCTS TO BE USED WHERE POSSIBLE

Only manufactured and farm products of the United States, wherever available, shall be used pursuant to N.J.S.A. 40A:11-18.

If indicated by a ☒ on the Document Checklist, the following items are mandatory requirements of the bid proposal and contract.

H. DOCUMENT CHECKLIST

Bidder shall complete and sign the Bid Submission Document Checklist and include it in the bid submission. For construction bids, failure to submit the checklist is a fatal defect and the bid will be rejected. This document serves as a guide to bidders of the documents that are required to be submitted with the bid.

I. NON-COLLUSION AFFIDAVIT

The Affidavit shall be properly executed and submitted with the bid proposal.

J. NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW ACT

The manufacturer or supplier of chemical substances or mixtures shall label them in accordance with the N.J. Worker and Community Right to Know Law (*N.J.S.A. 34:5A-1 et seq.*, and *N.J.A.C 8:59-1.1 et seq.*). All direct use containers shall bear a label indicating the chemical name(s) and Chemical Abstracts Service number(s) of all hazardous substances in the container, and all other substances which are among the five most predominant substances in the container, or their trade secret registry number(s) pursuant to *N.J.A.C. 8:59-5*. "Container" means a receptacle used to hold a liquid, solid or gaseous substance such as bottles, bags, barrels, cans, cylinders, drums and cartons. (*N.J.A.C. 8:59-1.3*). Further, all applicable Material Safety Data Sheets (MSDS) - hazardous substance fact sheet - must be furnished. All containers which are stored at an owner's facilities by the contractor or subcontractors shall display RTK labeling. Vendors with questions concerning labeling should contact the New Jersey Department of Health and Senior Services Right to Know Program for assistance in developing proper labels (www.nj.gov/health/workplacehealthandsafety/right-to-know).

K. PREVAILING WAGE ACT

Pursuant to *N.J.S.A. 34:11-56.25 et seq.*, contractors on projects for public work shall adhere to all requirements of the New Jersey Prevailing Wage Act. The contractor shall be required to submit a certified payroll record to the owner within ten (10) days of the payment of the wages. In the event it is found that any worker, employed by the contractor or any subcontractor has been paid a rate of wages less than the prevailing wage required to be paid, the owner may terminate the contractor's or subcontractor's right to proceed with the work, or such part of the work as to which there has been a failure to pay required wages and the contractor and subcontractor then be required to continue the work to completion or otherwise.

The contractor is also responsible for obtaining and submitting all subcontractors' certified payroll records within the aforementioned time period. The contractor shall submit said certified payrolls in

the form set forth in *N.J.A.C. 12:60- 6.1(c)*. It is the contractor's responsibility to obtain any additional copies of the certified payroll form to be submitted by contacting the New Jersey Department of Labor and Workforce Development, Division of Workplace Standards. Additional information is available at http://lwd.dol.state.nj.us/labor/wagehour/wagerate/pwr_construction.html.

L. PUBLIC WORKS CONTRACTOR REGISTRATION ACT

N.J.S.A. 34:11-56.48 et seq. requires that a general or prime contractor and any listed subcontractors named in the contractor's bid proposal shall possess a certificate at the time the bid proposal is submitted. After bid proposals are received and prior to award of contract, the successful contractor shall submit a copy of the contractor's certification along with those of all listed subcontractors. All non-listed subcontractors and lower tier sub-subcontractors shall be registered prior to starting work on the project. It is the general contractor's responsibility that all non-listed sub- contractors at any tier have their certificate prior to starting work on the job.

Under the law a "contractor" is "a person, partnership, association, joint stock company, trust, corporation or other legal business entity or successor thereof who enters into a contract" which is subject to the provisions of the New Jersey Prevailing Wage Act [*N.J.S.A. 34:11-56.25, et seq.*] It applies to contractors based in New Jersey or in another state.

To register, a contractor must provide the State Department of Labor with a full and accurately completed application form. The form is available online at www.state.nj.us/labor/lsse/lspubcon.html.

N.J.S.A. 34:11-56.55 specifically prohibits accepting applications for registration as a substitute for a certificate of registration.

M. EQUIPMENT CERTIFICATION

Bidder shall certify on the Equipment Certification form that they control or have access to equipment necessary to do the required work if awarded the contract. If the bidder does not own or lease the equipment, a certification from the owner of the equipment that the bidder will have access to the equipment is required with the bid. (*N.J.S.A. 40:11-20*)

VIII. METHOD OF CONTRACT AWARD

A. A bid which does not conform with the requirements of Form of Bids or which contains any addition, condition or other irregularity is subject to the Owner's rights set forth below.

B. The Bidder acknowledges the right of the Owner to conduct a Bid verification Meeting(s) with the apparent low bidder(s) prior to contract award. The purpose of the meeting is to review in detail the requirements of the Contract Documents in order to verify the Bidder's understanding of the project, and evaluate the validity of the bid and the bidder's ability to meet the requirements of the Contract in accordance with his bid. The bidder further acknowledges the Owner's right of bid evaluation set forth below and the intention to make a written record of the Bid Verification Meeting a part of the written Agreement/Contract with the Owner.

C. Should the bidder refuse to participate in the bid verification process or to subsequently enter into such Contract or fail to furnish the required bonds and insurance, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

D. The length of the contract shall be stated in the Special Conditions (Pg 42). Pursuant to requirements of *N.J.A.C. 5:30-5.1 et seq.*, any contract resulting from this bid shall be subject to the availability and appropriation of sufficient funds annually. Please see SECTION X, TERMINATION OF CONTRACT, Sub-section E, for additional information.

E. If the award is to be made on the basis of a base bid only, it shall be made to that responsible bidder submitting the lowest base bid.

F. If the award is to be made on the basis of a combination of a base bid with selected options, it shall be made to that responsible bidder submitting the lowest net bid.

G. The owner may also elect to award the contract on the basis of unit prices.

H. The form of contract shall be submitted by the owner to the successful bidder. Terms of the specifications/bid package prevail. Bidder exceptions must be formally accepted by the owner; material exceptions shall not be approved.

I. Successful bidder/respondent shall complete W-9 Form and submit to the owner prior to contract award. The form is available at the following link: www.irs.gov/pub/irs-pdf/fw9.pdf

IX. CAUSES FOR REJECTING BIDS

The Owner reserves the right to waive any minor irregularities or informalities in the bids and accept the bid, which in the Owner's judgment will best serve its interests. Bids may be rejected for any of the following reasons.

A. All bids pursuant to *N.J.S.A. 40A:11-13.2*;

B. If more than one bid is received from an individual, firm or partnership, corporation or association under the same name;

C. Multiple bids from an agent representing competing bidders;

D. The bid is inappropriately unbalanced;

E. The bidder is determined to possess, pursuant to *N.J.S.A. 40A:11-4b*, Prior Negative Experience; or,

F. If the successful bidder fails to enter into a contract within 21 days, Sundays and holidays excepted, or as otherwise agreed upon by the parties to the contract. In this case at its option, the owner may accept the bid of the next lowest responsible bidder. (*N.J.S.A. 40A:11-24b*)

X. TERMINATION OF CONTRACT

A. If, through any cause, the contractor shall fail to fulfill in a timely and proper manner obligations under the contract or if the contractor shall violate any of the requirements of the contract, the Owner shall there upon have the right to terminate the contract by giving written notice to the contractor of such termination and specifying the effective date of termination. Such termination shall relieve the Owner of any obligation for balances to the contractor of any sum or sums set forth in the contract. Owner will pay only for goods and services accepted prior to termination.

B. Notwithstanding the above, the contractor shall not be relieved of liability to the Owner for damages sustained by the owner by virtue of any breach of the contract by the contractor and the Owner may withhold any payments to the contractor for the purpose of compensation until such time as the exact amount of the damage due the owner from the contractor is determined.

C. The contractor agrees to indemnify and hold the Owner harmless from any liability to subcontractors/suppliers concerning payment for work performed or goods supplied arising out of the lawful termination of the contract by the owner under this provision.

D. In case of default by the contractor, the Owner may procure the goods or services from other sources and hold the contractor responsible for any excess cost.

E. Continuation of the terms of the contract beyond the fiscal year is contingent on availability of funds in the following year's budget. In the event of unavailability of such funds, the Owner reserves the right to cancel the contract.

F. It is understood by all parties that if, during the life of the contract, the contractor disposes of his/her business concern by acquisition, novation, merger, sale and or/transfer or by any means convey his/her interest(s) to another party, all obligations are transferred to that new party. In this event, the new Owner(s) will be required to submit all documentation/legal instruments that were required in the original bid/contract. Any change shall be approved by the Owner.

G. The contractor will not assign any interest in the contract and shall not transfer any interest in the same without the prior written consent of the Owner.

H. The Owner may terminate the contract for convenience by providing 60 calendar days advanced notice to the contractor.

I. The contractor shall maintain all documentation related to products, transactions or services under this contract for a period of five years from the date of final payment. Such records shall be made available to the New Jersey Office of the State Comptroller upon request.

J. For contracts that exceed one year, each fiscal year payment obligation of the Owner is conditioned upon the availability of Owner funds appropriated or allocated for the payment of such an obligation. If funds are not allocated and available for the continuance of any services performed by the bidder awarded the contract (contractor) hereunder, whether in whole or in part, the Owner at the end of any particular fiscal year may terminate such services. The Owner will notify the contractor in writing immediately of any services that will be affected by a shortage of appropriated funds. This provision shall not be construed so as to permit the Owner to terminate the contract during the term, or any service hereunder, merely in order to acquire identical services from another contractor.

K. Neither party shall be responsible for any resulting loss or obligation to fulfill duties as specified in any of the terms or provisions of a contract if the fulfillment of any term or provision of the contract is delayed or prevented by any revolutions, insurrections, riots, wars, acts of enemies, national emergencies, strikes, floods, fires, acts of God, or by any cause not within the control of the party whose performance is interfered with which by the exercise of reasonable diligence such party is unable to prevent. Additionally, if the fulfillment of any of the terms and provisions of the contract is delayed or prevented by any court order, or action or injunction or other such agreement, the contract shall become voidable by the owner by notice to the parties.

XI. PAYMENT

A. No payment will be made unless duly authorized by the Owner's authorized representative and accompanied by proper documentation.

B. Payment will be made in accordance with the Owner's policy and procedures. Invoices shall specify, in detail, the period for which payment is claimed, the services performed during the prescribed period, the amount claimed and correlation between the services claimed and this proposal.

C. The Owner may withhold all or partial payments on account of subsequently discovered evidence including but not limited to the following:

1. Deliverables not complying with the project specification;
2. Claims filed or responsible evidence indicating probability of filing claims;
3. A reasonable doubt that the contract can be completed for the balance then unpaid.

When the above grounds are removed, payment shall be made for amounts withheld because of them.

D. Public funds may be used to pay only for goods delivered or services rendered. The owner shall not pay penalties and/or interest on overdue bills unless otherwise required by law. No employee is authorized to sign a letter of credit or any other document that represents a legal commitment on the part of the owner to pay additional fees.

E. PROMPT PAYMENT OF CONSTRUCTION CONTRACTS

Prime Contractor shall be paid according to the guidelines set forth in *N.J.S.A. 2A:30A-1 et seq.* provided:

1. The contractor has performed in accordance with the contract; and
2. The work has been approved and certified by the Township's authorized representative, and
3. That a written statement identifying any discrepancies in the work has not been sent by the Township to the contractor explaining any amount withheld and the reason for withholding payment.
4. If any or all of the work associated with this bill is disputed, the portion of work which is not being questioned shall be paid in accordance with *N.J.S.A. 2A:30A-1 et seq.* A written explanation of any discrepancies shall be sent to the contractor no more than twenty days from the billing date.

If the foregoing conditions have been met, the Township shall pay the bill not more than thirty (30) calendar days after the billing date, or after the next Council Meeting date, whichever is less.

XII. OTHER PROVISIONS

A. Both parties agree to comply with all requirements of the Federal Health Insurance Portability and Accountability Act of 1996 ("HIPAA") as maybe amended from time to time, and the corresponding HIPAA regulations for the confidentiality and security of medical information. If awarded the bid, the contractor shall:

1. Not use or disclose protected health information other than as permitted or required by law
2. Use appropriate safeguards to protect the confidentiality of the information
3. Report any use or disclosure not permitted

The contractor, by execution of the contract, shall thereby indemnify and hold the Owner harmless from any and all liabilities, claims, actions, costs and penalties which may be incurred as the result of the failure of the contractor to comply with the requirements of the Health Insurance Portability and Accountability Act (HIPAA) or any other statute or case law protecting the privacy of persons using its services.

B. The owner shall retain all of its rights and interest in any and all documents and property both hard copy and digital furnished by the Owner to the successful bidder (contractor) for the purpose of assisting the contractor in the performance of this contract. None of the documents and/or property shall, without the written consent of the owner, be disclosed to others or used by the contractor or permitted by the contractor to be used by their parties at any time except in the performance of the resulting contract.

The contractor shall not have the right to use, sell, or disclose the total of the interim or final work products, or make available to third parties, without the prior written consent of the Owner. Any information supplied to the owner may be required to be supplied on CD/DVD or USB flash drive media compatible with Microsoft Windows and Microsoft Office Suite 2010 or greater.

C. Under state and federal statutes, certain government records are protected from public disclosure. The owner, the contractor and any subcontractors have a responsibility and an obligation to safeguard from public access an employee's personal information with which it has been entrusted when disclosure thereof would violate the employee's reasonable expectation of privacy. All payroll, personnel and health insurance related files are confidential. Additionally, the contractor and any subcontractors may be privy to sensitive law enforcement information or investigations during their review which must remain confidential. The owner retains the right to make any public disclosure under the law. Also, among government records deemed confidential are administrative or technical information regarding computer hardware, software and networks that, if disclosed, would jeopardize computer security. The contractor and any subcontractor(s) are prohibited from the sale or distribution of all supplied information to any third party.

D. Proof of licensure for any activity regulated by the State of New Jersey and required to do the work required under this specification, for either the firm or the person responsible for the work, shall be provided as required by the owner.

E. When Required - Criminal Background Checks, Harassment, Intimidation and Bullying

1. After award of the contract, but before the commencement of work under the contract, the contractor shall provide proof to the Owner that each worker assigned to a project involving contact with children has had a criminal history background check, and that said check indicates that no criminal history record information exists on file in either the Identification Division of the Federal Bureau of Investigation or the State Bureau of Identification which would disqualify said employee from employment . Failure to provide proof of a criminal history background check for any employee at a school location will be deemed a breach of contract by the Contractor.
2. If it is discovered during the course of the contract that either: (a) an employee with disqualifying criminal history record information on file or (b) any employee who has not had a criminal history background check is working at a contract school location, said employee is to be immediately removed by the Contractor. Failure to immediately remove said employee either upon notification by the Owner or discovery by the contractor shall constitute a material breach of contract. Proof of

clearance by the Department of Education or a temporary waiver pending receipt of qualification to work from the Department of Education shall provide proof to the Owner prior to assignment and commencement of work of each employee.

3. Pursuant to P.L. 2010, c.122, all contracted service providers, defined as any organization that is a party to a contract or agreement for services with the Owner, and all employees of contracted service providers are required to comply with the provisions of the Owner's anti-bullying policy. Contracted service providers and their employees shall verbally report any act of harassment, intimidation or bullying of a student on the same day on which the act was witnessed, or on the same day on which reliable information that a student has been subject to harassment, intimidation or bullying was received, and shall report the same in writing within two (2) school days. All verbal and written reports of harassment, intimidation or bullying of a student shall be made to the school principal or to any school administrator or safe schools resource officer. Reports may be made anonymously in accordance with the reporting procedure as set forth in the anti-bullying policy. The Owner shall provide to all contracted service providers and their employees a copy of the Owner's anti-bullying policy and information regarding the policy.

F. Retainage - Retainage in an amount of 2% of the contract amount will be withheld until such time as the Township and/or the Township's identified representative has determined that the work has been completed to such a point that it may be released.

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

TOWNSHIP OF PEQUANNOCK, NEW JERSEY
VENDOR INFORMATION SHEET

COMPANY NAME: Midwest Construction Inc

ADDRESS: 19 Dead River Road

Warren NJ 07059

PHONE NUMBER: 973-412-8880

FAX NUMBER: 973-412-8885

FEDERAL I.D. NUMBER: 20-1043185

NAME OF PERSON PREPARING BID: Manuel Araujo

PHONE NUMBER: 973-412-8880 EXT.

CONTACT PERSON FOR CORRESPONDENCE REGARDING THE PROPOSAL

NAME: Midwest Construction Inc - Manuel Araujo

ADDRESS: 19 Dead River Road

Warren NJ 07059

PHONE: 973-412-8880 FAX NUMBER: 973-412-8885

E-MAIL ADDRESS: midwest2@yahoo.com

PROJECT COORDINATOR

COMPANY NAME: Midwest Construction Inc

ADDRESS: 19 Dead River Road Warren NJ 07059

PHONE NUMBER: 973-412-8880

CELL PHONE NUMBER: 973-332-2384

FAX NUMBER: 973-412-8885

PERSON TO CONTACT: Sam Mahyar

EMAIL ADDRESS: midwest2@yahoo.com

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

AS A PROFESSIONAL COURTESY,

PLEASE PLACE HERE

A PHOTOCOPY OF

NEW JERSEY

BUSINESS REGISTRATION

CERTIFICATE

&

NEW JERSEY PUBLIC WORKS

CONTRACTOR REGISTRATION

CERTIFICATE (IF APPLICABLE)

FOR THE PRINCIPAL BIDDER

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

(REVISED 4/10)

EXHIBIT B
MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A. 10:5-31 et seq. (P.L.1975, c.127) & N.J.A.C. 7:27-1.1 et seq.

CONSTRUCTION CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor will send to each labor union, with which it has a collective bargaining agreement, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer, pursuant to *N.J.S.A. 10:5-31 et seq.*, as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by *N.J.A.C. 17:27-7.2*; provided, however, that the Department of LWD, Construction EEO Monitoring Program, may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures prescribed by the following provisions, A, B, and C, as long as the Department of LWD, Construction EEO Monitoring Program is satisfied that the contractor or subcontractor is employing workers provided by a union which provides evidence, in accordance with standards prescribed by the Department of LWD, Construction EEO Monitoring Program, that its percentage of active "card carrying" members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with *N.J.A.C. 17:27-7.2*. The contractor or subcontractor agrees that a good faith effort shall include compliance with the following procedures:

A. If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three business days of the contract award, seek assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to *N.J.S.A. 10:5-31 et. seq.*, as supplemented and amended from time to time and the Americans with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union at least five business days prior

to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the hiring or scheduling procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

B. If good faith efforts to meet targeted employment goals have not or cannot be met for each construction trade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:

1) To notify the public agency compliance officer, the Department of LWD, Construction EEO Monitoring Program, and minority and women referral organizations listed by the Division pursuant to *N.J.A.C. 17:27-5.3*, of its workforce needs, and request referral of minority and women workers;

2) To notify any minority and women workers who have been listed with it as awaiting available vacancies;

3) Prior to commencement of work, to request that the local construction trade union refer minority and women workers to fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;

4) To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;

5) If it is necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and non-discrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;

6) To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:

i. The contactor or subcontractor shall interview the referred minority or women worker.

ii. If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcontractor shall hire or schedule those individuals who satisfy appropriate qualification standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that the individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency, provided the referral agency is acceptable to the Department of LWD, Construction EEO Monitoring Program. If necessary, the contractor or subcontractor shall hire or schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provisions of (C) below.

iii. The name of any interested women or minority individual shall be maintained on a waiting list, and shall be considered for employment as described in (i) above, whenever vacancies occur. At the request of the Department of LWD, Construction EEO Monitoring Program, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.

iv. If, for any reason, said contractor or subcontractor determines that a minority individual or a woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the determination in its files, and send a copy to the public agency compliance officer and to the Department of LWD, Construction EEO Monitoring Program.

7) To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Department of LWD, Construction EEO Monitoring Program and submitted promptly to the Department of LWD, Construction EEO Monitoring Program upon request.

C. The contractor or subcontractor agrees that nothing contained in (B) above shall preclude the contractor or subcontractor from complying with the union hiring hall or apprentice- ship policies in any applicable collective bargaining agreement or union hiring hall arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in numbers which result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ratio established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that, in implementing the procedures of (B) above, it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union.

After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Department of LWD, Construction EEO Monitoring Program an initial project workforce report (Form AA-201) electronically provided to the public agency by the Department of LWD, Construction EEO Monitoring Program, through its website, for distribution to and completion by the contractor, in accordance with *N.J.A.C. 17:27-7*. The contractor also agrees to submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of this contract to the Department of LWD, Construction EEO Monitoring Program, and to the public agency compliance officer.

The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the-job and/or off-the job programs for outreach and training of minorities and women.

D. The contractor and its subcontractors shall furnish such reports or other documents to the Department of LWD, Construction EEO Monitoring Program as may be requested by the Department of LWD, Construction EEO Monitoring Program from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Department of LWD, Construction EEO Monitoring Program for conducting a compliance investigation pursuant to *N.J.A.C. 17:27-1.1 et seq.*

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

AFFIRMATIVE ACTION COMPLIANCE AFFIDAVIT

N.J.S.A. 10:5-31 et seq. and N.J.A.C.17:27

CONSTRUCTION CONTRACTS

Upon award of a construction contract, the contractor must access Form AA-201, the Initial Project Workforce Report. The Division of Public Contracts Equal Employment Opportunity Compliance has web-enabled Form AA-202, Monthly Project Workforce Report for Construction Contractors. Vendors and contractors may obtain these forms directly from the Division by accessing the following: www.nj.gov/treasury/contract_compliance. Contractors and vendors are responsible for sending copies of the forms to the Owner.

Proper completion and submission of these reports shall constitute evidence of the contractor's compliance with the regulations. Failure to submit these forms may result in the contract being terminated. The contractor also agrees to submit a copy of the Monthly Project Workforce Report, Form AA-202 once a month thereafter for the duration of the contract to the Owner and the Division. After notification of award, but prior to signing a construction contract the EEO/AA evidence must be submitted. The Owner shall retain the Affirmative Action evidence in the bid file for review by the Division.

All successful Construction Contractors must submit the following as evidence:

1. Complete Form AA-201 (Initial Project Workforce Report).

2. This report must be submitted to the Owner after notification of award but prior to signing a contract.

3. The contractor shall submit Form AA-202 (Monthly Project Workforce Report) to the Owner and to the Division of Public Contracts Equal Employment Opportunity Compliance once a month thereafter for the duration of the contract.

The undersigned vendor certifies that he/she is aware of the commitment to comply with the requirements of *N.J.S.A. 10:5-31* and *N.J.A.C. 17:27* and agrees to furnish the required forms of evidence.

The undersigned contractor further understands that his/her bid shall be rejected as non-responsive if said contractor fails to comply with the requirements of *N.J.S.A. 10:5-31* and *N.J.A.C. 17:27.*

COMPANY: Midwest Construction inc SIGNATURE: [signature]

PRINT NAME: Manuel Araujo TITLE: President

DATE: 4/8/2021

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

NEW JERSEY ANTI-DISCRIMINATION PROVISIONS

N.J.S.A. 10:2-1 ET SEQ.

Pursuant to N.J.S.A. 10:2-1, if awarded a contract, the contractor agrees that:

a. In the hiring of persons for the performance of work under this contract or any subcontract hereunder, or for the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under this contract, no contractor, nor any person acting on behalf of such contractor or subcontractor, shall, by reason of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex, discriminate against any person who is qualified and available to perform the work to which the employment relates;

b. No contractor, subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee engaged in the performance of work under this contract or any subcontract hereunder, or engaged in the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under such contract, on account of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex;

c. There may be deducted from the amount payable to the contractor by the contracting public agency, under this contract, a penalty of $50.00 for each person for each calendar day during which such person is discriminated against or intimidated in violation of the provisions of the contract; and

d. This contract may be canceled or terminated by the contracting public agency, and all money due or to become due hereunder may be forfeited, for any violation of this section of the contract occurring after notice to the contractor from the contracting public agency of any prior violation of this section of the contract.

No provision in this section shall be construed to prevent a board of education from designating that a contract, subcontract or other means of procurement of goods, services, equipment or construction shall be awarded to a small business enterprise, minority business enterprise or a women's business enterprise pursuant to P.L.1985, c.490 (*C.18A:18A-51 et seq.*).

The undersigned contractor further understands that his/her bid shall be rejected as non-responsive if said contractor fails to comply with the requirements of *N.J.S.A. 10:2-1 et seq.*

COMPANY: Midwest Construction Inc SIGNATURE: [signature]

PRINT NAME: Manuel Araujo TITLE: President

DATE: 4/8/2021

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

AMERICANS WITH DISABILITIES ACT OF 1990

Equal Opportunity for Individuals with Disability

The contractor and the Township of Pequannock, (hereafter "Township") do hereby agree that the provisions of Title 11 of the Americans With Disabilities Act of 1990 (the "Act") (42 U.S.C. S121 01 et seq.), which prohibits discrimination on the basis of disability by public entities in all services, programs, and activities provided or made available by public entities, and the rules and regulations promulgated pursuant there unto, are made a part of this contract.

In providing any aid, benefit, or service on behalf of the Township pursuant to this contract, the contractor agrees that the performance shall be in strict compliance with the Act. In the event that the contractor, its agents, servants, employees, or subcontractors violate or are alleged to have violated the Act during the performance of this contract, the contractor shall defend the Township in any action or administrative proceeding commenced pursuant to this Act.

The contractor shall indemnify, protect, and save harmless the Township, its agents, servants, and employees from and against any and all suits, claims, losses, demands, or damages, of whatever kind or nature arising out of or claimed to arise out of the alleged violation. The contractor shall, at its own expense, appear, defend, and pay any and all charges for legal services and any and all costs and other expenses arising from such action or administrative proceeding or incurred in connection therewith. In any and all complaints brought pursuant to the Township's grievance procedure, the contractor agrees to abide by any decision of the Township which is rendered pursuant to said grievance procedure. If any action or administrative proceeding results in an award of damages against the Township, or if the Township incurs any expense to cure a violation of the ADA which has been brought pursuant to its grievance procedure, the contractor shall satisfy and discharge the same at its own expense.

The Township shall, as soon as practicable after a claim has been made against it, give written notice thereof to the contractor along with full and complete particulars of the claim, If any action or administrative proceeding is brought against the Township or any of its agents, servants, and employees, the Township shall expeditiously forward or have forwarded to the contractor every demand, complaint, notice, summons, pleading, or other process received by the Township or its representatives.

It is expressly agreed and understood that any approval by the Township of the services provided by the contractor pursuant to this contract will not relieve the contractor of the obligation to comply with the Act and to defend, indemnify, protect, and save harmless the Township pursuant to this paragraph.

It is further agreed and understood that the Township assumes no obligation to indemnify or save harmless the contractor, its agents, servants, employees and subcontractors for any claim which may arise out of their performance of this Agreement. Furthermore, the contractor expressly understands and agrees that the provisions of this indemnification clause shall in no way limit the contractor's obligations assumed in this Agreement, nor shall they be construed to relieve the contractor from any liability, nor preclude the Township from taking any other actions available to it under any other provisions of the Agreement or otherwise at law.

The undersigned contractor further understands that his/her bid shall be rejected as non-responsive if said contractor fails to comply with the requirements of Title 11 of the Americans With Disabilities Act of 1990 (the "Act") (42 U.S.C. S121 01 et seq).

COMPANY: Midwest Construction inc SIGNATURE: [signature]

PRINT NAME: Manuel Araujo TITLE: President

DATE: 4/8/2021

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

STATEMENT OF OWNERSHIP
OWNERSHIP DISCLOSURE CERTIFICATION FORM

Required pursuant to N.J.S.A. 52:25-24.2 (P.L. 1977, c.33, as amended by P.L. 2016, c.43)

This Statement Shall Be Included with All Bid and Proposal Submissions

Name of Business: Midwest Construction Inc

Address of Business: 19 Dead River Road Wallen NJ 07059

Name of person completing this form: Manuel Araujo

N.J.S.A. 52:25-24.2:

"No corporation, partnership, or limited liability company shall be awarded any contract nor shall any agreement be entered into for the performance of any work or the furnishing of any materials or supplies, unless prior to the receipt of the bid or proposal, or accompanying the bid or proposal of said corporation, said partnership, or said limited liability company there is submitted a statement setting forth the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be.

If one or more such stockholder or partner or member is itself a corporation or partnership or limited liability company, the stockholders holding 10 percent or more of that corporation's stock, or the individual partners owning 10 percent or greater interest in that partnership, or the members owning 10 percent or greater interest in that limited liability company, as the case may be, shall also be listed. The disclosure shall be continued until names and addresses of every noncorporate stockholder, and individual partner, and member, exceeding the 10 percent Ownership criteria established in this act, has been listed.

To comply with this section, a bidder with any direct or indirect parent entity which is publicly traded may submit the name and address of each publicly traded entity and the name and address of each person that holds a 10 percent or greater beneficial interest in the publicly traded entity as of the last annual filing with the federal Securities and Exchange Commission or the foreign equivalent, and, if there is any person that holds a 10 percent or greater beneficial interest, also shall submit links to the websites containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent and the relevant page numbers of the filings that contain the information on each person that holds a 10 percent or greater beneficial interest."

The Attorney General has advised that the provisions of N.J.S.A. 52:25-24.2, which refer to corporations and partnerships apply to limited partnerships, limited liability partnerships, and Subchapter S corporations.

CONTINUED ON NEXT PAGE

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

STATEMENT OF OWNERSHIP
OWNERSHIP DISCLOSURE CERTIFICATION FORM (CONTINUED)

Required pursuant to N.J.S.A. 52:25-24.2 (P.L. 1977, c.33, as amended by P.L. 2016, c.43)

This Ownership Disclosure Certification form shall be completed, signed and notarized.

Failure of the bidder/proposer to submit the required information is cause for automatic rejection of the bid or proposal

PART I

Check the box that represents the type of business organization:

- ☐ Sole Proprietorship (skip Parts II and III, sign and notarize at the end)
- ☐ Non-Profit Corporation (skip Parts II and III, sign and notarize at the end)
- ☐ Partnership ☐ Limited Partnership ☐ Limited Liability Partnership
- ☐ Limited Liability Company
- ☒ For-profit Corporation (including Subchapters C and S or Professional Corporation)
- ☐ Other (be specific): _____

PART II

☐ I certify that the list on the next page contains the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be.

OR

☑ I certify that no one stockholder in the corporation owns 10 percent or more of its stock, of any class, or no individual partner in the partnership owns a 10 percent or greater interest therein, or that no member in the limited liability company owns a 10 percent or greater interest therein, as the case may be.

CONTINUED ON NEXT PAGE

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STATEMENT OF OWNERSHIP
OWNERSHIP DISCLOSURE CERTIFICATION FORM (CONTINUED)

Required pursuant to N.J.S.A. 52:25-24.2 (P.L. 1977, c.33, as amended by P.L. 2016, c.43)

Sign and notarize the form below, and, if necessary, complete the list below. (Please attach additional sheets if more space is needed):

Name: _____ Name: _____

Home Address: _____ Home Address: _____

_____ _____

Name: _____ Name: _____

Home Address: _____ Home Address: _____

_____ _____

Name: _____ Name: _____

Home Address: _____ Home Address: _____

_____ _____

Name: _____ Name: _____

Home Address: _____ Home Address: _____

_____ _____

Name: _____ Name: _____

Home Address: _____ Home Address: _____

_____ _____

Name: _____ Name: _____

Home Address: _____ Home Address: _____

_____ _____

CONTINUED ON NEXT PAGE

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STATEMENT OF OWNERSHIP
OWNERSHIP DISCLOSURE CERTIFICATION FORM (CONTINUED)

Required pursuant to N.J.S.A. 52:25-24.2 (P.L. 1977, c.33, as amended by P.L. 2016, c.43)

PART III

Any Direct or Indirect Parent Entity Which is Publicly Traded:

"To comply with this section, a bidder with any direct or indirect parent entity which is publicly traded may submit the name and address of each publicly traded entity and the name and address of each person that holds a 10 percent or greater beneficial interest in the publicly traded entity as of the last annual filing with the federal Securities and Exchange Commission or the foreign equivalent, and, if there is any person that holds a 10 percent or greater beneficial interest, also shall submit links to the websites containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent and the relevant page numbers of the filings that contain the information on each person that holds a 10 percent or greater beneficial interest."

☐ Pages attached with name and address of each publicly traded entity as well as the name and address of each person that holds a 10 percent or greater beneficial interest.

OR

☐ Submit here the links to the Websites (URLs) containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent.

_____

_____

AND

☐ Submit here the relevant page numbers of the filings containing the information on each person holding a 10 percent or greater beneficial interest.

_____

_____

Subscribed and sworn before me this
8th day of April, 2021

Jeny P. Barroqueiro
Notary Public

Commission Expires: 12/2/2024
(Notary Stamp/Seal)

Manuel Araujo
Affiant Signature

Manuel Araujo - President
Affiant Name and Title

(Corporate Seal, if appropriate)

END OF STATEMENT OF OWNERSHIP

Jeny P Barroqueiro
Notary Public
New Jersey
My Commission Expires 12-2-24
No. 50005746

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

ACKNOWLEDGEMENT OF PRINCIPAL

STATE OF New Jersey)
) SS:
COUNTY OF Somerset)

IF A CORPORATION

BE IT REMEMBERED, that on this 8th day of April in the year 2021, AND before me, the subscriber, a Notary Public of the State of New Jersey personally appeared who, being by me duty sworn on his/her oath, doth depose and make proof to my satisfaction the he is the Secretary or Assistant Secretary of Midwest Construction Inc, the Corporation named in the within Instrument; that Manuel Araujo is the President of said Corporation; that the execution, as well as the making of this Instrument has been duly authorized by a proper resolution of the Board of Directors of said Corporation; that deponent well knows the corporation seal of said Corporation; and the seal affixed to said Instrument is such Corporation seal and was thereto affixed and said Instrument signed and delivered by said President, as and for h voluntary act and deed and as and for the voluntary act and deed of said Corporation; in presence of deponent, who thereupon subscribed his/her name thereto as witness.

Signature of Secretary or Manuel Araujo
Signature of Assistant Secretary

IF A PARTNERSHIP

Sworn to and subscribed before me, a Notary Public in the State of _____.
On this _____ day of _____, 202___, before me personally came _____ and known to me to be one of the members of the firm of _____ described in and who executed the foregoing instrument, and he acknowledged to me that he executed the same as for the act and deed of said firm.

_____
Signature

IF AN INDIVIDUAL

Sworn to and subscribed before me, a Notary Public in the State of _____.
On this _____ day of _____, 202___ before me personally came _____ known to me to be the person described in and who executed the foregoing instrument, and acknowledged that he executed the same, as for his voluntary act and deed.

_____
Signature

Subscribed and sworn to before me this
8th day of April, 2021

Jeny P Barroqueiro
Notary Public

Commission Expires: 12/2/2024
(Notary Stamp/Seal)

Jeny P Barroqueiro
Notary Public
New Jersey
My Commission Expires 12-2-24
No. 50005746

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PRINCIPAL SUBCONTRACTOR DECLARATION

The bidder if awarded the contract must perform a minimum of fifty (50%) of the work by their own forces and the bidder shall not broker or sublet any portion of the contract that would exceed fifty (50%) of the Total Contract Price. The bidder must list any and all subcontractors expected to be used in the performance of this contract with the expected contract price for the subcontractor, which shall be consistent with the unit prices contained within this proposal. Failure to list the subcontractor and/or contract price shall deem this proposal unresponsive and incomplete and rejected by the Township. The Bidder shall set forth the Nature of Work for which the subcontractor has submitted a price quote and which the bidder has agreed to award to each subcontractor should the bidder be awarded the contract.

The bidder shall be required to supply other required forms for each subcontractor, including but not limited to, the subcontractor's Statement of Ownership and Certificate of Employee Information, by or before contract execution.

The undersigned bidder declares that the subcontractors listed below will be used as subcontractors to complete certain portions of the work in this project. The bidder shall not list alternate subcontractors.

SUBCONTRACTOR NAME	ADDRESS	NATURE OF WORK	CONTRACT PRICE

☑ **CHECK HERE IF NO SUBCONTRACTORS WILL BE USED ON THIS PROJECT**

ATTACH ADDITIONAL SHEETS IF NECESSARY

NAME OF BIDDER: Midwest Construction inc

ADDRESS: 19 Dead River Road Warren NJ 07059

BIDDERS SIGNATURE: _____ DATE: 4/8/2021

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

AS A PROFESSIONAL COURTESY, PLEASE PLACE HERE A PHOTOCOPY OF NEW JERSEY **BUSINESS REGISTRATION CERTIFICATE** & **NEW JERSEY PUBLIC WORKS CONTRACTOR REGISTRATION CERTIFICATE (IF APPLICABLE)** FOR ALL PRINCIPAL SUBCONTRACTORS LISTED ON PREVIOUS PAGE

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

NON-COLLUSION AFFIDAVIT

STATE OF New Jersey)
) SS:
COUNTY OF Somerset)

I, Manuel Araujo (name of affiant) residing in Warren (name of municipality)

in the County of Somerset and State of New Jersey

of full age, being duly sworn according to law on my oath depose and say that:

I am President (title or position) of the firm of Midwest (name of firm)

Construction Inc the bidder making this Proposal for the proposal entitled

Ramapo Road Sidewalk Replacement (title of bid proposal), and that I executed the said proposal with

full authority to do so that said bidder has not, directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named project; and that all statements contained in said proposal and in this affidavit are true and correct, and made with full knowledge that the Township of Pequannock relies upon the truth of the statements contained in said Proposal and in the statements contained in this affidavit in awarding the contract for the said project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by

Midwest Construction Inc.

Signature

Manuel Araujo
Type or Print name

Subscribed and sworn to before me this
8th day of April, 2021

Jeny P. Barroqueiro
Notary Public

Commission Expires: 12/2/2024

(Notary Stamp/Seal)

Jeny P Barroqueiro
Notary Public
New Jersey
My Commission Expires 12-2-24
No. 50005746

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

PREVAILING WAGE COMPLIANCE DECLARATION

(New Jersey Prevailing Wage Act, Chapter 150, P.L. 1963, as amended)

The contractor hereby agrees to comply in all respect with the New Jersey Prevailing Wage Act, Chapter 150, P.L. 1963, as amended. A copy of the prevailing wage rates pertaining to the work and issued by the New Jersey Department of Labor and Industry entitled "Prevailing Wage Rate Determination" are enclosed in Appendix A of these specifications and may be obtained from the New Jersey Department of Labor and Industry. Workers shall be paid not less than the prevailing wage rate. In the event it is found that any worker employed by the contractor or any subcontractor covered by the contract herein has been paid a rate of wages less than the prevailing rate required to be paid by such contract, the Township may terminate the contractor's or subcontractor's right to proceed with the work or such part of the work as to which there has been a failure to pay required wages and to prosecute the work to completion or otherwise. The contractor and his sureties shall be liable to the Owner for any excess costs occasioned thereby.

Before final payment is made by or on behalf of the Township of any sum or sums due to the work, the contractor or subcontractor shall file with the Township, written statements in form satisfactory to the Commissioner of Labor and Workforce Development certifying to the amounts then due and owing from such contractor or subcontractor filing such statement to any and all workmen for wages due on account of the work, setting forth therein the names of the persons whose wages are unpaid and the amount due to each respectively which statement shall be certified by the oath of the contractor or subcontractor as the case may be in accordance with the said New Jersey Prevailing Wage Act.

The prevailing wage rate shall be determined by the Commissioner of Labor and Workforce Development or his/her duly authorized deputy or representative.

The undersigned is an (individual) (partnership) (corporation) under the laws of the State of New Jersey, having principal offices at 19 Dead River Rd Warren NJ 07059

Bidder: Midwest Construction Inc

Signature: [signature]

Name: Manuel Araujo

Title: President

Date: 4/8/2021

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN

[Required pursuant with N.J.S.A. 52-32:55 et seq.]

PART 1: CERTIFICATION

BIDDERS MUST COMPLETE PART 1 BY CHECKING EITHER BOX.
FAILURE TO CHECK ON OF THE BOXES WILL RENDER THE PROPOSAL NON-RESPONSIVE.

Pursuant to Public Law 2012, c. 25 (*N.J.S.A. 52-32:55 et seq.*), any person or entity (bidder) that submits a bid or proposal of otherwise proposes to enter into or renew a contract must complete the certification below to attest, under penalty of perjury, that neither the person or entity, nor any of its parents, subsidiaries, or affiliates, is identified on the Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran. The Chapter 25 list is found on the Division's website at www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf. Bidders must review this list prior to completing the below certification. Failure to complete the certification will render a bidder's proposal non-responsive. If the contracting unit determines that a bidder submits a false certification, the contracting until shall report the name of the bidder to the New Jersey Attorney General, whom shall determine whether to bring a civil action against the person or entity to collect the penalty described in section 5 of P.L. 2012, c. 2012 (*N.J.S.A. 52:32-59.*)

PLEASE CHECK NEXT TO APPROPRIATE STATEMENT:

☑ **I certify, pursuant to Public Law 2012, c. 25, that neither the bidder listed above nor any of the bidder's parents, subsidiaries, or affiliates is listed on the New Jersey Department of Treasury's list of entities determined to be engaged in prohibited activities in Iran pursuant to P.L. 2012, c. 25 ("Chapter 25 List"). I further certify that I am the person listed above, or I am an officer or representative of the entity listed above and am authorized to make this certification on its behalf. I will skip Part 2 and sign and complete the Certification below.**

☐ **I am unable to certify as indicated above the bidder and/or one or more of its parents, subsidiaries, or affiliates is listed on the New Jersey Department Treasury's Chapter 25 list. I will provide a detailed, accurate and precise description of the activities in Part 2 below and sign and complete the Certification below. Failure to provide such will result in the proposal being rendered as non-responsive and appropriate penalties, fines and/or sanctions will be assess as provided by law.**

PART 2: PLEASE PROVIDE FURTHER INFORMATION RELATED TO INVESTMENT ACTIVITIES IN IRAN

You must provide a detailed, accurate, and precise description of the activities of the bidding person/entity, or one of its parents, subsidiaries and/or affiliates, engaging in investment activities in *N.J.S.A. 52:32-56(f)* by completing the boxes below.

Relationship to Bidder: _____

Description of Activities:
Duration of Engagement: _____

Anticipated Cessation Date: _____

Bidder/Offeror Contact Name: _____

Contract Phone Number: _____

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN (continued)

[Required pursuant with N.J.S.A. 52-32:55 et seq.]

☐ ADDITIONAL ACTIVITIES/CONTINUATION SHEETS (*Select this if you are including additional activities):* If there are additional activities that require disclosure, please provide the description as attachments to the form, following the same format under Part 2. Please number each attachment and affix to this form.

Number of Attachments: _____

PART 3: CERTIFICATION

I, being duly sworn upon my oath, hereby represent and state that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I attest that I am authorized to execute this certification on behalf of the below-referenced person or entity. I acknowledge that Midwest Construction Inc *(fill in the name of the contracting unit)* is relying on the information herein and thereby acknowledge that I am under a continuing obligation from the date of this certification through the completion of the contract to notify the contracting unit in writing of any changes to the answers of information contained herein. I acknowledge that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I recognize that I am subject to criminal prosecution under the law and that it will also constitute a material breach of my agreement(s) with the local contracting unit and that the local contracting unit, at its option, may declare any existing contract(s) resulting from this certification void and unenforceable.

Full Name (Print): Manuel Araujo

Signature: [signature]

Title: President

Date: 4/8/2021

Bidder/Vendor: Midwest Construction Inc

Bidder/Vendor Phone Number and/or Contact Information: 973-412-8880

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X). Not attached

NOTE: Bidders must use this form or its legal equivalent, conforming to N.J.S.A. 40A:11-21. Submission of the AIA Document 310, or any other form limiting or potentially limiting the penal sum of the bond to any amount less than 10% of the bid price not to exceed $20,000 (such as forms of bond that limit the penal sum to the difference between damages or the bid price and the Owner's cost of the Work), SHALL be cause for rejection of the bid.

BID BOND FORM

(If used, must accompany proposal)

KNOW ALL MEN BY THESE PRESENTS:
That we, the undersigned,_____as

Principal, and_____as

Surety, are hereby held and firmly bound unto the TOWNSHIP OF PEQUANNOCK in the penal sum of

_____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, That, **WHEREAS,** the Principal has submitted to the TOWNSHIP OF PEQUANNOCK a certain Bid attached hereto and hereby made a part hereof, to enter into a contract in writing for the supplying and furnishing of

_____.

NOW, THEREFORE,

(a) If said Bid shall be rejected, or, in the alternate

(b) If said Bid shall be accepted and the principal shall execute and deliver a contract properly completed in accordance with said Bid and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid,

THEN, this obligation shall be void; otherwise the same shall remain in force and effect, it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Obligee may accept such bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their CORPORATE SEALS to be hereto AFFIXED and these presents to be signed by their proper officers, this _____ day of ____, 20_____.

_____ By: _____
Principal/Company

Title: _____

By: _____
Attorney-in-Fact

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

CONSENT OF SURETY

All attached

A performance bond will be required from the successful contractor on this project, and consequently, all bidders shall submit, with their bid, a consent of surety in substantially the following form:

To: _____
(Owner)

Re: _____
(Contractor)

_____
(Project Description)

This is to certify that the _____
(Surety Company)

will provide to _____ a performance bond in
(Owner)
the full amount of awarded contract in the event that said contractor is awarded a contract for the above project.

_____
(CONTRACTOR)

_____
(Authorized Agent of Surety Company)

Date: _____

CONSENT OF SURETY MUST BE SIGNED BY AN AUTHORIZED AGENT OR REPRESENTATIVE OF A SURETY COMPANY AUTHORIZED TO DO BUSINESS IN NEW JERSEY AND NOT BY THE INDIVIDUAL OR COMPANY REPRESENTATIVE SUBMITTING THE BID.

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

EQUIPMENT CERTIFICATION

The undersigned Bidder hereby certifies as follows:

The bidder owns, controls, or has proof of lease of all the necessary equipment required to accomplish the work described in the specifications. To the extent that said equipment is not currently owned or under lease by the bidder, attached hereto is documentation from that owner or leasing organization that states the equipment will be available as required by the bidder upon award of a contract.

☑ Check here if documentation is attached.

Midwest Construction Inc
Name of Bidder

Signature of Authorized Representative

Marvel Araujo
Name

4/8/2021
Date

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

PERFORMANCE RECORD TO ACCOMPANY FORM OF PROPOSAL

NOTE: Bidders must complete this form in its entirety to have the bid considered complete. Bid may be rejected as non-responsive and incomplete should this form not be completed in its entirety. Contractor's attachment will not be accepted.

Previous work of similar nature completed within the last five (5) years (list five):

1. Town/Utility Town of Dover Phone No. 973-366-2200

Town/Business Address: 100 Princeton Avenue Dover NJ 07801

Type of Work: 2018 Small Cities Project

Contract Price: $ 432,870.00 Extra Work: $ 0

Approximate Date of Award: 9/10/2019 Completion Date: 11/27/2019

Was Contract Completed on Time: yes

Reason for Late Completion: —

Was Contract-Time Extension Granted: —

Name, Address & Phone No. of Town/Utility's Engineer or Project Manager:
Bill Isselin 100 Princeton Avenue Dover NJ 07801 973-366-2200

2. Town/Utility Township of Parsippany-Troy Hills Phone No. 973-263-4350

Town/Business Address: 1001 Parsippany Blvd Parsippany NJ 07054

Type of Work: Greenbank Road safety and improvements

Contract Price: $ 679,105.10 Extra Work: $ 0

Approximate Date of Award: 3/17/2020 Completion Date: 7/1/2020

Was Contract Completed on Time: yes

Reason for Late Completion: —

Was Contract-Time Extension Granted: —

Name, Address & Phone No. of Town/Utility's Engineer or Project Manager:
Paul Niehoff 1001 Parsippany Blvd Parsippany NJ 07054 973-263-4350

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PERFORMANCE RECORD TO ACCOMPANY FORM OF PROPOSAL (CONTINUED)

3. Town/Utility Township of Parsippany - Troy Hills Phone No. 973-263-4350

Town/Business Address: 1001 Parsippany Blvd Parsippany NJ 07054

Type of Work: New England Drive milling and Resurfacing Program

Contract Price: $ 467,487.21 Extra Work: $ 0

Approximate Date of Award: 4/21/2020 Completion Date: 9/4/2020

Was Contract Completed on Time: yes

Reason for Late Completion: —

Was Contract-Time Extension Granted: —

Name, Address & Phone No. of Town/Utility's Engineer or Project Manager:
Paul Niehoff 1001 Parsippany Blvd. Parsippany NJ 07054 973-263-4350

4. Town/Utility Township of Parsippany - Troy Hills Phone No. 973-263-4350

Town/Business Address: 1001 Parsippany Blvd Parsippany NJ 07054

Type of Work: Replacement of Simpson Avenue Retaining Wall

Contract Price: $ 66,780.00 Extra Work: $ 0

Approximate Date of Award: 4/21/2020 Completion Date: 11/19/2020

Was Contract Completed on Time: yes

Reason for Late Completion: —

Was Contract-Time Extension Granted: —

Name, Address & Phone No. of Town/Utility's Engineer or Project Manager:
Paul Niehoff 1001 Parsippany Blvd Parsippany NJ 07054

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PERFORMANCE RECORD TO ACCOMPANY FORM OF PROPOSAL (CONTINUED)

5. Town/Utility City of Summit Phone No. 908-273-6404

Town/Business Address: 512 Springfield Ave Summit NJ 07901

Type of Work: Pine Grove (section 2) Improvements Project

Contract Price: $ 465,191.05 Extra Work: $ 0

Approximate Date of Award: 2/11/2020 Completion Date: 11/24/2020

Was Contract Completed on Time: yes

Reason for Late Completion: —

Was Contract-Time Extension Granted: —

Name, Address & Phone No. of Town/Utility's Engineer or Project Manager:
Rick Matias 512 Springfield Ave. Summit NJ 07901

List approximate volume of work of similar completed within the last five years:

20 20 $ 3,104,200-
20 19 $ 2,857,966
20 18 $ 3,084,828
20 17 $ 3,415,958
20 16 $ 4,157,429

List of Projects presently under Contract and not yet completed:

Project: Township of Morris - James street Amount: $ 168,918.00
Project: _____ Amount: $ _____
Project: _____ Amount: $ _____
Project: _____ Amount: $ _____
Project: _____ Amount: $ _____
Project: _____ Amount: $ _____
Project: _____ Amount: $ _____
Project: _____ Amount: $ _____
Project: _____ Amount: $ _____

General Business Reference (list three)

	Name	Occupation	Business Address	Telephone No.
1.	Weldon materials	Supplier	141 Central Ave. Westfield NJ 07090	908-233-4444
2.	Tilcon New York	Supplier	9 Entin Rd Parsippany NJ 07054	800-789-7625
3.	Campbell Foundry	Supplier	800 Bergen St Harrison NJ 07029	973-483-5480

CONTINUED ON NEXT PAGE

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PERFORMANCE RECORD TO ACCOMPANY FORM OF PROPOSAL (CONTINUED)

Number of Permanently Employed Persons in your Organization: 12

Have you ever failed to complete a project in the last five years? Yes ☐ No ☑

If you answered Yes, Where? _____

It is understood and agreed that the execution of this Performance Record is made solely at the risk, cost and expense of the maker; is given in consideration of the agreement of the Township of Pequannock to make available to the Township for bidding purposes, and no rights, causes or claims at law or in equity shall arise on behalf of the maker against the Township of Pequannock for any use made there refusal to the maker of the right to bid on said work.

Manuel Araujo
Owner

Midwest Construction Inc
Company Name

19 Dead River Rd Warren NJ 07059
Address

973-412-8880
Telephone Number

[signature] 4/8/2021
Signature Date

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

CERTIFICATION OF BIDDER'S STATUS ON THE STATE TREASURER'S LIST OF DEBARRED, SUSPENDED AND DISQUALIFIED CONTRACTORS

STATE OF New Jersey

COUNTY OF Somerset

I, Manuel Araujo of the City/Town/Township/Borough/Village (circle one) of Warren in the State of New Jersey, of full age, being duly sworn according to law on my oath depose and sat that:

I am President of the firm of Midwest Construction Inc, the bidder making the Proposal for the attached named project; with full authority to do so; and that said bidder is not now at the time of submission of this bid included on the State of New Jersey Treasurer's List of Debarred, Suspended and Disqualified Bidders.

The undersigned further warrants that should the name of the firm making this bid appear on the State Treasurer's List of Debarred, Suspended and Disqualified Bidders at anytime prior to, and during the life of this Contract, including the Guarantee Period, that the Owner shall be immediately so notified by the signatory of this eligibility Affidavit.

The undersigned understands that the firm making the bid as a Contractor is subject to debarment, suspension and/or disqualification in contracting with the State of New Jersey and the Department of Environmental Protection if the Contractor, pursuant to *N.J.A.C. 7:15-5.2*, commits any of the acts listed therein, and as determined to applicable law and regulation.

By: _____ Date: 4/8/2021
Manuel Araujo
Deponent's Name

President
Deponent's Title

Subscribed and sworn to before me this
8th day of April, 2021

Jeny P. Barroqueiro
Notary Public

Commission Expires: 12/2/2024

(Notary Stamp/Seal)

Jeny P Barroqueiro
Notary Public
New Jersey
My Commission Expires 12-2-24
No. 50005746

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

TOWNSHIP OF PEQUANNOCK
ACKNOWLEDGMENT OF RECEIPT OF ADDENDA

[Required pursuant with N.J.S.A 40A:11-23.2(e)]

The undersigned Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Dated	Acknowledge Receipt (Bidder Initial)

☑ No addenda were received.

Acknowledged for: Midwest Construction Inc
(Name of Bidder/Company)

By: Manuel Araujo
(Signature of Authorized Representative)

Name: Manuel Araujo
(Print or Type)

Title: President

Date: 4/8/2021

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

SPECIAL CONDITIONS AND EXCEPTIONS TO INSTRUCTIONS TO BIDDERS / STATUTORY REQUIREMENTS - If Required

TIME OF COMPLETION: The contract period for work to be complete will be sixty (60) days, weather permitting. Additional time may be permitted, upon request from the contractor, at the sole discretion of the Township of Pequannock.

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

TOWNSHIP OF PEQUANNOCK
RAMAPO ROAD SIDEWALK REPLACEMENT
PROPOSAL PAGE

Proposer Name: Midwest Construction Inc

Address of Firm: 19 Dead River Road
Warren NJ 07059

Phone Number: 973-412-8880 Fax Number: 973-412-8885

Print Name: Manuel Araujo Title: President

The undersigned declares that he/she read the Notice, Instructions, Affidavits and Scope of Services attached; that he/she has examined the places of the work and all matters referred in the Bidding Documents and has determined the conditions affecting the proposal and agrees that, if this proposal is accepted, to furnish and deliver all labor, material, equipment, transportation and services necessary to complete the required scope of work, and hereby offer to enter into a Contract to perform the Work of the Sum of:

Base Bid
ninety eight thousand, seven hundred fourty nine and no cents. dollars
($ 98,749.00) in lawful money of the United States of America.

All exceptions to these requirements shall be included with the proposal submitted. If the proposer does not submit any exceptions, he/she must meet all requirements.

Manuel Araujo
Signature of Authorized Agent

4/8/2021
Date

(Corporate Seal, if applicable)

THIS FORM IS ONLY REQUIRED IF DENOTED ON THE DOCUMENT CHECKLIST BY AN (X).

Township of Pequannock
Morris County, New Jersey
RAMAPO ROAD SIDEWALK REPLACEMENT

Item No.	Item Description	Unit	Quantity	Unit Cost	Item total
1	Clearing of Site/ Traffic Control	LS	1	$ 2,500.00	$ 2,500.00
2	Excavation Unclassified	CY	10	$ 10.00	$ 100.00
3	Police Traffic Directors	MH	20	$ 120.00	$ 2,400.00
4	Inlet Sediment Traps	Each	4	$ 1.00	$ 4.00
5	HMA Driveway Restoration, 3.5" Thick	SY	50	$ 30.00	$ 1,500.00
6	Concrete Curbing	LF	50	$ 23.00	$ 1,150.00
7	Concrete Sidewalk, 4" Thick	SY	875	$ 60.00	$ 52,500.00
8	Reinforced Concrete Apron, 6" Thick	SY	555	$ 69.00	$ 38,295.00
9	Detectable Warning Surface, Embedded	Each	2	$ 150.00	$ 300.00

TOTAL BASE BID (Items 1 through 9) $ 98,749.00
(Write Total Price)

The undersigned agrees to save the Township of Pequannock, consultants or representatives harmless with respect to any claim or claims of liability which may be incurred by reason or in connection with the performance of said work, including but not limited to blasting work, the existence of open trenches, etc. Said prices equal the total bid price of all items listed in the detailed description pages for which the bidder has submitted a bid.

It is further understood that the prices herein bid and the lump sum bid are to remain firm for a period of sixty (60) days from date of bid opening in accordance with New Jersey Local Public Contracts Law N.J.S.A. 40A:11-24 or as extended by agreement.

The undersigned bidder is [ ] an individual; [ ] any form of Corporation; [✓] any Partnership; [ ] an LLC (check one). If a Corporation, Partnership or LLC, give exact name of firm, also full name of Officer or Partner authorized to sign for it.

The undersigned bidder acknowledges the presence of a bid guarantee, consent of surety, power of attorney, statement of ownership/stockholder disclosure and subcontractor listing.

Midwest Construction Inc.
Type Bidder's Name

SECTION B
PREVAILING WAGE RATE DETERMINATION

This project is subject to the payment of prevailing wages. Current information on prevailing wage rates is available at:
https://www.nj.gov/labor/wagehour/wagerate/CurrentWageRates.html

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G-1 DEFINITIONS

Whenever in these contract documents the following terms and abbreviations or pronouns in place of them are used, their intent and meaning shall be interpreted as follows:

ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ACI	American Concrete Institute
AISC	American Institute of Steel Construction, Inc.
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASTM	ASTM (American Society for Testing and Materials) International
AWS	American Welding Society
AWWA	American Water Works Association
CIAP	Construction Industry Advancement Program of New Jersey
CFR	Code of Federal Regulations
DBE	Disadvantaged Business Enterprise
DCR/AA	New Jersey Department of Transportation, Division of Civil Rights and Affirmative Action
ESBE	Emerging Small Business Enterprise
EEO	Equal Employment Opportunity
FED-STD	Federal Standard
FHWA	Federal Highway Administration
FSS	Federal Specifications and Standards, General Services Administration
HDPE	High-Density Polyethylene
HMA	Hot Mix Asphalt
ITE	Institute of Transportation Engineers
MSDS	Material Safety Data Sheet
MUTCD	Manual on Uniform Traffic Control Devices
N.J.A.C.	New Jersey Administrative Code
N.J.S.A.	New Jersey Statutes Annotated
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
OSHA	Occupational Safety and Health Administration
PCI	Precast/Prestressed Concrete Institute
PVC	Polyvinyl Chloride
QPL	Qualified Products List
ROW	Right-of-Way
SBE	Small Business Enterprise
SESC	Soil Erosion and Sediment Control
SSPC	Society of Protective Coatings
USDOL	United States Department of Labor

Acceptance. The written acceptance by the Township of the Work

addendum. A Contract revision or response to a Contractor inquiry issued after advertisement and before the opening of bids.

approval. The Township's written notification that a submission or portion of work is believed to be in general conformance with the Contract. Approval does not constitute the Township's agreement to a change in the Contract.

as-built quantity. The quantity of a completed Item eligible for payment.

Bid - The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the work to be performed.

Bidder - Any individual, firm, corporation, joint venture, or any acceptable combination thereof submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.

Change Order - A written order to the Contractor signed by the Owner authorizing an addition, deletion or revision of the work, modifications in the basis of payment, or an adjustment of the contract amount or contract time.

Clerk - The Clerk of the governing body if the Owner be a County or Municipality.

Completion. When all of the following have occurred:

1. The Work has been satisfactorily completed in all respects according to the Contract.
2. The Project is ready for use by the Township as required by the Contract.
3. The Contractor has satisfactorily executed and delivered to the Township Engineer all documents, certificates, and proofs of compliance required by the Contract including the Notice of Completion.

Contract - The written integrated agreement between the Department and the Contractor setting forth the obligations of the parties, including, but not limited to, the performance of the Work and the basis of payment. The Contract includes the advertisement, Proposal, Certification as to Publication and Notice of Advertisement for Proposal, bid, Appointment of Agent by Nonresident Contractors, Resolution of Award of Contract, Executed Form of Contract, performance and payment bonds, Specifications, Plans, Right-of-Way Plans, permits, boring logs, pavement core records, addenda, Change Orders, and Field Orders, all of which are to be treated as one instrument whether or not set forth at length in the form of Contract. Other information mailed or otherwise made available to the prospective bidders before the opening of bids is not part of the Contract unless specified as such.

Contract Time. The number of working days allowed to complete the work for a milestone or the date by which work must be completed, as provided in the Contract and as modified by Change Order. When Interim Completion and Completion requirements are specified as a specific date instead of the number of working days, achieve Interim Completion or Completion on or before that date

Contractor - Party of the second part to the contract, acting directly or through his agent or employees, and primarily liable for the acceptable performance of the work, and for the payment of all debts pertaining to the work.

Contract Documents - The contract; Notice to Bidders; proposal; Information for Bidders; General Instructions and Conditions; Special Provisions; Specifications; Standard and Supplementary Specifications; Drawings; Addenda; and Modifications.

day. Every day shown on the calendar

Discrimination. That act (or action) whether intentional or unintentional, through which a person in the United States, solely because of race, creed, color, national origin, age, ancestry, nationality, sex (including pregnancy and sexual harassment), marital status, domestic partnership or civil union status, affectional or sexual orientation, gender identity or expression, atypical hereditary cellular or blood trait, genetic information, liability for military service, or disability has been otherwise subjected to unequal treatment.

Drawings - All plans or reproductions of Drawings furnished by the Engineer, pertaining to the construction of the project or any portion thereof.

Engineer - Whenever the word Engineer is used in reference to the work or any part thereof in these Specifications or the Contract, it shall be understood to apply and refer to the professional engineering representative of the Owner, duly authorized to represent the Owner in the execution of the work covered by the Specifications and Contract. The term "Engineer" or the pronouns used in place thereof shall refer to those acting either directly or through assistants under him, limited to the particular duties entrusted to them.

Estimate. Progress payment made to the Contractor by the Department.

Extra Work. New Work and quantity adjustments to Items that are not the result of as-built measurement or calculation.

Federal Aid Project. Any agreement or modification thereof between NJDOT and any applicant and a person for construction work which is paid for in whole or in part with funds obtained from the Federal government or borrowed on the credit of the Federal government pursuant to any program involving a grant, contract, loan, insurance or guarantee under which the NJDOT itself participates in the construction work.

Federal Aid Project Attachments. Attachments to the Contract Special Provision document, used for Federal Aid Projects.

Field Order. Written direction, signed by the RE, requiring action by the Contractor.

holiday. A legal holiday as defined by N.J.S.A. 36:1-1

Construction Observer - An authorized representative of the Owner assigned, under the supervision of the Engineer, to the inspection of the work.

Item. A specifically described portion of Work for which there is a unit or lump sum price. Items described in the Specifications are designated in all capital letters.

Materials - All raw or prepared, and/or fabricated products entering into the finished work.

Modification -
(a) a written amendment of the contract documents signed by both parties,
(b) a change order, or
(c) a written clarification or interpretation issued by the Engineer.

Owner - A public body or authority, association, partnership, corporation or individual for whom the work is to be performed; the party of the first part of the contract.

Project - The design or scheme used and set forth on the Drawings and to be carried out by the Specifications to complete the work in a manner satisfactory to the Engineer.

Project Limits. The Project Limits are shown on the key sheet and modified as follows:

1. The areas of construction operations and areas used by the Contractor to perform the work. If only a portion of a lane or shoulder of a road is being constructed, the Project Limits include all lanes and shoulders of the roadway.
2. Where only one direction of a road is being constructed, and the road is divided by a median, island, or barrier curb, the Projects Limits include all of the lanes in that direction and the median. Otherwise, the Project Limits include all lanes in both directions.
3. The longitudinal Project Limits include all safety devices and signs excluding signs greater than 1,600 feet outside the Project Limits shown on the key sheet.
4. Areas within the ROW provided for the Contractor's use.

Proposal - The schedule of Items and estimate of the various quantities and kinds of Work to be performed for which bid prices are invited. The Proposal also includes the location and description of the Project and the date and time of the opening of bids.

Roadway - That portion of the highway included between the gutter or side ditch lines, reserved for the accommodation of the traveling public, and its appertaining structures and slopes, and all ditches, channels, waterways, etc., necessary to its correct drainage.

Specifications - The compilation of provisions and requirements for the performance of prescribed work contained in the Standard Specifications, Special Provisions as modified by addenda.

Subcontractor - An individual, firm, partnership, corporation, joint venture, or any acceptable combination thereof, to which the Contractor subcontracts part of the Work.

Substantial Completion. When all work is complete, with the exception of landscaping Items listed in 811.04, removal of SESC measures and FINAL CLEANUP, and repair of unacceptable work; provided the RE has determined that:

1. The Project is safe and convenient for use by the public.
2. Failure to complete work and repairs excepted above will not result in the deterioration of other completed work.
3. The value of the remaining landscaping work, removal of SESC measures, repairs, and FINAL CLEANUP is less than 2 percent of the Total Adjusted Contract Price.

Superintendent. The Contractor's authorized representative responsible for and in charge of the Work and is authorized by the Contractor to receive all communications from the Department.

Surety. The individual, partnership, or corporation, other than the Contractor, that has provided a proposal bond, a performance bond, or a payment bond

Work - Labor, services, materials, equipment, tools, transportation, supplies, and incidentals necessary or convenient for Completion by the Contractor of the construction described in the Contract and the carrying out of all duties and obligations imposed by the Contract wholly, or any portion thereof, on the Contractor.

Working Day - Any day, exclusive of:

1. Saturdays, Sundays, and holidays.

2. Days on which the Contractor is specifically required by the Contract to suspend construction operations.
   Days on which the Contractor is prevented by any conditions beyond the control of the Contractor and adverse to the current controlling operation or operations, as determined by the RE, from proceeding with at least 75 percent of the normal labor and equipment force engaged on such operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations for all shifts.

G-2 INVITATION TO BID

In accordance with the advertisement, bids will be received for the performance of the project, the designation of which is stated in the advertisement.

Bids are required on the items requested in the form of proposal for the project. The prices bid shall cover all costs of any nature, incident to or growing out of the work, including the cost of all work, labor, materials, equipment, transportation and all else necessary to perform and complete the project in the manner and within the time required, all incidental expenses in connection therewith, all costs for loss by damage or destruction of the project, for any additional expenses on account of unforeseen difficulties encountered, for settlement of damages and for replacement of damages and for replacement of defective work and materials.

Before submitting his proposal, the Bidder shall be familiar with the Drawings, Specifications and other documents that will form parts of the Contract

G-3 SCOPE OF THE WORK

The Contractor shall furnish all of the materials and all of the equipment and labor necessary, and perform all of the work as described in the Specifications for the project, in accordance with the requirements and provisions of the following documents which are hereby made a part of the agreement:

(a) Plans and Specifications prepared for the Township of Pequannock, 530 Newark-Pompton Turnpike, Pompton Plains, New Jersey 07444.
(b) General Instructions and Conditions inclusive Article G-1 through Article G-78.
(c) "Special Instructions to Bidders" (if included) and "Supplemental Specifications".
(d) The proposal forms.
(e) All other contract documents included herein and made part hereof.
(f) Notice to Bidders

The work consists, generally, of items listed in the Notice to Bidders that provide bidders with information to determine overall scope, trade involvement and significant cost items for the project, as further described in the plans and specifications for bid.

G-4 INFORMAL PROPOSALS

The Owner may consider informal any proposal not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any or all proposals.

G-5 WITHDRAWING PROPOSALS

In certain circumstances where bids are allowed to be submitted in advance, proposals forwarded to the

Owner before the time of opening of proposals may be withdrawn prior to the twenty-four (24) hour period immediately preceding the opening of bids upon written request of the Bidder who represents the principal or principals involved in the proposal. Proposals may not be withdrawn after bids are opened, except by reasons referenced in New Jersey statutes.

N.J.S.A. 40A:11-23.3 authorizes a bidder to request withdrawal of a public works bid due to a mistake on the part of the bidder. A mistake is defined by N.J.S.A. 40A:11-2(42) as a clerical error that is an unintentional and substantial computational error or an unintentional omission of a substantial quantity of labor, material, or both, from the final bid computation.

A bidder claiming a mistake under N.J.S.A. 40A:11-23.3 must submit a request for withdrawal, in writing, by certified or registered mail to Township Manager, Township of Pequannock, 530 Newark Pompton Turnpike, Pompton Plains, New Jersey 07444. The bidder must request withdrawal of a bid due to a mistake, as defined by the law, within five business days after the receipt and opening of the bids. Since the bid withdrawal request shall be effective as of the postmark of the certified or registered mailing, the Township Manager may contact all bidders, after bids are opened, to ascertain if any bidders wish to, or already have exercised a request to withdraw their bid pursuant to N.J.S.A. 40A:11-23.3.

A bidder's request to withdraw the bid shall contain evidence, including any pertinent documents, demonstrating that a mistake was made. Such documents and relevant written information shall be reviewed and evaluated by the public owner's designated staff pursuant to the statutory criteria of N.J.S.A. 40A:11-23.3.

The public owner will not consider any written request for a bid withdrawal for a mistake, as defined by N.J.S.A. 40A:11-2(42), by a bidder in the preparation of a bid proposal unless the postmark of the certified or registered mailing is within the five (5) business days following the opening of bids.

G-6 QUALIFICATION OF BIDDERS

Experience and Capital Required

Bidders must be experienced in the kind of work required to be performed (three recent similar projects completed successfully at a minimum within the last three years), have the equipment required and/or have the means to secure it, and have sufficient capital to properly execute the work within the time allowed.

Bidder Qualification Form

The Contractor is to fully complete the "Bidder Qualification Form" and submit it with his proposal(s).

Unsatisfactory Past Performance

Proposals received from bidders who have previously failed to complete contracts within the time scheduled thereof, who have performed similar work in an unsatisfactory manner or who are deemed to be not responsible bidders, may be rejected.

G-7 ANNUAL REQUALIFICATION

If the bidder has filed a Bidder Qualification Form of the type required within the six (6) months of the date of receipt of bids, he may meet the requirement of Article G-6 by submitting, with his bid, a

statement describing any material changes in his financial standing since the date of his last submittal including a description of the status of any current contracts.

G-8 DRAWINGS AND SPECIFICATIONS

The project shall be performed in accordance with the requirements of the Drawings and Specifications, or such modifications thereof as may be made during the progress of the work. Drawings showing general outlines and details necessary for a comprehensive understanding of the project form a part of the contract and are on file at the office of the Engineer. The Contractor will receive two (2) copies of these Drawings and Specifications, one of each shall be kept at the site of the project.

On the Drawings, figures dimensions shall govern in the case of discrepancy between the scale and figures. The Drawings and Specifications are intended to be complete, but if any deviations from the same are required by the exigencies of construction, they, in all cases, shall be determined by the Engineer and authorized in writing. The Engineer shall have the right to correct apparent errors or omissions in the Drawings and Specifications and to make such interpretations as he may deem necessary for the proper fulfillment of the intent of the Drawings and Specifications. When doubt exists as to the meaning of the Drawings, Specifications or other matters relative to the proposed work, the Engineer shall interpret them and his decisions shall be final.

G-9 TIME FOR COMPLETION OF WORK

All work stipulated in the contracts shall be completed within the period specified in the Special Conditions, which for this project is sixty (60) days. In no case shall the official contract start extend more than fourteen days after the date of award, however, contractor shall not begin work until:

a. The Contractor has provided the appropriate Affirmative Action Evidence (AA201 – Initial Project Workforce Report) after notification of award but prior to signing of any construction contract.
b. The contract has been fully executed and the required bonds and insurance certificates have been provided and approved by the Owner within 14 days of award by the Governing Body of the Township of Pequannock.
c. The Contractor has provided the Engineer with a minimum of seventy-two (72) hours notice concerning the time and place he intends to commence work; and
d. The Contractor has received and executed a written Notice to Proceed.

G-10 LIQUIDATED DAMAGES

Damages for Cause

The Contractor shall be liable to the Owner for all expenses, losses or damages, as determined by the Engineer, incurred in consequence of any defect, omission or mistake of the Contractor, his subcontractors, agents or employees, or for the making good thereof.

Cost of Engineering and Inspection

There will be deducted from any payments due the Contractor and retained by the Owner an amount to defray the cost of wages and overhead paid by the Owner to any Engineer, Construction Observer or Construction Observers employed on the work for any time in excess of the completion time stipulated, in excess of eight (8) hours per day or on Saturdays, Sundays or legal holidays. This amount shall be based

on the actual engineering costs incurred. The hourly rates for engineering shall be the rates actually billed by the Engineer in accordance with his standard hourly rate schedule for the required engineering services including specialized services such as geotechnical and electrical subconsultants, testing laboratory services, etc.

Damages for Non-Compliance

If the Contractor is permitted to finish the work after the specified period of completion, the Owner shall have full authority to and may deduct and retain from any payments due the Contractor the sum of one thousand five hundred dollars ($1,500.00) for each calendar day thereafter that the contract remains uncompleted, all as liquidated damages, and not as a penalty, to compensate the Owner for reasonable loss due to failure to complete the work in the stipulated time.

G-11 PREVAILING WAGES

Requirements of Law

Attention is called specifically to the requirements of Chapter 10, Title 34, Revised Statutes providing, as a condition of this contract, the establishment of an eight-hour working day for laborers, workmen and mechanics, and requiring payment of prevailing rates of wages.

The Contractor will be required to comply with the provisions of the New Jersey Prevailing Wage Act, Chapter 150 of the Laws of 1963 (N.J.S. 34:11-56.25 et. seq.), setting forth requirements for the payment of prevailing wages and for the proper documentation of such payments.

Wage Rate Determination on File

Copies of the Act cited above and of the New Jersey Department of Labor and Industry Wage Rate Determination for this project are available at the office of the Engineer and may be inspected during regular business hours.

Wage Rates, A Condition of Contract

Bidders should familiarize themselves with the particular wage rate determination for this project since they will be made available via the Engineer, his office or electronically, and made a condition of the contract to be executed for this project.

In the event that it is determined that any workmen employed by the Contractor or any subcontractor covered by this contract are paid less than the required wage rates, the Owner may terminate the Contractor's right to proceed with the work or such part of the work as to which there has been a failure to pay required wages and prosecute the work to completion or otherwise. The Contractor and Sureties shall be liable to the Owner for any excess costs occasioned thereto.

G-12 PREPARATION OF PROPOSAL

Basis of Contract Award

Bids will be received under these Specifications for the completion of the whole work. The correct

total lump sum will govern in the awarding and administration of the contract. The Contractor must give separate prices per unit measure for each of the several classes of work to be performed as given in the Schedule of Prices. The sum of the estimated quantities multiplied by the prices per unit of measure including overhead and profit should equal the lump sum bid for the entire work. No amount in excess of the lump sum bid may be exceeded without advance written consent of the Owner. All prices quoted in the proposal shall include the necessary cost to remove, where required, and replace all obstacles to the proper completion of the work unless noted otherwise.

Incomplete or Informal Proposals

No bids will be considered in which all of the items given in the Schedule of Prices are not filled out. Bidders are cautioned not to attach any conditions, limitations or provisions to the proposal as such conditions, limitations or provisions will render their bid informal and cause its rejection.

Completion & Submission of Proposals

All prices and amounts must be written in ink, or preferably, typewritten. All erasures or corrections must be initialed by each signatory to the proposal. Bids must be enclosed in sealed envelopes, addressed to the Owner, bearing on the outside the name and address of the bidder, and must be delivered at the place and time required, or in certain cases where allowed to be mailed so received by the business day prior to the opening time set in the advertisement. Bids received after the start of the formal bid opening will not be considered.

Any clarification must be requested in writing to the Township Engineer no less than ten days prior to bid opening. Where addenda are issued, notice shall be provided no later than seven days, Saturdays, Sundays, or holidays excepted, prior to the date for acceptance of bids, to any person who has submitted a bid or who has received a bid package in accordance with NJSA 40A:11-23 et seq.

Errors in Proposals

In the event there is a discrepancy between the unit prices and the extended totals, the lower sum cost shall govern. Amounts written in words shall govern over the amounts given in numerals.

Material to be Bid in Place

Unless otherwise specified, the price bid for each of the items in the proposal shall be for the material in place. Any and all work necessary to construct, erect or place such material in the work shall be estimated and included in the cost of each item.

Estimated Quantities

The Engineer has attempted to estimate in approximate amounts, in each class, to cover the contract requirements. If a greater or lesser quantity or amount of the various classes given in the estimated amounts for bidding is required to finally complete the work, the Contractor agrees to make no claim for the variation. The Bidder is solely responsible to confirm the quantities required to complete the contract work.

G-13 BIDDERS TO EXAMINE SITE AND CONDITIONS

Bidders to Visit Site

All bidders or their representative(s) are required to visit the site of work of this contract and examine the means of access to the site. Bidders shall make all necessary investigations to become thoroughly informed as to the character and magnitude of all work involved in the complete execution of the contract, including facilities for delivery and handling of material, plant(s), if any, at site, and conditions and difficulties that will be encountered in the performance of the work specified herein. All examinations and investigations will be made prior to submission of bid.

Bidders to Determine Conditions

The Bidder is assumed to have fully informed himself of all the conditions to be found at the site of the work, including all physical characteristics above, on and below the surface of the ground; to have examined the Drawings and Specifications; to have read and understood every section and clause of the contract and all other matters which can in any way affect the work under the agreement. The Contractor agrees that he will make no claims for, or have any right to, damages or extension of time of completion of the work because of misinterpretation or misunderstanding of the conditions, the contract, the Drawings and Specification, or because of lack of information.

G-14 SUBSURFACE CONDITIONS

It is the obligation of the Bidder to make his own investigation of subsurface conditions prior to submitting his proposal. Borings, test excavations and other subsurface investigations, if any, made by the Engineer prior to the construction of the project, the records of which may be shown on the Drawings, are made for design purposes. The Contractor agrees that he will make no claims against the Owner, if, in carrying out the project, he finds that the actual conditions encountered, or the estimates of quantities shown on the Drawings or in the form of proposal, based on said borings, test excavations, and other subsurface investigations or records do not conform to those indicated by said borings, test excavations, records or estimated quantities.

G-15 PROGRESS

The Contractor shall proceed with the work in accordance with the schedule submitted in a diligent, consistent manner to completion. No claims for damages shall be made by the Contractor for any delay or hindrance from any cause whatsoever.

G-16 MODIFICATIONS OF PROPOSALS

Any bidder may modify his proposal by telegraphic communication or registered mail at any time prior to the scheduled closing time for receipt of bids, provided such communications are verified received by the Owner prior to the closing time, and, provided further, the Owner is satisfied that a written confirmation of any telegraphic modification over the signature of the bidder was mailed prior to the closing time. The communications should not reveal the bid price, but must provide the addition or subtraction or other modification so that the final price or terms will not be known by the Owner until the sealed bid is opened. If written confirmation is still not received within 48 hours of the closing time, no consideration will be given to telegraphic modifications. Closing time shall be such time as officially declared and announced aloud publicly by the Borough Official at the bid opening and as scheduled in the documents.

G-17 SCHEDULES

The Contractor shall submit a progress schedule satisfactory to the Engineer, showing in general the times

intended by the Contractor for commencing the principal items or work included in the project. It shall include the contractual time of completion of this project from the Notice to Bidders and Notice to Proceed and major components and subcontracts of work such as guide rail removal, end treatment removal, guide rail installation, end treatment replacement and punchlist. The Contractor shall not anticipate work on Saturdays, Sundays or recognized legal holidays in the schedule.

G-18 METHOD OF AWARD

Award, if made, will be to the lowest "responsible" bidder of the Base Bid whose proposal complies in all respects with the requirements herein. Where alternate bids are requested for more than one (1) method or type of construction, the decision as to the method or type to be adopted and constructed is expressly made to the Bidder whose total bid for the entire work of the type selected, as based upon the estimated quantities, is lowest, provided that the Bidder, in the opinion of the Owner, is otherwise qualified to perform the work. A contract will not be awarded to a bidder who has failed to bid on the alternate type of work or material covered in the proposal. If the Base Bid for the lowest responsible bidder exceeds the appropriation for this project, the bid may be awarded to the lowest responsible bidder where deductions are possible via an Alternate Bid.

The Owner will not be bound by the award nor shall any work be on account of the proposed contract until the contract has been fully executed, delivered, and approved.

G-19 PERFORMANCE SECURITY

Security Required

The Contractor shall furnish a surety bond or bonds of face value equal to one hundred percent (100%) of the amount of the proposal as security for faithful performance of this contract and for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract, as specified in the contract documents, annexed hereto. The Surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner and as currently licensed to do business in the State of New Jersey.

Bonding Requirements: Section 200.325 permits the Federal agency to accept the recipient's bonding policy and requirements if the Federal agency has determined that the Federal interest is adequately protected, and if not, the minimum requirements (abbreviated) are as follows:

a) A bid guarantee from each bidder equivalent to five percent of the bid price.
The "bid guarantee" shall consist of a firm commitment such as a bid bond, certified check or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of his bid, execute such contractual documents as may be required within the time specified. (Note: State of NJ requires ten percent of the bid price).

b) A performance bond on the part of the contractor for 100 percent of the contract price. A "performance bond" is executed in connection with a contract to secure fulfillment of all the contractor's obligations under such contract.

c) A payment bond on the part of the contractor for 100 percent of the contract price. A "payment bond" is executed in connection with a contract to assure payment as required by law of all persons supplying labor and material in the execution of the work provided for in the contract.

d) Bonding companies must be listed in OMB Circular 570, not just State of NJ

Release of Performance Security

The surety bond or bonds provided shall not be released until final acceptance of the whole work and then only if all liens or claims have been satisfied and any maintenance or guarantee bonds required have been executed and approved by the Owner.

G-20 EXECUTION OF CONTRACT

After notification of award but prior to signing any construction contract, the successful bidder must submit a completed Form AA201 (Initial Project Workforce Report).The successful Bidder shall, within fourteen (14) calendar days of the date of the Award by the Governing Body, have furnished and delivered to the Owner the Surety Performance and Labor and Materials Payment Bond, if required, Certificate of Insurance and other necessary documents pertaining to the contract so the contract can be executed by the Owner.

G-21 CERTIFICATE OF INSURANCE

The Contractor shall furnish certificates of both public liability and workers' compensation insurance satisfactory to the requirements of Section G-59 as to company and limits. A certificate endorsed by the company shall be furnished stating that said company will notify the Owner in writing thirty (30) calendar days in advance of any cancellation becoming effective.

G-22 FAILURE TO EXECUTE OR FURNISH DATA

The successful Bidder, upon his, her or their failure or refusal to execute and deliver the contract, insurance certificates, and bonds required within fourteen (14) calendar days hereinabove specified after the date of the Award by the Governing Body of the Township of Pequannock, shall forfeit to the Owner, as liquidated damages, and not as a penalty, for such failure or refusal, the proposal security deposited with his proposal.

G-23 BIDDER MAY DEMAND RETURN OF SECURITY

If no contract has been executed within sixty (60) calendar days of the date of opening of bids, then, upon demand of any bidder, the Owner shall return his proposal security, provided, however, that the bidder making such demand has not been notified of the acceptance of his proposal and, provided further, that an extension of time has not been agreed pursuant to N.J.S.A. 40A:11-24.

G-24 SUBLETTING AND ASSIGNING CONTRACTS

The Contractor shall not sell, sublet, transfer, assign or otherwise dispose of the contract, or any portion thereof, or of the work provided therein, or his right, title or interest therein, to any third party without the written consent of the Owner. The Contractor shall perform the work with his own organization under his immediate control until the work is completed and accepted by the Owner, except for minority business utilization commitment. Subject to the written consent of the Owner, work may be sublet, but said consent shall be effective only after a Surety Performance and Labor and Material Payment Bond satisfactory to the Owner has been furnished and delivered by the subcontractor to cover the work to be

performed and the material to be used in that particular subcontract. It is understood, however, that the subcontract shall not under any circumstances relieve the Contractor of his full obligations under the contract. Should any subcontractor violate any of the terms of the contract and/or Specifications, the Owner may, at its option, end and terminate such subcontract. The subcontractor shall look only to the Contractor for the payment of any claims of any nature arising out of said subcontract, and shall make no claims whatsoever against the Owner for any work performed, materials furnished or things done by reason of said subcontract.

G-25 PERMITS TO BE SECURED BY CONTRACTOR

The Contractor shall secure permits, licenses and bonds, and shall pay all necessary fees required in the prosecution of the work. The Township of Pequannock contains both State and County roads requiring separate road permits to be obtained. The Bidder shall fully inform himself as to the cost of all necessary permits, licenses and bonds, and shall include this cost in the price bid.

G-26 BIDDERS REFERRED TO LAWS

The attention of the bidders is especially directed to the provisions of Federal, State, County and Municipal laws, statutes and regulations that may apply to the work, particularly with regard to obstruction of streets, maintaining of signals, storing and handling of explosives, etc. Particular note is to be taken also of those provisions affecting the Contractor or his employees in the prosecution of the work or his relation to any political subdivision or person. All pertinent laws, statutes, ordinances and regulations shall be obeyed and complied with.

G-27 ADVERTISING REFERENCE AND PICTURES

The Contractor shall not make advertising reference to the Owner and no photographs or pictures of this project shall be made in any advertising done by or for the Contractor without written permission of the Owner. The design and text of signs advertising the Contractor's business in connection with this project shall be subject to the approval of the Engineer.

G-28 LAYING OUT THE WORK

Contractor to Establish Controls

The Contractor shall be obligated to establish all bench marks and the position of base line control points on the site of the work through the use of a licensed land surveyor, if necessary.

Contractor to Provide Construction Stakes

From the established controls the Contractor shall run all offset lines, set and drive stakes, and take all other measurements to lay out the work in accordance with the intent of the Contract Drawings. This work is to be performed by a licensed land surveyor in the State where the project is located. Prior to the commencement of construction the Contractor may be required to submit cut sheets for review and approval by the Engineer if necessary.

Engineer to Check Contractor's Layout

After the Contractor has erected forms, and set line and elevations for the sidewalk replacements, the Engineer shall check such work for obvious errors in alignment and grade and only upon approval of the Engineer shall the Contractor proceed with permanent construction of the work so checked.

Contractor Responsible for Errors

Notwithstanding the Engineer's responsibility to check the Contractor's layout of the work for obvious errors or omissions, the basic responsibility for laying out the work remains the Contractor's and he shall be responsible to the Owner for rectifying same or for the cost of rectifying any errors resulting from his layout of the work.

Contractor to Assist Engineer

When requested by the Engineer, the Contractor shall make available a competent employee from his construction force to assist the Engineer in any manner which may be necessary to check the grades and alignment as well as other features of the work. No extra payment will be made for the services of such assistant, and payment for the assistance shall be deemed to be included in the price bid. Failure to comply with this provision shall be sufficient cause for the Engineer to stop the work on unchecked sections.

Contractor to Protect Control Points

The Contractor shall adequately protect all monuments, stakes and marks set or existing. If they are disturbed or obliterated by the Contractor during the progress of the work, they shall be replaced at the Contractor's expense, and the amount thereof may be withheld from any payment due or becoming due. The Engineer shall require two (2) days notice prior to replacement.

G-29 MONUMENT STONES

When any existing monument stones, irons or stakes designating the lines of property, streets or highways are encountered, the Contractor shall not disturb them, except with the approval of the Engineer.

The Contractor shall furnish the necessary labor, when required, to remove any monument stone and to reset same, and he shall be held responsible for the loss of any such stone removed.

The re-establishment and resetting of any existing monument stones shall be done by a Professional Land Surveyor licensed to practice in the State that the project is located in. Upon notification by the Engineer, the Contractor shall promptly re-establish and/or reset any monument stones disturbed by his operations. All costs for the above work shall be borne by the Contractor and there shall be no separate payment by the Owner.

a) The Owner shall consider itself damaged to the amount of one thousand dollars ($1,000.00) for each violation of this provision.
b) The amount of the damage shall be deducted from any payments to be made on the contract.

G-30 MAINTENANCE PERIOD REQUIRED

The Bidder's attention is directed to the provisions hereinafter in the contract documents which require, unless otherwise provided, the maintenance of all work and materials furnished under this contract, for a minimum period of two (2) years after final completion and acceptance of the work. The contract requirements for two (2) year Maintenance Guarantee are further presented in these conditions in Section G-67 or Section G-68.

G-31 NORMAL WORKING HOURS REQUIRED

Unless otherwise provided, the Contractor will be expected to accomplish all of the work of this project during normal working hours. No work will be performed on Saturdays, Sundays, Legal Holidays, in excess of eight (8) hours or prior to 7:30 a.m. on any normal working day, without the permission of the Engineer. If permission for work during normally prohibited hours is granted, there shall be no machinery such as wood chippers, chain saws, jackhammers or heavy equipment used which produce excessive noise, unless emergency operations are under way.

G-32 CONTRACT DOCUMENTS

Description of Contract Documents

The contract documents consist of the Contract, Notice to Bidders (Advertisement), Proposal and all other Bidding Forms, General Instructions and Conditions, Special Provisions, Standard Specifications, Supplementary Specifications, Drawings, Addenda, and Modifications.

Sequence of Precedence

In the case of conflict between the various parts of the contract documents, they shall be interpreted; (a) to require the higher, in terms of quality of materials and workmanship, of the possible interpretations, and (b) in accordance with this sequence of precedence:

a. Contract
b. Addenda, Bulletins, Change of Drawings
c. Details
d. Drawings
e. Supplementary Specifications
f. Special Provisions
g. Standard Specifications
h. Federal General Conditions (if applicable)
i. General Instructions and Conditions

In case of discrepancies between calculated, represented and scaled dimensions versus actual field measured results on the details or Drawings, the calculated dimensions shall govern.

Ownership of Documents

All Contracts and copies thereof are furnished by the Engineer for use only on the project herein described and, with the exception of those sets which have been signed in connection with the execution of the Contract, shall at all times remain the property of the Pequannock Township Engineer. They shall not be used in connection with any other project.

G-33 INTENT OF CONTRACT DOCUMENTS

Description of Complete Project

It is the intention of the Contract Documents to describe a complete project to be constructed in accordance with all the requirements therein, notwithstanding that each and every item required may not be shown on the Drawings or mentioned in the Specifications. The Contract Documents comprise the

entire agreement between the Owner and the Contractor and may be amended or added to only as herein described. No other contract work by any third party shall precede, diminish or compromise this contract upon award, nor shall any third party benefit from this contract without formal written notice to the Owner and Engineer.

Documents are Complementary

The Contract Documents are complementary; they are to be considered as one instrument; the intent is to make them explanatory of the other. No sections thereof or any papers attached to or bound with the Contract Documents shall be detached as each one is a necessary part thereof.

G-34 ADDENDA AND INTERPRETATIONS (PRE-BID)

No interpretation of the meaning of the Drawings, Specifications or other pre-bid documents will be made to any bidder orally. Every request for such interpretation should be in writing addressed to the Engineer at the address given in the Notice to Bidders (Advertisement) and to be given consideration must be received at least nine (9) business days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the Specifications which, if issued, will be faxed to all prospective bidders (at the respective fax numbers furnished for such purposes), not later than seven (7) business days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the Contract Documents.

G-35 OWNER TO FURNISH DRAWINGS AND SPECIFICATIONS

The Owner will furnish or cause the Engineer to furnish the Contractor with two (2) complete sets of Drawings (paper prints) and two (2) complete sets of other contract documents after the execution of the contract agreement. Additional sets of Drawings or contract documents will be furnished the Contractor upon application, at the cost of reproduction.

When Drawings are revised or supplemental Drawings are prepared, two (2) copies of such revisions or supplements shall also be furnished the Contractor for inclusion with the previously issued Drawings.

G-36 CONTRACTOR TO REVIEW DRAWINGS

The Contractor shall be assumed to have reviewed all Drawings, details, and schedules for conflicts or discrepancies. He shall notify the Engineer of any and all conflicts or discrepancies therein for interpretation and correction and/or revision as necessary prior to bid submission.

The Contractor will be deemed to have fully examined the Drawings and contract documents during the preparation of his proposal and to have been aware of and have made allowances therein for any such discrepancies; consequently, no additional compensation on account of any such discrepancy will be due to the Contractor in excess of the amounts scheduled in his proposal.

G-37 WORK TO BE PERFORMED

The work of the contract comprises the performance and completion of the project, including the furnishing of all materials, equipment, transportation, labor and all else necessary therefore and incidental thereto and final cleaning up, payment of all due obligations and the replacement of any defective work or

materials all as herein provided.

G-38 QUALITY OF WORK REQUIRED

Materials Required

Unless otherwise provided, all materials shall be new and shall be of domestic manufacture. All materials required for the work, unless otherwise provided, shall be provided by the Contractor and shall be subject to the Engineer's approval before and/or after delivery and before and/or after incorporation into the work.

All materials shall have been inspected, tested and approved at their source and shall be certified as meeting the requirements of the Specifications for same. The costs of testing materials shall be borne by the Contractor.

Materials shall not be used until approved by the Engineer. All materials which appear to be defective or unclean when received or which may become damaged in storage shall not be used in the work, even though they have been previously accepted.

Equipment Required

All bidders should familiarize themselves with the requirements herein regarding the equipment required for the proper prosecution of the work. All equipment used shall, in the opinion of the Engineer, be proper for work to be performed. No equipment which, because of its weight or dimensions, will cause damage to public or private property shall be allowed. Any accidental damage must be promptly repaired without claim for additional cost from the Contractor.

Good and sufficient equipment shall be used to ensure the completion of the work. It shall be in proper working order and shall be operated so as not to do damage to public or private property. When a specific type of equipment is called for, it shall be provided and used. All equipment is subject to the approval of the Engineer. The responsibility for damage done through the use of improper tools and equipment shall be borne by the Contractor.

Workmanship Required

All workmanship shall be, in every respect, in accordance with the best current practice. All skilled craftsmen, fully qualified in the various disciplines required, shall be used on the work.

Equivalent Materials and Workmanship

Whenever the contract documents request a particular brand or make of material or specify by trade name or otherwise, such brand or make of materials is to be regarded as a minimum standard. If the Contractor wishes to furnish or use a proposed substitute he will be required to show, to the satisfaction of the Engineer, that the proposed substitute will perform adequately the duties required by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. No substitute shall be used without the written permission of the Engineer who shall be the sole judge of equality.

G-39 COOPERATION WITH OTHERS

Work of Other Contractors

The right is reserved to the Owner to do work with its own employees or by other contractors and to permit public utility companies and others to do work during and within the limits of, or adjacent to, the project. The Contractor shall conduct his work so as to cause as little interference with the work of such other contractors as possible.

If any of the work of the Contractor or his subcontractors depends upon the proper execution of the work by others, the Contractor will inspect the work promptly, give notice to the Engineer of any defects found in such work that render it unsuitable in the performance of his work. Failure of the Contractor to inspect and so notify the Engineer shall constitute an acceptance by him, but not of the Owner, of the work as being fit and proper, and the Contractor shall be held liable for any defects that may develop in such work.

Requirements of Other Bodies

Certain work to be done incidental to this contract may be required by persons, municipalities or bodies other than the Owner. Drawings, Specifications or other available detail information, such as is in the possession of the Owner, will be placed on file for the Bidder's reference.

All such file data, if any, is only for the guidance of the Contractor, who may use such data at his own discretion. No responsibility is assumed by the Owner, Engineer or their agents, as to the completeness or accuracy of the data, or for the acceptance of the work.

The Contractor shall be responsible for the approval and acceptance of work that is to meet the requirements of persons, municipalities or bodies other than the Owner. The work may include but shall not be restricted to replacement of sidewalks, curbs, pavement or utilities, as well as other incidental work required to complete the contract.

Disputes Concerning Non-Cooperation

It is agreed that, in the event of disputes arising as to possible or alleged interferences among various contractors on the site of the work which, in the opinion of the Engineer, may retard the progress or adversely affect the quality of the work, the Engineer is vested with the authority to render a judgment of fault insofar as the interference, if any exists, is occasioned by the Contractor or by any of his subcontractors or agents or by the Owner. Such decisions of the Engineer shall be binding and conclusive on any party to the contract.

G-40 CONTRACTOR'S PERSONNEL

Contractor's Superintendence

The Contractor shall attend to the work personally or through a competent, English-speaking superintendent, who shall be continually present on the project site whenever work is in progress. Such a superintendent shall be satisfactory to the Engineer and shall not be removed or replaced without due notice being given the Engineer. The superintendent shall have full authority to act for the Contractor without the need to consult any higher level of authority.

Contractor's Employees

All workmen must be competent and fully qualified in the type of work to be performed. Any employee of the Contractor who is found by the Engineer to be incompetent, unprepared, disorderly, unresponsive,

or who is performing his work contrary to the Specifications or the Engineer's instructions shall be removed from the project and shall not be again employed on the project without the Engineer's consent.

Work Force to be Sufficient

The quality of superintendence and the number of workmen employed on the site of the work shall, in the opinion of the Engineer, be sufficient to complete the project within the stipulated time. No progress payments due or becoming due during this project shall be certified for payment for as long as any Contractor may be held in violation of the terms of this section.

Certain Employees Prohibited

Neither the Contractor nor any subcontractor shall engage, on any basis, during the period of this Contract, any of the professional, technical or administrative personnel of the Owner who are or have been employed by the Owner during the period of this Contract, without the written consent of the Owner.

G-41 CONTRACTOR'S WORKING FACILITIES

Working Site - Additional Right-of-Way

The Owner will provide land, easements or rights-of-way for the work within the limits designated on the Drawings. The Contractor shall not enter or occupy any land outside of the limits so designated on the Drawings without first obtaining the written consent of the property owner(s). A copy of such written consent shall be filed with the Engineer. Upon completion of the work, including all cleanup and restoration, the Contractor shall obtain a written release from the owners of all lands used and file such release or releases with the Engineer.

The Contractor shall inform himself of the rights-of-way provided as indicated on the Drawings. The Contractor shall make all necessary arrangements for additional rights-of-way required for his own purposes, such as for storage of equipment and material.

No further payment will be made for additional rights-of-way other than that included in the price bid for the construction work.

Temporary Utilities

The Contractor shall provide and maintain in a strictly sanitary manner, and at his own expense, toilet facilities for himself and his workmen, which shall be screened from public view and no closer than 50 feet from any residence. The location thereof and the method of waste disposal shall be subject to the approval of the Engineer. The Contractor shall observe and enforce all sanitary regulations and maintain satisfactory conditions on all parts of the work.

G-42 USE OF COMPLETED SECTIONS OF THE WORK

The Engineer may order completed or partially completed but previously unused sections of the work to be placed in operation prior to the acceptance of the entire project. Unless otherwise provided herein, the maintenance of such sections of the project shall be the responsibility of the Owner who shall also be responsible to the Contractor for any additional costs occasioned by such opening. The Engineer shall, and is hereby agreed to have, the final authority in the determination of such additional costs. For reconstruction work the use of partially completed sections of the contract work is limited to selective

access by owners or service providers whereas such access does not compromise integrity of completed work or safety measures required to remain in place.

G-43 FINAL CLEAN UP

Before the final acceptance of the work, the Contractor shall remove all the equipment, temporary work, unused and useless materials, rubbish and temporary buildings, shall repair or replace in an acceptable manner any private or public property which may have been damaged or destroyed on account of the prosecution of the work, shall fill all depressions and water pockets on public or private property caused by his work, shall clean all drains, sewers, and ditches within and adjacent to the work which have been obstructed by his operations, and shall leave the site, and adjacent public and private property, in a neat and presentable condition wherever his operations have disturbed conditions existing at the time of starting the work. When required by the Engineer to do so, the Contractor shall procure and submit to the Engineer signed statements from affected property owners that he has fulfilled his obligations with regard to their respective properties.

G-44 ENGINEER'S STATUS DURING CONSTRUCTION

The Engineer shall be the Owner's representative during the construction period. All instructions of the Owner to the Contractor shall be issued through the Engineer.

The Engineer shall make periodic visits to the site of the work to observe the progress and quality of the executed work to determine, in general, if the work is proceeding according to the contract documents. The Engineer shall not be required to make continuous or exhaustive on-site inspections nor shall he be responsible for construction means, methods, techniques, sequence or procedures, or the safety precautions incidental thereto. On the basis of his on-site observations as an experienced and qualified design professional, the Engineer shall keep the Owner informed of the progress of the work and will endeavor to guard the Owner against defects and deficiencies in the completed work. If the Owner and Engineer agree, the Engineer shall provide one or more full time Resident Project Representatives (Construction Observers) to assist the Engineer in carrying out his responsibilities at the project site. Such representatives are to be provided at the Owner's expense.

G-45 ENGINEER'S DECISIONS AND ORDERS

Work to Satisfy Engineer

The work provided for herein shall be performed under the general direction and to the entire satisfaction of the Engineer, and his decision upon all questions relating to the quality and acceptability of the work performed shall be final and binding.

Clarification and Interpretations (Post-Bid)

The Engineer shall issue, with reasonable promptness, such written clarification or interpretations of the Drawings or Specifications as he may determine necessary for the proper execution of the work. Such clarifications must be consistent with the overall intent of the contract documents and shall be binding upon all parties to the Contract.

Engineer to Decide Payment Disputes

The Engineer shall determine the amount and quality of the work performed and of the materials furnished which are to be paid for under the Contract. Any such decision and his estimate shall be final and conclusive and such estimate, in case any questions may arise, shall be a condition precedent to the right of the Contractor to receive any money due under the Contract, or to the right of the Owner to withhold amounts due.

G-46 ENGINEER'S FIELD OFFICE

On all projects where the item "Engineer's Field Office" is scheduled in the Proposal, the Contractor shall provide a field office, for the exclusive use of the Engineer and Construction Observers, meeting the minimum requirements hereinafter set forth in the Supplementary Specifications. Such a field office shall be made available, fully equipped, within ten (10) days of starting work on the project and shall be maintained a minimum of thirty (30) days and a maximum of ninety (90) days following final acceptance of the work.

G-47 INSPECTION AND TESTING PROCEDURES

Thorough Inspection Required

The Owner contemplates and will require, and the Contractor agrees to, the most thorough possible inspection of the work at all times by the Owner, Engineer or their representatives. Such inspection shall include but is not limited to all labor performed and material furnished, delivered or intended to be used in the work and including their manufacture, fabrication, installation and testing.

Access to the Work

The Contractor shall furnish the Engineer with every reasonable facility for ascertaining whether or not the work, as performed, is in accordance with the requirements and intent of the contract documents.

The Owner or the Engineer shall have the right to inspect all work done and all materials furnished either in the field or at the point of manufacture. The Contractor shall furnish or cause to be furnished to the Engineer safe access at all times to the places where preparation, fabrication or manufacture of materials and/or construction of the work is in progress.

When the Engineer or his representative is in or about the premises mentioned above in the course of his duties, he shall be deemed conclusively to be an invitee of the Contractor. If the Contractor be not the owner of the premises mentioned above, the owner thereof shall be deemed an agent of the Contractor with respect to the obligation assumed hereby.

The Contractor or his agent, as described above, shall be liable for the payment of claims for injuries to the Engineer or his representative due to negligence on the part of the Contractor or his agent.

Covering Uninspected Work

If any work be buried, covered or otherwise concealed prior to inspection or otherwise contrary to the orders and direction of the Engineer and such work is not subject to testing and approval by any acceptable alternate method, it must, if required by the Engineer, be uncovered for examination. Such uncovering and all necessary restoration, regardless of the final acceptability of the work uncovered, shall be at the expense of the Contractor.

Uncovering Completed Work

The Engineer, with the approval of the Owner, may order the uncovering of any completed portion of the work at any time prior to acceptance regardless of the degree of inspection initially provided and regardless of any prior approvals. If, after examination, such uncovered work is found to be in accordance with the contract documents, then all expenses involved in the uncovering, examination, testing and restoration, shall be borne by the Owner. If such uncovered work does not meet the requirements of the contract documents, then all expenses involved, including the correction of all deficiencies in the work, shall be borne by the Contractor.

Construction Observers

The work shall be conducted under the general supervision of the Engineer who may be assisted by such Construction Observers as the Owner and the Engineer may agree to employ.

Construction Observers are stationed on the site of the work to represent the Engineer and to report to him concerning the progress of the work and the quality of workmanship and materials being furnished. Such Construction Observers shall inform the Engineer and the Contractor when it appears that work being performed and/or the materials being furnished do not conform to the requirements of the contract documents. Such inspections, if provided, shall not relieve the Contractor of his basic responsibility to furnish materials and perform work in complete accordance with the requirements of the contract documents.

The Construction Observer is not authorized to revoke, alter, relax or release any requirements of the contract documents or to issue instructions contrary to the contract documents.

If disputes arise between the Construction Observer and the Contractor relating to the acceptability of the work, the Construction Observer is authorized to reject the work involved and to notify the Contractor that further work on the portions of the project involved is unauthorized and subject to non-payment until the question at issue can be referred to and decided by the Engineer.

The Construction Observer shall perform certain tests to insure adequate construction, compliance with Specifications, and the suitability of construction materials and for any other reason it may deem necessary. The Contractor shall cooperate in making all tests and furnish the labor and equipment i.e., small construction tools, (wheel barrows and the like) to assist the Engineer and/or his representative at the job site in performing the testing.

Ordering Materials

Before ordering materials, the Contractor shall obtain the Engineer's approval of the acceptability. In the case of concrete aggregate, and similar materials, samples must accompany the request for approval. The Contractor must forward to the Engineer copies of all purchase orders as issued to his suppliers and must, within forty-eight (48) hours of receiving any shipments of materials, notify the Engineer of the kind, quantity, proposed use, and storage place of such material and must forward to the Engineer copies of any shipping lists, invoices or delivery slips accompanying such deliveries.

Testing Materials

Except as may be provided elsewhere, tests or analysis of material which are usually tested after delivery to the site, such as concrete aggregate, mixed and placed concrete, and similar materials, are to be

performed by the Contractor or testing laboratories which will be an approved testing facility and selected and paid for by the Contractor. The preliminary testing of concrete mixtures and tests or analysis of the materials, samples of which are to be submitted prior to delivery, will also be performed by the laboratory and paid for by the Contractor. The Contractor shall furnish all labor and material and otherwise make provisions for the collection and undisturbed storage of all samples of materials as required and directed by the Engineer. The Contractor will furnish necessary sampling equipment and containers, and transport all samples from the site to the laboratory.

If the Engineer orders sampling and analysis or tests of material which are usually accepted on certification of the manufacturer but which appear defective or not conforming to the requirements of the Specifications, the Owner will bear the reasonable costs of sampling, transportation, tests and analysis if the material is found to be sound and conforming to the Specifications.

Certificates of Manufacturer

For raw or manufactured materials or products which are normally tested in the shop by the manufacturer, the Contractor shall furnish the Engineer with three (3) copies of certified records of physical, chemical and other pertinent tests, and/or certified statements from the manufacturer that the materials have been manufactured and tested in conformity with the Specifications. Where such a small quantity of material is required as to make physical tests of chemical analysis impractical, a certificate from the manufacturer stating the results of such test or analysis of similar materials which were concurrently produced may, at the discretion of the Engineer, be considered as the basis for the acceptance of such materials.

G-48 CONTROL OF THE WORK

Unauthorized or Defective Work

Any materials or work unauthorized or found to be defective, or not in strict conformity with the requirements of the Drawings and Specifications or defaced or injured through negligence of any Contractor or his subcontractors or employees, or through actions of fire or the weather or any causes, shall be removed immediately and new materials or work substituted therefore without delays by the Contractor.

No previous inspection or partial payment shall be held as an acceptance of defective work or materials or to relieve any Contractor from the obligation to furnish sound material and to perform good satisfactory work. The Engineer is to be the final judge of the materials and work furnished.

If the Engineer deems it inexpedient to correct work injured or done not in accordance with the contract, the difference in value between such work and that specified, together with a fair allowance for damage, shall be deducted from the contract price.

Suspension of Work

The Engineer shall have the authority to suspend the work wholly or in part, for such period or periods as he may deem necessary and not due to the failure on the part of the Contractor to carry out orders given, or perform any or all provisions of the contract. If it should become necessary to stop work for such an indefinite period, the Contractor shall store all materials in such a manner that they will not obstruct or impede the traveling public unnecessarily nor become damaged in any way, and he shall take every precaution to prevent damage or deterioration of the work performed, provide suitable drainage of the site by opening ditches, shoulder drains, etc., and erect temporary structures where necessary. The Contractor

may not suspend the work without written authority.

During suspension of work due to any cause whatsoever, when deemed necessary by the Engineer, the entire work under contract or any section thereof, shall be thrown open to use, and the Contractor shall place any such section in satisfactory condition for use without additional compensation. The Contractor shall be responsible for the satisfactory maintenance of any such section of work thrown open to use prior to its final acceptance.

When work is suspended as herein provided, payments for completed portions of the work will be made as hereinafter provided for normal progress payments and a suitable extension of time for completing the suspended work will be made. No compensation or allowance will be made on account of such suspension unless it is for more than fifteen (15) days.

Should the suspension exceed fifteen (15) days and should the Contractor have additional expenses on account thereof, he shall have the right to file with the Owner a statement of such additional expense and if the Owner deems such statement proper, the Contractor will be reimbursed therefore, provided:

a. That the statement of additional expense is filed within fifteen (15) days of the conclusion of the period of suspension in question;
b. That the statement of additional expense includes no charges occurring during the first fifteen (15) days of any suspension; and
c. That no charges are made by the Contractor for any work performed during that period of suspension.

If the period of suspension exceeds one (1) year, the Owner will, upon the request of the Contractor, annul the contract as hereinafter provided.

Annulment of Contract

When the Owner deems it advisable in the interest of the Owner, it may annul this Contract upon giving thirty (30) days written notice to the Contractor, and if not in default, payments will be made as provided, for all work done by him under the terms and conditions of this contract, up to the time of annulment. The Contractor shall be reimbursed by the Owner for such expenditures as, in the judgment of the Owner, are not otherwise provided for and as are required in preparing for and moving to and from the work. It is understood, however, that no payment shall be made for any claim for loss of anticipated profits.

The Contractor, if notified to do so by the Owner, shall promptly remove any part or all of his equipment and supplies from the site of the project, failing which the Owner shall have the right to remove such equipment and supplies at the expense of the Contractor.

If the Contractor shall be adjudged bankrupt or make an assignment for the benefit of creditors, or if a receiver or liquidator shall be appointed for the Contractor or for any of his property and shall not be dismissed within twenty (20) days after such appointment, or the proceeding in connection therewith shall not be dismissed within twenty (20) days after such appointment, or the proceedings in connection therewith shall not be stayed on appeal within the said twenty (20) days, or if the Contractor shall fail or refuse to comply with laws and ordinances, and such orders as may from time to time be given by the Engineer with respect to the work, or if the Contractor shall assign or sublet the work other than as herein specified, or if the Contractor fails in doing the work as specified, or fails to perform the work with sufficient materials to ensure the prompt completion of said work, or shall perform the work unsuitably or shall neglect or refuse to remove materials or perform anew such work as shall be rejected as defective

and unsuitable, or shall discontinue the prosecution of the work, the Owner may, upon written certificate from the Engineer and after two (2) days written notice to the Contractor from the Owner of the fact of such delay, neglect or default on the part of the Contractor, have full power and authority, without violating the Contract, to take the prosecution of the work out of the hands of said Contractor, to appropriate or use any or all materials and equipment on the ground as may be acceptable and may enter into an agreement with another or others for the completion of said contract, according to the terms and provisions thereof, or use such other methods as, in the Owner's opinion, shall be required for the completion of said contract in an acceptable manner.

Should the Owner so elect to take the prosecution of the work out of the hands of the said Contractor, all rights, titles and interest in and to the equipment and material owned by the Contractor and used in the execution of the Contract, shall be vested in the Owner, and on completion of the said Contract, the Owner may dispose of the same in the manner that to it may be deemed to the best interest of the parties concerned. All costs and charges incurred by the Owner, together with the costs of completing work under contract, shall be deducted from the monies due or which may become due to said Contractor. In case the expense so incurred by the Owner shall be less than the sum which would have been payable under the Contract, if it has been completed by said Contract, then the said Contractor shall be entitled to receive the difference, and in case such expense shall exceed the sum which would have been payable under the contract, the Contractor and his Surety shall be liable and shall pay to the Owner the amount of said excess

Contractor's Right to Stop Work or Terminate Control

If the work should be stopped under an order of any court, or any other public authority, for a period of three (3) months, through no act or fault of the Contractor or of anyone employed by him, or if the Engineer should fail to issue any estimate for payment within thirty (30) days after it is due, or if the Owner should fail to pay the Contractor within thirty (30) days of its maturity and presentation any sum certified by the Engineer or awarded by arbitrators, then the Contractor may, upon seven (7) days written notice to the Owner and the Engineer, stop work or terminate this contract and recover from the Owner payment for all work executed, plus any loss sustained upon any plant or materials plus reasonable profit and damages.

Default of Contract

When, in the opinion of the Engineer, the work or any part thereof has been abandoned, is unnecessarily delayed, or cannot be completed by the Contractor at the rate of progress or within the time specified, or the Contractor is willfully violating any of the covenants of this contract, or is carrying it out in bad faith, then the Engineer may so certify in writing to the Owner and the Owner may declare the Contractor in default on the Contract and notify him to discontinue the project. The Owner may then call upon the Surety to complete the project, or may complete it by other means, as the Owner may elect. The Owner may take over and use materials and equipment on the site of the project at the time of default and may procure other materials and equipment and all else necessary for the completion of the project. The Owner shall recover the cost of finishing the project by deducting the amount thereof from any monies due or which may be due that Contractor under his contract, and when such monies are insufficient to pay said cost the amount of said cost in excess of such monies shall be paid by the Contractor or the Surety.

Legal Address of Contractor

Both the address given in the Proposal upon which this Contract is founded and the Contractor's office at or near the site of the work are hereby designated as places to either of which notices, letters, and other

communications to the Contractor may be mailed or delivered. The delivering at either of the above-named places, or depositing in a postpaid wrapper directed to either such place, in any post office box regularly maintained by the post office, of any notice, letter or other communication to the Contractor, shall be deemed sufficient service thereof upon the Contractor, and the date of said service shall be the date of such delivery or mailing. The first-named address may be changed at any time by an instrument in writing executed and acknowledged by the Contractor and delivered to the Owner. Nothing herein contained shall be deemed to preclude the service of any notice, letter or other communication upon the Contractor personally.

G-49 CONTRACT CHANGES

Claim for Additional Compensation

The Contractor shall notify the Engineer, in writing, of his intention to make claim for additional compensation for work required or materials to be furnished which, in his opinion, cannot be classified under the schedule of items of work and which have not been covered by an extra work order or supplementary agreement as already provided for, before he begins the work or furnishes the materials in question.

No work shall be done or materials furnished until the Contractor is authorized in writing by the Engineer to do so specifically addressing scope, cost and schedule. If such authorization not be given, then the Contractor shall agree, and hereby does agree, to waive the claim for such additional compensation.

Supplementary Agreements

If it is found necessary to have any work executed beyond that covered by the items of work in the Contract, the Contractor hereby agrees to execute the same in as diligent a manner as followed in the execution of the work under the original Contract. Any significant change to scope, cost, exceedance of the contract awarded lump sum, or project schedule must be agreed to in writing prior to initiation of work, unless a public emergency exists. The Engineer will have the right to enforce any provisions under the Contract and Standard Specifications in the execution of work.

The amount of compensation to be paid to the Contractor for any supplementary work, as so classified, ordered, and agreed upon, can be determined by any of four methods, as chosen and approved by the Owner as follows:

a. By such applicable combination of contract unit prices, if any, as are set forth in the Contract and may be used to describe the work performed; or

b. If no combination of unit prices is possible, then by unit prices or by a lump sum mutually agreed upon by the Owner and the Contractor; or

c. If the supplementary work is performed by subcontract, and the amount of such subcontract is approved in writing by the Engineer, then the Contractor may be paid the amount of such subcontract plus ten percent (10%) as full compensation; or

d. If no such unit prices are set forth and if the parties cannot agree upon unit prices or a lump sum and the work is not done by a subcontract, the Contractor shall receive the true necessary cost to him, including workers' compensation, public liability, unemployment and social security insurance but exclusive of administration, general superintendence and profit, as determined by the Engineer. Costs paid to the Contractor shall not exceed current publicly bid rates, wherever possible.

All components of cost, work performed, equipment, material and labor furnished shall be reported on daily sheets, and the Contractor shall be paid on the basis of the daily reports signed by the Engineer.

UNDER NO CIRCUMSTANCES SHALL WORK BE HALTED FOR LACK OF AGREEMENT RELATIVE TO PRICE. NO EXTRA WORK SHALL BE PAID FOR UNLESS ORDERED IN WRITING BY THE ENGINEER.

Change Orders

Before payment is made for any additional or supplementary work or before any final payment certificate is submitted, the Engineer will prepare a Change Order for any such changes in quantities, additional items or other alterations in the requirement of the contract documents. He shall also prepare a reduction order if any quantities have been omitted.

These Change Orders shall be written, shall carry a statement or recommendation over the signature of the Engineer and shall be executed by the Contractor and the Owner. These orders shall be combined with the original Contract and the final estimate shall be in accordance with this combination.

All change orders shall comply with Local Public Contracts Regulations issued by the Department of Community Affairs, N.J.S.A 40A:11-1 et seq. and N.J.A.C. 5:34.

Supplementary Drawings

Supplementary Drawings may be issued by the Engineer, to the Contractor, from time to time, where the Drawings require supplementing, to explain the work more fully or to show additions or changes which have been ordered by the Owner. These supplementary Drawings shall have the same force and effect as any other contract documents.

Extension of Time

An extension of time may be granted by the Owner or Engineer in writing on account of some unusual difficulty, accident or other good and sufficient cause, and by so doing, said Owner may waive the right to deduct from any subsequent payments due the contractor, during the period of any such allowed extension of time, the liquidated damages already provided for herein. All wages and expenses which said owner must pay for the inspection of the work or material after the date herein set forth in the completion of the work, except when such extension of time is required by a duly issued Change Order increasing the quantity of work to be performed shall be borne by the Contractor. All requests from the Contractor for an extension of time must be accompanied by the approval of the surety company bondsman.

G-50 SHOP & SETTING DRAWINGS

The Contractor shall submit with such promptness as to cause no delay in his work or that of any other contractor a transparent copy of all shop or setting Drawings, details, and schedules required for the work, and the Engineer will pass upon them with reasonable promptness. The Contractor shall make any corrections required by the Engineer and resubmit a transparent copy for approval. After final approval of the Drawings has been received, the Contractor shall immediately send the Engineer six (6) prints of the final approved Drawings, plus one (1) approved print each to every other interested contractor or supplier. The Engineer will make proper distribution of all Drawings as directed by the Owner. At the Contractor's option the requirement for a transparent copy may be waived and the Contractor permitted to submit sufficient copies of the actual Shop Drawings, schedules, etc., direct to the Engineer.

The Engineer's approval of shop or setting Drawings shall only be construed to apply to general layout and conformance to the design concept of the project and for compliance with the general requirements of the contract documents. The responsibility for any deviations from the requirements of the contract documents must remain the Contractor's unless he has, in writing, specifically called the Engineer's attention to such deviations at the time of submission and has received the Engineer's written approval of such deviations.

G-51 CONSTRUCTION PHOTOGRAPHS

Unless otherwise provided, the Contractor, as directed by the Engineer, shall furnish a series of construction photographs, taken by an experienced commercial photographer, to show the progress of the work. Photographs shall be taken at such times and locations as ordered by the Engineer. Not less than eight (8) photographs, nor more than twelve (12) photographs, taken at regular intervals, shall be taken during each month throughout the duration of the project.

Proofs of all photographs shall be provided to the Engineer. Of these proofs, the Engineer shall, monthly, select not less than four (4), nor more than eight (8), for printing. Two (2) glossy prints of each proof selected during each month shall be submitted to the Engineer. Prints for submission shall be not less than eight inches (8") by ten inches (10") in size, mounted on cloth, with a flap for binding, and properly and fully identified as to date, location, etc., by typing on the reverse side.

G-52 PROSECUTION OF THE WORK

Beginning Work

The Contractor shall begin work within five (5) calendar days after receipt of Notice to Proceed, and shall continue without interruption until the work is completed, except as provided for. The Contractor shall fully complete the project within the time period as stipulated herein. The Contractor shall notify the Engineer at least twenty-four (24) hours in advance prior to starting any work on the project. Failure to prosecute the work, without permission of the Engineer, for a period of ten (10) consecutive days will be considered an abandonment of the contract.

Place of Beginning Work

The place where the work is to be started will be as stated elsewhere herein or will be designated on the ground by the Engineer. The work will be prosecuted from as many different points in such part or parts and at such times as may be directed, and shall be conducted in such a manner and with sufficient materials, equipment and labor as is considered necessary to ensure its completion within the time set forth in the Contract. Should the prosecution of work for any reason be discontinued by the Contractor, with the consent of the Engineer, he shall notify the Engineer at least twenty-four (24) hours before again resuming operation.

Unavoidable Delays

If for any reason beyond the control of the Contractor the work is delayed, the Contractor shall have no right to nor shall make any claim whatsoever for damages by reason of the delay.

Contractor's Organization

When, in the opinion of the Engineer, either the working force or the equipment are inadequate or insufficient to ensure completion of the work within the specified time, the Engineer may order the Contractor to correct same and the Contractor will comply with the order.

Progress Schedule

Prior to beginning work, the Contractor shall submit to the Engineer four (4) copies of a progress schedule for all items of construction. The schedule shall show the sequence of construction operations, the estimated time of initiation and completion of each operation, and the times of establishment and estimated duration of any traffic relocations. If any sequence of operations is repeated at different locations, said locations shall be specified noting the duplicate sequence. Such progress schedules shall be subject to the Engineer's approval and the Contractor, once he receives approval of a particular schedule, may not deviate from it without the permission of the Engineer.

Job Meetings

The Contractor, his subcontractors, his material men, and suppliers whose presence is requested, shall attend all job meetings called by the Engineer upon forty-eight (48) hours notice. Lack of attendance at any job meeting by any of the above shall be sufficient reason for the suspension of work as herein provided. The proceedings of all job meetings shall be recorded by the Engineer who shall furnish two (2) copies of each proceeding to the Owner and four (4) to the Contractor for distribution as required.

G-53 PUBLIC AND LABOR RELATIONS, SAFETY AND PROTECTION OF PROPERTY

Public Safety and Convenience

The Contractor shall conduct his work with the least possible obstruction to traffic. The protection of persons and property, and the convenience of the public and of residents adjacent to the work, are of first importance and shall be provided for by the Contractor in an adequate and satisfactory manner. Suitable and safe temporary crossings shall be constructed and maintained where access to adjacent property is required. Fire hydrants shall be free of obstruction at all times, and access provided for fire apparatus.

Materials and equipment stored on the site shall be placed so as to cause as little inconvenience to residents and the traveling public as is necessary. Roadways, sidewalks, and gutters, and storm inlets, adjoining the work under construction, shall not be obstructed more than is absolutely necessary. The Contractor shall provide for prompt removal from existing roadways all dirt and materials that have been spilled, washed, tracked or otherwise deposited thereon by his hauling and other operations, whenever, in the opinion of the Engineer, the accumulation is sufficient to cause the formation of mud, interfere with drainage, damage pavements or create a traffic hazard. The Contractor shall cause to have the roadway(s) swept at the end of every work week, to the satisfaction of the Engineer.

The Contractor shall employ construction methods and means that will keep flying dust to a minimum. He shall provide for the laying of calcium chloride whenever the public is affected by such dust. The materials and methods of dust control shall comply with standards for sediment control and be subject to the approval of the Engineer.

Labor Relations

All labor employed by the Contractor on the project, or by a subcontractor shall work with the other trades, if any, that may be employed on the work or improvement under construction, so that there will be

no dissension or poor communication between trades or employees of other contractors.

Maintenance and Protection of Traffic

The Contractor shall provide sufficient watchmen, flagmen and traffic directors and shall take all other precautions, including any which may be ordered by the Engineer or designated Traffic Safety Officer, that may be necessary for the safety of the public and protection of the work.

The Contractor shall obtain the approval of the Engineer and consent of all appropriate authorities having jurisdiction for any detours which may be required. The Contractor shall make all necessary arrangements with such authorities regarding the establishment, maintenance and repair of such detours, the regulation and direction of traffic thereon, and the installation and maintenance of sign and traffic devices.

In the event the Chief of Police of the Municipality shall determine that traffic control officers are required, arrangements for said officers shall be made by the Contractor with the Chief of Police including arrangements for the payment of the costs therefore. Budgetary estimates of time and cost will be prepared in advance and the Contractor shall assume any overage for uniformed police presence attributable to his own delay of the construction progress and anticipated schedule.

Closing Work Areas to Public Use

All streets are to be kept open overnight and on Fridays, Saturdays and Sundays of each week unless written permission is granted by the Engineer to do otherwise.

If required by construction operations and permitted by the Engineer, temporary closures of public properties or rights of way will be subject to property owners affected by such closings receiving written notice at least twenty-four (24) hours in advance. Copies of such notices shall be provided to the Engineer.

Inadequate Precautions by Contractor

If the Engineer deems the precautions taken by the Contractor to be inadequate, he may order additional protection and should the Contractor or his men neglect to put up, provide or maintain such suitable protection as is required by these Specifications, the Engineer, or the authorities of the owner, may immediately and without notice to the Contractor furnish materials and put and maintain such protection as is deemed necessary and the cost thereof shall be paid by the Contractor. All expense incurred for protective measures herein specified and for repairs and replacements shall be borne by the Contractor.

Maintenance of Drainage

The Contractor shall provide all that is required for the removal and disposal of water from the trenches, excavations for structures, and other points of work. Ground water shall be lowered and maintained at such elevation that there will be no spring action or flow of water into excavations until concrete has received its initial set. Adequate facilities, as approved by the Engineer, shall be provided for the interception of suspended matter from the pump discharge before its disposal into existing drainage facilities. Where well points are to be used, the Contractor shall obtain approval of the Drawings and equipment from the Engineer. The Contractor shall provide and maintain acceptable ditches, flumes or pumping installations, as required to care for water courses and sewerage facilities (natural or artificial) intercepted by his operations or structures. In all cases where temporary pipes must be installed, or where sewage water, or drainage must be pumped or otherwise carried over or around excavations, or any other

portions of the work, the Contractor shall furnish such pipes, pumps, and all other materials, equipment and labor as are required to maintain continuity of service in the utilities affected. The Contractor will be held responsible for flooding of adjacent properties from any of his operations, and will be held liable for all claims due to flooding or other damage caused by the above operations.

Protection of Property

The Contractor shall not enter upon or make use of private property without the written consent of the owner, nor shall any Owner's lands be used by him except by special permission. The use of adjacent streets for storing of materials will not be permitted. The Contractor shall, without cost to the owner, shore up and protect as may be necessary all walls, fences or other property within the site of the project that may be injured during the progress of the work. The Contractor shall promptly restore or repair, at his own expense and to the satisfaction of the owner, property damaged or destroyed by the Contractor's operations. Any temporary staging areas used for material transfer or recycling operations shall be used solely for the benefit of the contract work and shall not be used for work outside the scope of contract work without specific advance written permission of the Owner and Engineer. No materials outside the scope of contract work are permitted on public property. Any temporary staging required for material transfer shall be for the contract work exclusively. The Contractor shall provide its own disposal sites as necessary based on materials classifications. The Contractor is responsible that all handling procedures, placement and disposal of materials in the contract from origin to destination are done in compliance with Federal, State and Local regulations and permit procedures.

Emergencies

In emergencies affecting the safety of persons, public or private property or the work of the project, the Contractor, without specific instructions or authorization from the Engineer or Owner, is obligated to act, at his discretion to prevent damage, injury or loss. He will give the Engineer prompt written notice of any changes in the work or deviations from the contract documents caused by such action as he was obligated to take.

G-54 PUBLIC UTILITIES

Available information as to the location of existing subsurface structures and utilities has been collected from various sources. The results of such investigations, shown on the Contract Drawings, are not guaranteed as to accuracy.

Attention is particularly directed to the fact that the locations, elevations and sizes of utilities, and other subsurface structures shown on the Contract Drawings are not warranted to be even approximately correct, nor can they be assumed to be the only subsurface piping or structures which may be encountered in the work. The Contractor shall make all necessary supplemental investigations, and shall have no claims for damages due to subsurface structures or utilities encountered in locations other than shown on the Contract Drawings.

The Contractor is required to notify, in writing, any utility owners involved as to the nature and scope of the project and of his operation that may affect their facilities. The Engineer shall receive two (2) copies of such notices. The terms "public utility" or "public utilities" used in these

Specifications shall be construed to mean those publicly or privately owned. When utility facilities are damaged by the Contractor, he shall notify their owners, who may cause him to repair the damage or may cause its repair by others at the Contractor's expense. If the cost thereof has not been paid by the

Contractor within thirty (30) days after billing, the Owner, upon application of the utility, may retain an amount sufficient to cover the cost from any monies due or that become due to the Contractor.

The Contractor shall, at his own expense, support and secure from damage any utility structure within the site of the project, and shall not remove any utility without the consent of the Owner.

G-55 PERMITS AND LICENSES

The Contractor shall obtain all required permits and licenses necessary for same. The Township of Pequannock will waive all building permit fees. He shall give all notices necessary and incident to the due and lawful prosecution of the work.

G-56 RESPONSIBILITY OF CONTRACTOR

Responsibility for Work

The Contractor is responsible for all damages due to his operations; to all parts of the work; and to all adjoining property until the work is accepted and final payment is made. The Contractor shall protect, indemnify and hold the Owner and the Engineer harmless from all suits, actions, damages and costs of every name and description resulting from the work of this Contract. The Contractor is responsible for the protection of all furnished work until the project is accepted and final payment is made.

If, at any time after final acceptance by the Owner, it should be discovered that the work was not constructed to the line or grade established by the Engineer, or that the materials used or the work performed were not in accordance with the Drawings and Specifications, or that settlement or Irregularities in the line or grade have occurred, the Contractor shall be held as fully liable as though such defect or condition had occurred or been discovered before such acceptance.

Responsibility for Damages and Claims

The Contractor shall assume the defense of and indemnify and keep indemnified and save harmless the Owner, and all of the officers, agents and employees of the Owner, from and against all claims, demands, detriment, liability, suits, action losses, damages, costs and expenses of any kind, character, name or description, resulting from or arising out of the performance of the Contract or the doing of any work, or furnishing and delivery of any machinery, tools, plants, equipment, supplies, materials or labor, provided for herein or therein, or resulting from or arising out of, or brought for or on account, or by reason of any injuries or damages to any person or persons or property, by or from the Contractor, or his or its agents, servants or employees, or by or on account of any claims, or amounts received, for any infringement of patent, trademark, or copyright, or by or from any claims arising, or recovered, under any law, ordinance, regulation, or order of judgment. The whole, or so much of the monies due under and by virtue of the contract as shall be considered necessary by the Owner may, at its option, be retained by the Owner until all suits or claims or demands for damages as aforesaid shall have been settled and evidence to that effect furnished to the satisfaction of the Owner.

Contractor Assumes Absolute Liability

The liability of the Contractor hereunder, for all injuries to persons or damages to persons or damages to property, is absolute and is not dependent upon any question or negligence on his or its part or on the part of his or its agents, servants or employees, and neither the approval of the Engineer or the methods of doing the work nor the failure of the Engineer to all attention to improper or inadequate methods or to

require a change in methods nor the neglect of the Engineer to direct the Contractor to take any particular precautions or to refrain from doing any particular thing, shall excuse the Contractor in case of any such injury to persons or damages to property.

Insurance Requirements

Certificates of liability and workers' compensation insurance satisfactory to the Owner and the Engineer shall be filed with the Owner and the Engineer. All of the Contractor's insurance coverage shall contain a clause indemnifying and saving harmless the Owner, the Engineer and their agents from any and all liability of whatever nature arising from the work to be performed under the Contract, including attorney's fees and costs in connection with the defense of such claims. The certificate of insurance furnished by the Contractor shall state specifically that the above indemnification is guaranteed by the policy.

The minimum amounts of insurance to be carried by the Contractor shall be as identified in the Section V.A of the Instructions to Bidders ad Statutory Requirements.

Property damage insurance shall be extended to cover damage to underground wires, pipes, ducts, conduits, structures, etc., and further to cover explosive damage and damage due to collapse.

The policies shall remain in force until all work has been completed. The Contractor shall ascertain the cost to him of all the required insurance policies before submitting his bid. All policies shall be endorsed to provide both the Owner and the Engineer with thirty (30) days written notice in advance of any changes or cancellations which modify the coverage provided. In the event the Contractor shall carry blanket liability insurance coverage, compliance with the foregoing requirements shall be met by furnishing an endorsement or rider to said blanket liability insurance policy naming the Owner as co-insured for the work involved, hereunder, provided the limits of said blanket liability insurance policy shall comply with the amounts outlined above.

G-57 LIEN INTEREST

No materials or supplies for the work shall be purchased by the Contractor or by any subcontractor subject to any lien interest or under a conditional sale or other agreement by which an interest is retained by the seller. The Contractor warrants that he has good title to all materials and supplies used by him in the work.

G-58 RIGHT OF PROPERTY IN MATERIALS

Nothing in these specifications or in the contract shall be considered as vested in the Contractor any right of property in materials used, after they shall have been attached or affixed to the work or the soil, but all such materials shall, upon being so attached or affixed, become the property of the Owner. Any materials requiring disposal become the sole responsibility of the Contractor once removed from the Project Limits. Any materials testing regarding waste disposal classification shall be completed within the Project Limits at the time and place of origin to avoid potential for mingling materials offsite that are not related to the contract work. The Contractor shall inform the Owner of the date, time and place of classification testing to allow for control samples.

G-59 PATENTS, ROYALTIES AND LICENSES

As part of his obligation, hereunder and without any additional compensation, the Contractor shall pay for all patent fees, licenses or royalties required with respect to the work, and will fully indemnify the Owner

for any loss on account of infringement of any patent rights unless, prior to his use on the work of a particular process or a product of a particular manufacturer, he notifies the Owner in writing that such process or product is an infringement of a patent.

G-60 CLAIMS AND PROTESTS

If the Contractor considers any work required of him to be outside the requirements of the Contract or considers any record or ruling of the Construction Observers or Engineer as unfair, he shall ask for a written instruction or decision immediately and should then file a written protest with the Owner and the Engineer against the same within five (5) days thereafter or he shall be considered as having accepted the record or ruling, and shall, therefore, forfeit any claim to future compensation in any form on account of such order or decision.

G-61 PAYMENT

Measurement of Quantities

All work completed under the Contract shall be measured by the Engineer according to the United States Standard Measures using the units scheduled in the Proposal. Whenever requested by the Engineer, the Contractor shall provide the necessary capable assistance together with suitable facilities for weighing, measuring or otherwise determining the quantities of materials used in the work.

Before and During Construction

All dimensions shall be obtained or verified by the Contractor for accommodation of equipment and/or materials furnished by the Owner and/or the Contractor and installed by the Contractor. Dimensions on the Drawings indicate nominal sizes under ideal conditions and shall not, under any circumstances, be so construed as to relieve the Contractor of the responsibility of taking measurements in the field and furnishing material of the correct dimensions.

After Construction

All work completed under this Contract will be measured for payment by the Engineer according to United States Standard Measures.

Adjustment of Estimated Quantities

The quantities shown are approximate only, and the Owner reserves the right to increase or decrease them. Such change, however, will be only upon the written order of the Engineer. The Owner reserves the right to omit any items in the proposal if deemed to be in the best interest of the Owner to do so.

Scope of Payments

The Contractor shall receive and accept the compensation, as herein provided, in full payment for furnishing all materials, labor, tools, plants, supplies and equipment and for performing and maintaining all work contemplated and embraced under the Contract, also for all loss or damage arising out of the nature of the work, or from the action of the elements, or from any unforeseen difficulties or obstructions which may arise or be encountered during the prosecution of the work, until its final acceptance by the Owner after the duration of the maintenance period, and for all risks of every description connected with prosecution and maintenance of the work, also for all expenses incurred by, or in consequence of, the

suspension or discontinuance of the said prosecution of the work as herein specified, and for any infringement of patent, trademark or copyright and for completing the work and the whole thereof, in an acceptable manner according to the Drawings and Specifications. The payment of any current or final estimate, or of any retained percentage, shall in no way or degree, prejudice or affect the obligation of the Contractor at his own cost and expense, to repair, correct, renew or replace any defects and imperfections or damages that shall be discovered on or before final inspection and acceptance of the work or during or after the maintenance period, and of which defects, imperfections or damages, the Engineer shall be the judge, and the said Contractor shall be liable to the Owner for failure to do so.

Payments

Payments will be made for the actual quantity of authorized work done under each item scheduled in the proposal and under supplemental agreements, if any. Payment will not be made to the Contractor until the proper documentation is furnished indicating that the Monthly Manning Report, Form AA-202, has been filed with the State.

Monthly invoices should be made of the approximate quantities of work done and materials built into the project. Percentages of the amount due, in accordance with the Contract, including that for extra work, according to the monthly invoices, will be approved for payment within fifteen (15) days following said approval. Thereafter, payments will be made in like manner monthly until the work is completed.

When the work is completed and accepted by the Owner, a final certificate of the cost of the work will be made by the Engineer, based upon the actual quantities of authorized work done, and when the final invoice is approved, the money due the Contractor for the performance of the work, after deduction of all previous payments, will be paid, provided, however, that all claims have been fully satisfied.

If specifically contained within the Contract between the Owner and Contractor, the Owner may provide, in the monthly progress payments, payment with respect to all materials stored at secured locations, subject to approval by the Engineer, which are suitable for use in the execution of the contract agreement, if the person providing the materials furnished releases of liens and invoices for the materials at the time each estimate of work is submitted for payment. The total of all the partial payments shall not exceed seventy-five percent (75%) of the cost of the materials until such time as the materials become an integral part of the project. Until such time as final acceptance of the project, the Contractor shall maintain, be responsible for and assume full liability for damages, destruction, theft, etc. of all materials furnished, supplied and stored on site.

The Contractor, before receipt of any certificate calling for payment, shall furnish the Engineer with satisfactory evidence that all persons who have done work or furnished material for this contract or who have sustained damage or injury by reason of any act, omission or carelessness on his part or his agents in the prosecution of the work, have been duly paid or so secured that no liability of any kind or character can attach to the Engineer or the Owner on account of any such claim.

The Engineer shall not be required to prepare or process for payment any current progress estimated whose aggregate amount is less than one thousand dollars ($1,000.00) or one percent (1%) of the Contract amount, whichever sum be the lesser.

Negotiable Bearer Bonds

In contracts having a total cost in excess of one hundred thousand dollars ($100,000.00), the Contractor may agree to the withholding of payments in the manner prescribed below, or may deposit with the

contracting unit negotiable bearer bonds of the State of New Jersey, or negotiable bearer bonds or notes of any political subdivision of the State, the value of which is equal to ten percent (10%) of the amount due on each partial payment, or as provided by the Contractor.

The nature and amount of the bonds or notes to be deposited shall be subject to approval by the Owner. For purposes of this section, "value" shall mean par value or current market value, whichever is lower.

If the Contractor agrees to the withholding of payments, the amount withheld shall be deposited, with a banking institution or savings and loan association insured by agency of the Federal Government, in an account bearing interest at the rate currently paid by such institutions or associations on time or savings deposits. The amount withheld, or the bonds or notes deposited, and any interest accruing on such bonds or notes, shall be returned to the Contractor upon fulfillment of the terms of the contract relating to such withholding. Any interest accruing on cash payments withheld shall be credited to the contracting unit.

Project Cash Retainage

The cash retainage being withheld from partial payments pending completion of the contract will be determined as follows:

1. For total contracts in excess of one hundred thousand dollars ($100,000.00), the retainage will be two percent (2%) of the amount due on each partial payment, pursuant to P.L. 1979, c. 152 (C.40A:11-16.1).
2. For total contracts of one hundred thousand dollars ($100,000.00) or less, the retainage will be ten percent (10%) of the amount on each partial payment.

Withholding Payments

The Engineer may withhold or, on account of subsequently discovered evidence, nullify the whole or part of the certificate for payment to such extent as may be necessary to protect the Owner from losses on account of:

a. Defective work not remedied.
b. Claims filed, or reasonable evidence indicating probable filing of claim, including but not limited to a Notice of Lien Claim under the Municipal Mechanics Lien Act, N.J.S.A. 42A:44 125 et seq.
c. Failure of any Contractor to make payments promptly to subcontractors or for material or labor.
d. A reasonable doubt that the Contract can be completed for the balance then unpaid.

When all the above grounds are removed, certificates will at once be issued for amount withheld because of them.

Condition of Acceptance

The Contractor shall notify the Engineer when the project is completed. Liquidated damages will continue to accrue beyond the contract term if written certification of acceptance and substantial completion by the Engineer has not been made. If the project is not acceptable to the Engineer, he will advise the Contractor as to the particular defects to be remedied before final acceptance will be made. The whole work is not to be construed to prevent the Owner from entering upon and using the whole or any portion of the project which may be in condition for use at any time prior to the final acceptance

by the Owner and such privilege is hereby given. The final inspection and acceptance will be made by the Owner when the project is completed. Payments made to the Contractor before final acceptance do not commit the Owner to acceptance of the work.

Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the Owner a complete release of all liens arising out of this Contract, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as he has materials for which a lien could be filed, but the Contractor may, if any subcontractor refuses to furnish a release in full, furnish a bond satisfactory to the Engineer in twice the amount of any lien, to indemnify the Owner against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a lien, including all costs and reasonable attorney's fees.

G-62 ACCEPTANCE OF PAYMENT NOT A WAIVER

Neither the acceptance by the Owner or the Engineer, nor any of their employees, nor any order, measurement or certificate of the Engineer, nor any order by the Owner for payment of money, nor any payment, nor acceptance of the whole or any part of the work by the Engineer or the Owner, nor any extension of time, nor any possession taken by the Owner of employees thereof shall operate as a waiver of any portion of this contract or any powers herein reserved to the Owner, or any right to damages herein provided, nor shall any waiver of any breach of this contract be held to be a waiver of any other or subsequent breach. All remedies provided in this Contract shall be taken and construed as cumulative, that is, in addition to each and every remedy herein provided.

G-63 FINAL PAYMENT TERMINATES OWNER'S LIABILITY

No person, firm or corporation other than the signer of this contract as Contractor now has any interest hereunder, no claim shall be made or be valid and neither the Owner nor any of his agents shall be liable for or be held to pay any money, except as provided by this Contract. The acceptance by the Contractor of the final payment aforesaid shall operate as, and shall be, a release to the Owner and his agents.

G-64 GUARANTY (MAINTENANCE) BOND

Unless otherwise specified, before final payment is made as herein provided, the Contractor shall furnish a Surety Corporation Bond to the Owner in a sum equal to:

a. Fifty percent (50%) of the final adjusted Contract amount if such amount be twenty-five thousand dollars ($25,000.00) or less;
b. Thirty percent (30%) of the final adjusted Contract amount if such amount be greater than twenty-five thousand dollars ($25,000.00) but less than seventy-five thousand dollars ($75,000.00) and;
c. Ten percent (10%) of the final adjusted Contract amount if such amount be seventy-five thousand dollars ($75,000.00) or more

The Bond and Surety Corporation shall be satisfactory to the Owner and the Bond shall remain in full force and effect for a period of two (2) years from the date of final payment by the Owner for the work and shall provide that the Contractor and the Surety guarantee to replace for the said period of two (2) years from the date of final payment for the work all work performed and/or all materials furnished that was not performed or were not furnished according to the terms and performance requirements of the contract documents, and will make good any defects thereof which become apparent before the expiration of two (2) years.

G-65 AFFIRMATIVE ACTION REQUIREMENTS

EXHIBIT B (REVISED 12/11)
MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A. 10:5-31 et seq. (P.L. 1975, C. 127)
N.J.A.C. 17:27

CONSTRUCTION CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, up-grading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor will send to each labor union, with which it has a collective bargaining agreement, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer, pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by N.J.A.C. 17:27-7.2; provided, however, that the Dept. of LWD, Construction EEO Monitoring Program may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures prescribed by the following provisions, A, B and C, as long as the Dept. of LWD, Construction EEO Monitoring Program is satisfied that the contractor or subcontractor is employing workers provided by a union which provides evidence, in accordance with standards prescribed by the Dept. of LWD, Construction EEO Monitoring Program, that its percentage of active "card carrying" members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with N.J.A.C. 17:27-7.2. The contractor or subcontractor agrees that a good faith effort shall include compliance with the following procedures:

(A) If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three business days of the contract award, seek

assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to N.J.S.A. 10:5- 31 et. seq., as supplemented and amended from time to time and the Americans with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union at least five business days prior to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the hiring or scheduling procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

(B) If good faith efforts to meet targeted employment goals have not or cannot be met for each construction trade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:

(l) To notify the public agency compliance officer, the Dept. of LWD, Construction EEO Monitoring Program, and minority and women referral organizations listed by the Division pursuant to N.J.A.C. 17:27-5.3, of its workforce needs, and request referral of minority and women workers;

(2) To notify any minority and women workers who have been listed with it as awaiting available vacancies;

(3) Prior to commencement of work, to request that the local construction trade union refer minority and women workers to fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;

(4) To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;

(5) If it is necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and non-discrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;

(6) To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:

(i) The contactor or subcontractor shall interview the referred minority or women worker.

(ii) If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcontractor shall hire or schedule those individuals who satisfy appropriate qualification standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that the individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency, provided the referral agency is acceptable to the Dept. of LWD, Construction EEO Monitoring Program. If necessary, the contractor or subcontractor shall hire or schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provisions of (C) below.

(iii) The name of any interested women or minority individual shall be maintained on a waiting list, and shall be considered for employment as described in (i) above, whenever vacancies occur. At the request of the Dept. of LWD, Construction EEO Monitoring Program, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.

(iv) If, for any reason, said contractor or subcontractor determines that a minority individual or a

woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the determination in its files, and send a copy to the public agency compliance officer and to the Dept. of LWD, Construction EEO Monitoring Program.

(7) To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Dept. of LWD, Construction EEO Monitoring Program and submitted promptly to the Dept. of LWD, Construction EEO Monitoring Program upon request.

(C) The contractor or subcontractor agrees that nothing contained in (B) above shall preclude the contractor or subcontractor from complying with the union hiring hall or apprenticeship policies in any applicable collective bargaining agreement or union hiring hall arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in numbers which result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ratio established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that, in implementing the procedures of (B) above, it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union. After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Dept. of LWD, Construction EEO Monitoring Program an initial project workforce report (Form AA 201) electronically provided to the public agency by the Dept. of LWD, Construction EEO Monitoring Program, through its website, for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7. The contractor also agrees to submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of this contract to the Division and to the public agency compliance officer.

The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the-job and/or off-the-job programs for outreach and training of minorities and women.

(D) The contractor and its subcontractors shall furnish such reports or other documents to the Dept. of LWD, Construction EEO Monitoring Program as may be requested by the Dept. of LWD, Construction EEO Monitoring Program from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Dept. of LWD, Construction EEO Monitoring Program for conducting a compliance investigation pursuant to **Subchapter 10 of the Administrative Code (NJAC 17:27).**

G-66 AMERICANS WITH DISABILITIES ACT

Equal Opportunity for Individuals with Disability

The Contractor and the Township of Pequannock do hereby agree that the provisions of Title II of the Americans With Disabilities Act of 1990 (the "ACT") (42 U.S.C. §12101 et seq.), which prohibits discrimination on the basis of disability by public entities in all services, programs, and activities provided or made available by public entities, and the rules and regulations promulgated pursuant thereunto, are made a part of this contract. In providing any aid, benefit, or service on behalf of the Township of Pequannock pursuant to this contract, the Contractor agrees that the performance shall be in strict compliance with the Act. In the event that the Contractor, its agents, servants, employees, or

subcontractors violate or are alleged to have violated the Act during the performance of this contract, the Contractor shall defend the Township of Pequannock in any action or administrative proceeding commenced pursuant to this Act. The Contractor shall indemnify, protect, and save harmless the Township of Pequannock, its agents, servants, and employees from and against any and all suits, claims, losses, demands, or damages of whatever kind or nature arising out of or claimed to arise out of the alleged violation. The Contractor shall, at its own expense, appear, defend, and pay any and all charges for legal services and any and all costs and other expenses arising from such action or administrative proceeding incurred in connection therewith. In any and all complaints brought pursuant to the Township of Pequannock grievance procedure, the Contractor agrees to abide by any decision of the Township of Pequannock which is rendered pursuant to said grievance procedure. If any action or administrative proceeding results in an award of damages against the Township of Pequannock or if the Township of Pequannock incurs any expense to cure a violation of the ADA which has been brought pursuant to its grievance procedure, the Contractor shall satisfy and discharge the same at its own expense.

The Township of Pequannock shall, as soon as practicable after a claim has been made against it, give written notice thereof to the Contractor along with full and complete particulars of the claim. If any action or administrative proceedings is brought against the Township of Pequannock or any of its agents, servants, and employees, the Township of Pequannock shall expeditiously forward or have forwarded to the Contractor every demand, complaint, notice, summons, pleading, or other process received by the Borough or its representatives.

It is expressly agreed and understood that any approval by the Township of Pequannock of the services provided by the Contractor pursuant to this contract will not relieve the Contractor of the obligation to comply with the Act and to defend, indemnify, protect, and save harmless the Township of Pequannock pursuant to this paragraph.

It is further agreed and understood that the Township of Pequannock assumes no obligation to indemnify or save harmless the Contractor, its agents, servants, employees and subcontractors for any claim which may arise out of their performance of this Agreement. Furthermore, the contractor expressly understands and agrees that the provisions of this indemnification clause shall in no way limit the Contractor's obligations assumed in this Agreement, nor shall they be construed to relieve the Contractor from any liability, nor preclude the Township of Pequannock from taking any other actions available to it under any other provisions of the Agreement or otherwise at law.

G-67 EMPLOYMENT GOAL COMPLIANCE

The Contractor or subcontractor agrees to attempt in good faith to employ minority and female workers consistent with the applicable employment goals prescribed by Section 5.2 of the Regulations promulgated by the Treasurer pursuant to P.L. 1975, C. 127, as amended and supplemented from time to time or in accordance with a binding determination of the applicable county employment goals determined by the Affirmative Action Office/Equal Opportunity Office/Division of Contract Compliance pursuant to Section 5.2 of the Regulations promulgated by the Treasurer pursuant to P.L. 1975, C. 127, as amended and supplemented from time to time.

The Contractor or subcontractor agrees to inform, in writing, all recruitment agencies, including employment agencies, placement bureaus, colleges, universities and labor unions, that it does not discriminate on the basis of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex and that it will discontinue the use of any recruitment agency which engages in direct or indirect discriminatory practices.

The Contractor or subcontractor agrees to revise any of its testing procedures, if necessary, to assure that all personnel testing conforms with the principles of job-related testing, as established by the statutes and court decisions of the State of New Jersey and as established by applicable federal law and applicable court decisions.

The Contractor or subcontractor agrees to review all procedures relating to transfer, upgrading, downgrading and layoff to ensure that all such actions are taken without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex, and conform with the applicable employment goals, consistent with the statutes and court decisions.

G-68 AFFIRMATIVE ACTION PLAN COMPLIANCE

After notification of award but prior to signing of a construction contract, all successful construction contractors must submit their Initial Project Manning Report to the New Jersey Department of the Treasury, Division of Public Contracts Equal Employment Opportunity Compliance with a copy to the Township of Pequannock. The Initial Project Manning Report will be made available to the construction contractor by the Public Agency awarding the contract (or it is available online at http://www.state.nj.us/treasury/contract_compliance/pdf/aa201.pdf).

A contractor's bid must be rejected as non-responsive if the successful contractor fails to submit the Initial Project Manning Report within the time specified.

G-69 MINIMUM WAGES

Condition of Contract

The Contractor shall be required to comply with the provisions of the Department of Labor, Employment Standards Administration, Minimum Wages for Federal and Federally assisted construction projects promulgated under the Davis-Bacon Act and for the proper documentation of payments made thereunder.

Higher Rate

The Contractor shall pay the higher rate under either the above-cited provisions or the provisions of Section G-11 PREVAILING WAGES.

G-70 WEEKLY WAGE CERTIFICATION

Certification Required

Each Contractor or subcontractor shall furnish the Owner within seven (7) days after the regular payment date of the weekly payroll period a certification with respect to wages paid to each of the Contractor's employees. A said certification shall comply with U.S. Department of Labor Forms WH-347.

Payments

There shall be no separate payment for this work. All costs necessary therefore and incidental thereto shall be included in the prices bid on the various items in the Proposal. Failure to supply the above information shall be cause for suspension of progress payments and/or default of contract.

G-71 BACKCHARGE FOR CONSTUCTION OBSERVATION SERVICES

The Contractor shall be responsible to provide proper notification of the requirements for construction observation services to the office of the Engineer. Failure to do so, or, where said notification has been made and an Construction Observer is scheduled for the project, whereby the Contractor does not comply with his advisement, back charges for lost time will be rendered.

Payment for said back charges are to be made directly to the Owner by the Contractor. Failure to render such payment will result in a deduction from the retainage of said charges prior to release of said retainage.

G-72 WORKER AND COMMUNITY RIGHT TO KNOW ACT (N.J.S.A. 34:5A-1 et seq.)

Per N.J.S.A. 34:5A-1 et seq. (Workers and Community Right to Know Act) the State Department of Health has adopted a Workplace Hazardous Substance List (N.J.A.C. 8:59-9) which includes 2051 substances that pose a threat to the health and safety of employees. Therefore, under the provisions of N.J.A.C. 8:59-7, each bidder must furnish the Township of Pequannock a "Material Safety Data Sheet" for each product they supply which contains a substance listed on the Hazardous Substance List (N.J.A.C. 8:59-9). These Material Safety Data Sheets should be submitted to the Township of Pequannock upon receipt of bids. The Township of Pequannock reserves the right to request that a copy of the applicable Material Safety Data Sheet be forwarded with the delivery of a product to the appropriate department. Furthermore, under the provisions of N.J.A.C. 8:59-5, each product shall have a label affixed or stenciled onto any container that contains such substances and is going to be supplied to the Township of Pequannock.

G-73 JOB SAFETY AND HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers through the promotion of safe and healthful working conditions throughout the Nation. Requirements of the Act include the following:

Employers: Each employer shall furnish to each of his employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to his employees; and shall comply with occupational safety and health standards issued under the Act.

Employees: Each employee shall comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to his own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards and its Compliance Safety and Health Officers conduct jobsite inspections to ensure compliance with the Act.

Inspection: The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint: Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold on request names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or otherwise exercising their rights under the Act. An employee who believes he has been discriminated against may file a complaint with the nearest OSHA office within thirty (30) days of the alleged discrimination.

Citation: If, upon inspection, OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three (3) days or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

The Act provides for mandatory penalties against employers up to one thousand dollars ($1,000.00) for each serious violation and for optional penalties of up to one thousand dollars ($1,000.00) for each non-serious violation. Penalties of up to one thousand dollars ($1,000.00) per day may be proposed for failure to correct violations within the proposed time period. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to ten thousand dollars ($10,000.00) for each such violation.

Criminal penalties are also provided for in the Act. Any willful violation resulting in death of an employee, upon conviction, is punishable by a fine of not more than ten thousand dollars ($10,000.00) or by imprisonment for not more than six (6) months or by both. Conviction of an employer after a first conviction doubles these maximum penalties.

While providing penalties for violations, the Act also encourages efforts by labor and management before an OSHA inspection to reduce injuries and illnesses arising out of employment. The Department of Labor encourages employers and employees to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all work places and industries.

Such cooperative action would initially focus on the identification and elimination of hazards that could cause death, injury or illness to employees and supervisors. There are many public and private organizations that can provide information and assistance in this effort if requested.

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA regional Office in the following locations:

Atlanta, GA	Kansas City, MO	Boston, MA	New York, NY
Chicago, IL	Philadelphia, PA	Dallas, TX	San Francisco CA
Denver, CO	Seattle, WA		

Telephone numbers for these offices and additional area office locations are listed in the telephone directory under the United States Department of Labor in the United States Government listing.

G-74 "IF AND WHERE DIRECTED" ITEMS

The Proposal Form may request bids on one or more Pay Items to be incorporated into the Project "If and Where Directed" by the Engineer. Such items may not be located on the Plans. The estimated quantities set out in the Proposal Form for such items are presented solely for the purpose of obtaining a representative bid price, but are not intended to indicate the Owner's anticipation as to the quantities of such items which are to be actually incorporated into the Project. Depending on field conditions, such "If and Where Directed" items may or may not be incorporated into the Project and if incorporated may be many times the estimated quantity or only a fraction thereof.

Incorporation of such items shall only be made on written directions of the Engineer. In the absence of written directions, no such items shall be incorporated into the Project and if incorporated will not be paid for. The Engineer may order incorporation of such items at any location within the Project, and at any time during the Contract Time. Claims for additional compensation shall not be made because of any increase, decrease or elimination of such items, nor because of an increase or decrease in the amount of work due to the field conditions encountered in incorporating such items into the Project.

G-75 INDEMNITY

The Contractor shall indemnify and save harmless the Owner/Municipality from all loss, damage, proceedings, claims, suits, or actions of any name or description arising out of the performance under this Contract, to undertake and pay the entire expense of defending any suit or action arising out of the performance under this Contract, and to secure the payment of all claims against the Contractor including the claims for services performed, and materials, supplies or equipment furnished to the Contractor in the prosecution of the work and to secure the payment for any and all lands which may be required to be leased or purchased in connection with the performance of the work mentioned herein.

Without limiting any indemnification contained herein, the Contractor shall indemnify, defend and save harmless the Owner/Municipality, the Mayor and Council of Owner/Municipality, its officers, agents, servants and employees from all such demands, claims, liability, suits, losses, injuries, damages, judgments, expenses and costs of every kind of description (expressly including counsel fees, court costs, witness charges or fees, investigation costs) and amounts paid in settlement resulting from any third party litigation challenging the validity of this Contract or the award of this Contract to the Contractor. The Owner/Municipality shall fully cooperate and assist the Contractor and participate in the defense of any such action.

G-76 DISPUTE RESOLUTION

All claims, controversies and disputes which arise as a result of the work contemplated herein shall be governed by the process of Alternate Dispute Resolution, and shall be resolved pursuant to the procedures described therein.

A. Written Notice. Any claim by the Contractor hereunder must be provided in writing to the Owner, with a copy to the Engineer, within ten (10) days of the discovery of the facts or circumstances upon which a claim is alleged to be based. Failure to provide such written notice shall be deemed a waiver of Contractor's rights hereunder, and shall be a bar to the bringing of any such claim. Verbal notification to the Owner, Engineer or any individuals acting on their behalf shall not be deemed sufficient to comply with this Article.

Every such written notice shall provide a clear and concise description of the facts or circumstances giving rise to the claim, the relief or other action required to remedy the claim, and to the extent known at the time the claim arises, the nature and/or amount of additional costs that may be incurred or additional time for completion that may be required as a result of said claim.

B. Response to Claim Notice. Upon receipt of the claim, the Owner and the Contractor shall undertake in good faith to investigate and resolve the dispute. Within ten (10) days of receipt of a written claim notice, Owner shall respond in writing to Contractor's claim. If the response is sufficient to resolve Contractor's claim, then the parties shall enter into a Memorandum of Claim Resolutions (MCR) and said claim will be resolved based upon the terms and conditions included in said MCR. If appropriate, a Change Order may be issued in lieu of an MCR.

C. If the parties cannot resolve the claim by mutual agreement within fifteen (15) calendar days of the Owner's response, either party shall have the right to request resolution of the dispute by senior management, by providing written notice requesting that a meeting be convened at the job site (or other mutually agreed location), attended by a representative of the Owner, duly authorized to recommend settlement along with a principal of the Contractor and a principal of the Engineer, each of whom shall have the authority to bind their respective firms. Such meeting shall be held not less than ten (10) nor more than fifteen (15) working days after receipt of notice.

D. In the event that the parties cannot resolve the dispute within twenty (20) days after the first meeting of the principals, then the matter shall be presented to a mutually agreed-upon qualified mediator for mediation, pursuant to the Rules of Construction Mediation promulgated by AAA.

E. Either party shall provide notice to the agreed-upon mediator, within ten (10) working days, that the parties have been unable to reach an agreement on the dispute between them. A copy of such notice shall be served upon the other interested parties as identified. Within ten (10) calendar days of the filing of Notice with the mediator, the claiming party shall prepare a clear and concise written statement of the claim, including all supporting documentation, and submit it to the mediator with a copy to the other parties. Other parties shall thereafter present a written response to the Affidavit of Claim, singly or jointly, within ten (10) calendar days of receipt thereof. The mediator shall then resolve the matter within forty-five (45) days, unless all parties mutually agree to an extension of time thereof. The mediator shall attempt to reach satisfactory agreement between parties through MCR; but in the absence of the ability to do so, the mediator shall render a written opinion to all parties. Such opinion shall be admissible in any Court proceedings between or among the parties thereafter.

CONTRACT

PEQUANNOCK TOWNSHIP
MORRIS COUNTY, NEW JERSEY

THIS AGREEMENT, made this ___ day of _____ in the year ___ _____, by and between the Township of Pequannock, in the County of Morris, a Municipal Corporation of the State of New Jersey, having an office at Newark-Pompton Turnpike, Pompton Plains, New Jersey, hereinafter referred to as the "Municipality", and

_____

(Contractor)

_____

(Address)

Party of the Second Part, herein called the "Contractor".

WITNESSETH that the parties to these presents, each in consideration of the agreements on the part of the other, herein contained, do hereby agree as follows:

1. The Contractor will, at his expense, furnish all labor, services and all materials for the construction and completion of the work proposed to be done for the Municipality, and will construct, complete and finish the same in a workmanlike manner to the satisfaction and approval of the Municipality, in the manner and within the time hereinafter limited, and in accordance with the Contract Documents, including but not limited to the Information for Bidders, Proposal, General Conditions, Specifications, and/or Proposal, dated , which are hereby fully incorporated and with the same effects as if the same had been set forth in the body of this agreement.

2. The Contractor agrees to make payments of all proper charges for labor and materials required in the aforementioned work, and to defend, indemnify, and save harmless the Municipality, its officers, employees, agents and servants, and each and every one of them, against and from all damages to which the said parties must be put, by reason of injury to the person or property of others resulting from performance of said work, or through the negligence of the Contractor, or through any improper or defective machinery, implements, or omission on the part of the Contractor, or his agent or agents, employees or servants.

3. It is also agreed and understood that the acceptance of the final payment of the Contract shall be considered as a release in full of all claims against the Municipality, or any of its

officers, employees, agents and servants, arising out of or by reason of, the work done and materials furnished under this Contract.

4. In consideration of the premises, the Municipality hereby agrees to pay to the Contractor for the said work, when fully completed, the estimated sum of _____

_____

_____

($_____), payments to be made at the prices specified in the Contractor's Proposal, or as provided in the Specifications, and upon presentation of the proper certificates to the Municipality and upon the terms set forth in Specifications, if any. It is understood that the amount to be paid shall be the total based on the said prices contained in the said Proposal and made a part of the Contract, for the work actually done.

5. The Specifications and any Addenda and the other Bid Package documents referenced above (including but not limited to the Notice of Award and Notice to Proceed) are hereby made a part of this Contract as though they were physically attached hereto and, by execution of this Contract, the Contractor acknowledges that the Contractor has examined and is familiar with the contents of all said documents.

6. The Contractor herein represents that neither the Contractor nor any person owning five percent (5%) or more of the stock or equity interest in the Contractor's business has been convicted of an offense under N.J.S.A. 2C:27-2, 2C:27-4, 2C:27-6 or 2C:29-4 subsequent to September 13, 1977. This representation is made pursuant to P.L. 1977, Chapter 214.

7. This Contract is to be binding upon the Municipality and its successor or successors, and upon the Contractor and its executors, administrators, successor or successors, and is voidable and may be terminated by the Municipality if the provisions of the Specifications relative thereto are not complied with.

8. During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital statue or sex. The contractor will take affirmative action to ensure that such applicants are recruited and employed, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status so affectional or sexual orientation. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates or pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable, will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regarding to age, race, creed, color, national origin, ancestry, marital status or sex.

The contractor or subcontractor, where applicable, will send to each labor union or representative or workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with the regulations promulgated by the Treasurer pursuant to P.L. 1975, c. 127, as amended and supplemented from time to time and the Americans With Disabilities Act.

The contractor or subcontractor agrees to make good faith efforts to employ minority and women workers consistent with the applicable county employment goals established in accordance with N.J.A.C. 17:27-5.2, or a binding determination of the applicable county employment goals determined by the Division, pursuant to N.J.A.C. 17:27-5.2.

The contractor or subcontractor agrees to inform in writing appropriate recruitment agencies in the area, including employment agencies, placement bureaus, colleges, universities, labor unions that it does not discriminate on the basis of age, creed, color, national origin, ancestry, marital status or sex, and that it will discontinue the use of any recruitment agency which engages in direct or indirect discriminatory practices.

The contractor or subcontractor agrees to revise any of its testing procedures, if necessary, to assure that all personnel testing conforms with the principles of job-related testing, as established by the statutes and court decisions of the State of New Jersey and as established by applicable Federal law and applicable Federal court decisions.

The contractor or subcontractor agrees to review all procedures relating to transfer, upgrading, downgrading and layoff to ensure that all such actions are taken without regard to age, creed, color, national origin, ancestry, marital status or sex, and conform with the applicable employment goals, consistent with the statutes and court decisions of the State of New Jersey, and applicable Federal law and applicable Federal court decisions.

The contractor shall submit to the public agency, after notification of award but prior to execution of a goods and services contract, one of the following three documents:

Letter of Federal Affirmative Action Plan Approval

Certificate of Employee Information Report

Employee Information Report Form AA302

The contractor and its subcontractors shall furnish such reports or other documents to the Division of Contract Compliance & EEO as may be requested by the office from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Division of Contract Compliance & EEO for conducting a compliance investigation pursuant to **Subchapter 10 of the Administrative Code at N.J.A.C. 17:27**.

IN WITNESS WHEREOF, the said parties hereto have duly executed this Agreement in the day and year first above written.

ATTEST:

PEQUANNOCK TOWNSHIP
IN THE COUNTY OF MORRIS

_____
, Clerk

By:_____
Mayor

(SEAL)

_____
Date

ATTEST:

CONTRACTOR

_____

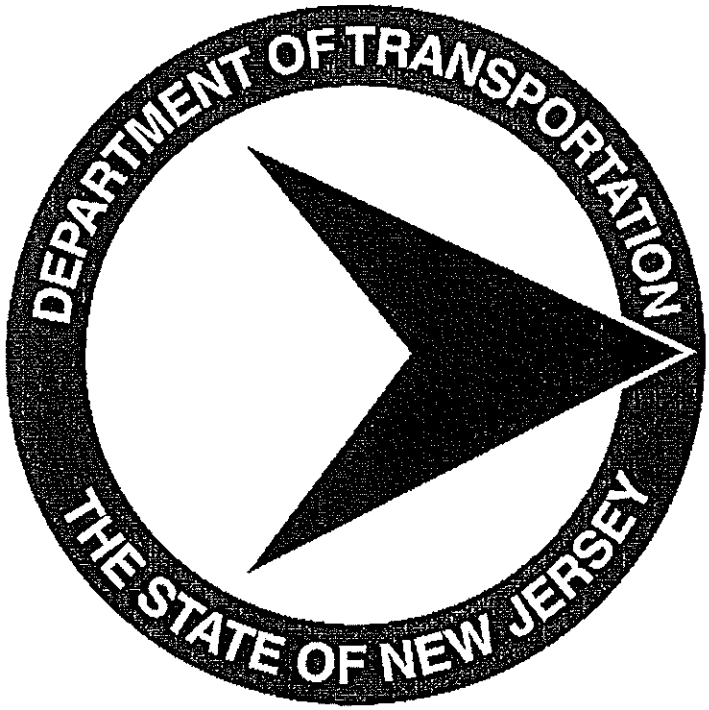
By:_____

(SEAL)

_____
Date

Township of Pequannock

Ramapo Road Sidewalk Replacements
Technical Specifications



Standard Specifications
for Road and Bridge Construction

2019

BID ITEM #4 – INLET SEDIMENT TRAPS

158.01 DESCRIPTION

This Section describes the requirements for: providing pollution control measures to maintain water quality; constructing and maintaining permanent SESC measures; and constructing, maintaining, and removing temporary SESC measures.

158.02 MATERIALS

Provide materials as specified:

Coarse Aggregate (No. 2 and No. 8)	901.03
Seed Mixtures	917.03
Mulch	917.06
Sod	917.07
Miscellaneous Landscape Materials	917.09
Geotextiles	919.01
Inlet Filter, Type 1	919.01
Inlet Filter, Type 2	919.01
Sediment Control Bag	919.02
Haybales	919.03

Provide wood stakes and wood posts that are solid, reasonably knot free and conform to the nominal size shown on the Plans.

Provide absorbent booms, towels, and blankets made from UV-resistant, spunbond polypropylene skin and filler.

158.03 CONSTRUCTION

158.03.01 Environmental Manager

Assign a supervisory-level employee experienced in all aspects of soil erosion and sediment control, water quality control, and work site waste control. Submit the name and applicable experience of this employee to the RE for approval at least 15 days before beginning any construction operations, except construction layout, on the Project. Submit written notification and obtain approval from the RE before changing the environmental manager.

The environmental manager shall have the responsibility and sufficient authority for implementing the approved SESC and water quality methods of operations. The environmental manager shall coordinate, oversee, and supervise SESC and water quality operations on the Project. This includes both on-site and off-site activities, including those involving subcontractors. The environmental manager shall oversee and supervise all site waste control operations for the Project.

The environmental manager shall attend SESC and water quality meetings. The environmental manager, with the RE, shall inspect SESC and site waste control measures at least weekly. Perform additional inspections immediately after precipitation and other weather events that may damage SESC measures or cause uncontrolled erosion to occur. During extended periods of precipitation, perform inspections every 24 hours until the precipitation has ended. Submit original Environmental Compliance Check List and Inspection Form to the RE the same day that the inspection is performed. Perform corrective actions, if required, within 24 hours of the inspection, and resubmit the Environmental Compliance Check List and Inspection Form to the RE within 2 days indicating that the corrective action has been completed.

158.03.02 SESC Measures

Construct SESC measures, as required, before starting construction operations. With the approval of the RE, the Contractor may fell trees or cut other vegetation not designated to be preserved using hand methods before constructing SESC measures. Coordinate temporary SESC measures with the permanent measures and with other construction operations to ensure effective and continuous erosion and sediment control. Construct temporary SESC measures to correct unforeseen conditions that develop during construction. If the Contractor fails to comply with SESC or site waste control provisions, the RE will suspend the Work as specified in 108.13.

Maintain SESC measures regardless of construction season or other times when the Project is closed down or suspended to ensure that the SESC measures function properly. Immediately correct or replace non-functioning SESC measures to meet the specified functionality. If the Contractor fails to maintain SESC or site waste control measures, the RE will suspend the Work as specified in 108.13.

Ensure that clearing and grubbing does not interfere with the construction of permanent SESC measures or other operations. When unstabilized areas caused by site development, grading, or other soil disturbing activities exist beyond 14 days, seed and mulch the disturbed areas. The RE may limit the size of unstabilized areas due to clearing, grubbing, grading, or other soil disturbing activities based on site conditions and the Contractor's ability to install and maintain SESC measures. Upon completion of soil disturbing activities, permanently stabilize disturbed areas within 7 days as specified in 807.03.01. If seasonal limitations preclude permanent stabilization, provide temporary SESC measures as approved by the RE.

When excavation or embankment construction reaches the finished subgrade, areas where pavement is to be placed are exempt from the above stabilization requirements. Roadways and haul roads actively used for daily conveyance of equipment, as well as areas between temporary berms, except median areas, are also exempt.

Employ construction methods to minimize airborne dust and prevent soils and other materials from being deposited on existing roadways. Apply water or other RE approved materials to unpaved areas to control dust caused by hauling or other construction operations. Reuse, as specified in 202.03.03.C.1, dirt and other materials that have been spilled, washed, or tracked onto existing roadways by hauling or other construction operations.

Remove temporary SESC measures when necessary to allow for the installation of permanent measures, or as permanent measures become functional. Notify the RE 10 days before removing temporary SESC measures. Between Substantial Completion and Completion, remove temporary SESC measures unless the RE directs that specific Items remain in place.

Construct SESC measures as follows:

1. **Caution Fence.** Install caution fence at locations shown on the Plans to delineate wetlands and other environmentally sensitive areas. Space posts at least every 10 feet.

2. **Silt Fence.** Install silt fence with geotextile buried securely in the existing soil. Join sections of the geotextile so that they work effectively as a continuous fence. The Contractor may install haybales instead of silt fence when approved by the Township.

3. **Heavy-Duty Silt Fence.** Install heavy-duty silt fence with geotextile securely buried in the existing soil. Join sections of the geotextile so that they work effectively as a continuous fence. Install fence posts at a slight angle toward the anticipated runoff source. Install the color of heavy-duty silt fence in locations as shown in the Plans. Do not substitute orange for black or black for orange.

4. **Haybale.** Embed haybales in the ground and place end to end to form a continuous line without gaps. Anchor haybales in place with wood stakes.

5. **Haybale Check Dams With Temporary Stone Outlets.** Embed haybales into the ground and anchor in place with wood stakes. Place temporary riprap in the center of each flow line. Place temporary No. 2 coarse aggregate immediately upgrade of each stone outlet. Place temporary riprap and No. 2 coarse aggregate on geotextile. When joining sections of geotextile, overlap the sections a minimum of 18 inches in the direction of flow.

6. **Temporary Stone Check Dams.** Construct temporary stone check dams in ditches to reduce flow velocity. Place No. 2 temporary coarse aggregate immediately upgrade of each check dam. Place temporary riprap and No. 2 coarse aggregate on the geotextile. When joining sections of the geotextile, overlap the sections a minimum of 18 inches in the direction of flow. Construct temporary stone check dams with limestone rock in areas of acid producing soils as directed by the RE.

7. **Temporary Slope Drains.** Install temporary drainage pipe, minimum of 8 inches in diameter, on embankment slopes to intercept surface runoff where concentrated runoff will cause excessive erosion of the slope. Stake the drainpipe to the slope or secure it with temporary riprap to prevent movement or displacement. Attach a flared end section at each end of the pipe, and install elbows that conform with the existing changes in slopes. Ensure that end sections and elbows are of the same material as the pipe to which they are joined.

   Construct a temporary berm using suitable material, and place haybales at the top of slope in the vicinity of the slope drain to intercept runoff and channel the runoff to the slope drain. Embed the haybales into the ground, and anchor them with wood stakes.

   Place temporary riprap loosely on geotextile at both ends of the pipe to prevent scour. Drape the geotextile over the top of the earth berm and anchor it as necessary. When joining sections of the geotextile, overlap the sections a minimum of 18 inches in the direction of flow.

8. **Inlet Filters.** Provide Type 1 and Type 2 inlet filters as follows:

   a. **Type 1.** For a new inlet structure without a casting, mold welded steel wire fabric around the inlet walls.

Extend the welded steel wire a minimum of 6 inches down each side of the structure. Secure geotextile to the welded wire fabric. Place No. 2 coarse aggregate against the inlet structure to hold the inlet filter in place.

For an inlet structure with a casting and exposed exterior walls, place geotextile under the casting and extend it a minimum of 6 inches below the top of the exposed walls. Place No. 2 coarse aggregate around the drain hole opening.

For an existing inlet structure without exposed exterior walls, place geotextile under the grate and extend the geotextile for a minimum of 6 inches beyond the grate.

For an inlet with a curb piece and without exposed exterior walls, ensure that the opening in the curb piece has a height of 2 inches. If the opening is greater than 2 inches, achieve the 2 inch opening size by wrapping the geotextile around an appropriately sized piece of lumber. Place the lumber against the vertical opening.

b. **Type 2.** Remove the inlet grate and place the inlet filter in the opening, holding out approximately 6 inches of the filter outside the frame. Replace the inlet grate to hold the filter in place. Empty the filter according to the manufacturer's recommendations. When removing the filter, ensure that sediment does not enter into the drainage system. Clean out the filter, dispose of the sediment as specified in 202.03.03.C.2, rinse and return the filter to its original shape, and replace the filter inside the inlet.

9. **Temporary Inlet Sediment Traps.** Construct temporary inlet sediment traps when the elevation of the surface runoff is lower than the inlet structure. Create a 6 inch diameter opening in the inlet and place a 3 × 3 foot piece of Type 1 inlet geotextile and No. 2 coarse aggregate over the opening to prevent sediment from entering the inlet. Place temporary inlet sediment traps in each flow line upgrade of the inlet structure.

   Before raising the elevation of the surface runoff, remove and dispose of the temporary inlet sediment trap and repair the opening in the inlet.

10. **Sediment Control Bag.** At least 10 days before installation, submit to the RE for approval a plan detailing the size, location, details of aggregate base, anticipated discharge flow, and manufacturer's catalog cuts. If the outfall of the sediment control bag flows into receiving waterbody, ensure that floating turbidity barriers are installed as specified in 158.03.02.11.

    Install and maintain sediment control bags according to the manufacturer's recommendations. Size sediment control bags to accommodate anticipated sediment and flow rates. Place the sediment control bag on the slope to allow water to flow downhill through the bag. Place the discharge hose into the neck of sediment control bag and fasten to ensure that water does not leak at the connection. To increase the efficiency of filtration, place the bag on an aggregate bed to maximize water flow through the surface area of the bag. Size aggregate to prevent puncture of sediment control bags. Ensure that the discharge from the sediment control bag does not cause erosion to, or scour of, the area onto which the water is being discharged.

    When the sediment control bag is 90 percent full, can no longer efficiently filter sediment, or does not allow water to pass at a reasonable rate, remove and replace.

    Remove sediment control bags according to the manufacturer's recommendations and dispose as specified in 202.03.09. Restore the disturbed area to the original condition.

11. **Sediment Control Tank.** At least 10 days before installation, submit sediment control tank design and proposed location for Township approval. Design sediment control tanks to contain or control the expected discharge of water and sediment based on the flow rate of the pump to be used, the volume of area to be dewatered, and the frequency of removal of water, sediment, or both. Provide a sediment control tank to capture sediment and floating debris from dewatering activities. Provide filtration to release clean and clear water into adjacent streams or other waterbodies. Relocate the tank as needed to dewater other locations. Inspect the tank daily for level of sediment, debris, and water. Remove tank contents before the tank reaches 50 percent of its capacity or when the tank no longer efficiently captures sediment or floating debris. Dispose of tank contents as specified in 202.03.03.C.2. If water from the tank is being discharged into a waterbody, install floating turbidity barriers to corral the discharge area. Protect the discharge area from erosion and scour.

12. **Construction Driveway.** To minimize tracking of dirt and other materials onto existing roadways, provide a construction driveway at each location where vehicles exit the work site as approved by the RE. Construct driveways using No. 2 coarse aggregate placed on geotextile. Ensure that the driveway is at least 15 feet wide. The Contractor may make driveways wider if approved by RE. Maintain the driveway by top dressing or by

excavating and top dressing, as directed by the RE, with additional No. 2 coarse aggregate. When the driveway is no longer required, remove the driveway, backfill to the adjacent ground elevation, and restore the disturbed area to the original condition.

13. **Concrete Washout System.** At least 10 days before the first concrete placement, submit to the RE for approval a plan for the concrete washout system. Design the concrete washout system to fully contain the concrete washout needs, concrete slurry, and the Department's concrete testing of the Work.

    Ensure that each concrete washout facility prevents discharge from concrete trucks and equipment cleaning from entering into inlets and into surface or groundwater. Ensure that the location of concrete washout facilities are no closer than 50 feet from environmentally sensitive areas such as streams, wetlands, or other areas shown on the Plans. Use signs to designate concrete washout areas. Ensure that concrete washout facilities are limited to the designated areas.

    Ensure that the concrete washout system is in place before delivery of concrete to the site. Ensure that a secure, non-collapsing, non-water collecting cover over each concrete washout facility is in place during precipitation so that precipitation does not accumulate and cause the washout areas to overflow. If the concrete washout facility becomes 50 percent full, discontinue pouring concrete until the concrete washout facility is cleaned out. Remove hardened concrete and reuse as specified in 202.03.03.C.1. Allow slurry to evaporate, or dispose of as specified in 202.03.03.C.2.

    If a lined basin is used, replace the liner if it becomes damaged or compromised. Remove concrete washout facilities when no longer needed. Restore the disturbed area to original condition.

14. **Absorbent Boom.** Install the absorbent boom inside turbidity barrier or as shown on Plans to ensure that oil products do not escape the work site. If an oil spill occurs, remove absorbent boom after absorption of oil and dispose of as specified in 202.03.09. Replace as necessary to continually protect the waterbody.

15. **Oil-Water Separator.** At least 10 days before beginning the work, submit to the RE for approval a plan detailing the size, location, anticipated discharge flow and manufacturer's catalog cuts of the oil-water separator before installation. Provide an oil-water separator for removal of free product generated in dewatering excavations in each area of petroleum contaminated groundwater.

    Use a self-contained factory assembled oil-water separator meeting the following requirements:

    a. Capable of removing free petroleum product as required by Contractor-obtained discharge permits.
    b. Designed for intermittent, varied, or continuous flows of water, oil, or combinations of non-emulsified oil-water mixtures.
    c. Designed to minimize solids buildup in the separator's oil-water collection chamber.
    d. Capable of being moved about within the Project Limits as needed.

    Dispose of oils and sediments collected in the oil-water separators as specified in 202.03.09.

16. **Oil-Only Emergency Spill Kit.** Before start of construction operations, place Oil-Only Emergency Spill Kits within the Project Limits, with each kit capable of cleaning up at least 95 gallons of spill. Include Oil-Only Emergency Spill Kit, Type 1 consisting of the following:

    a. An instruction manual and emergency response guide.
    b. Ten 5 inch × 1 foot oil-only absorbent booms.
    c. Ten 3 inch × 10 foot oil-only absorbent booms.
    d. One hundred 20 × 16 inch oil-only absorbent pads.
    e. Twenty temporary disposal bags and ties.
    f. A 40 pound bag of loose absorbent pellets.
    g. A wheeled container for the above.

    If a spill occurs, immediately contain the spill and notify the NJDEP Hotline (1-877-927-6337) and the RE. Clean up and remediate the spill as directed by the NJDEP. Separately stockpile, as specified in 201.03.03.3, the contaminated material and dispose of the contaminated material as specified in 202.03.09. Submit an incident report to the RE within 10 days after clean-up that includes a summary of the incident, the clean-up and containment measures taken, the time and date of the incident, and the NJDEP case number.

    Replenish the kits to ensure that the specified number of complete kits are on-site at all times during construction operations.

17. **Tree Protection.** Before start of construction operations, install tree protection by surrounding trees and other

vegetation with chain-link fence. Place the tree protection a minimum of 2 feet outside the dripline of tree or vegetation canopy. Do not park vehicles or equipment, or store materials within the area of tree protection. In situations where tree protection conflicts with excavation or other construction, request permission to modify tree protection and provide a protection plan for approval by the Township.

158.03.03 Erosion Control Sediment Removal

Remove sediment from sediment traps and dewatering basins when they are 50 percent filled. Remove sediment from silt fences, stone outlet structures, dams, and haybales when the sediment reaches 50 percent of the height of the SESC measure. Remove the coarse aggregate and riprap from check dams when removing the sediment. Reuse the removed material as specified in 202.03.03.C.1. Replace the coarse aggregate and riprap removed from check dams.

158.04 MEASUREMENT AND PAYMENT

The Township will measure and make payment for Items as follows:

Item	*Pay Unit*
INLET SEDIMENT TRAP	EACH

BID ITEM #1 –TRAFFIC CONTROL
BID ITEM #3 – POLICE TRAFFIC DIRECTORS

159.01 DESCRIPTION

This Section describes the requirements for implementing controls to protect vehicular and pedestrian traffic. Traffic control includes providing, installing, placing, relocating, maintaining, and removing traffic control devices for daily operations as well as the installation and maintenance of detours as required. This section also describes the use of Uniformed Police Traffic Directors during construction activities.

159.02 MATERIALS

159.02.01 Materials

Provide materials as specified:

Tack Coat PG 64-22 ..... 902.01.01
Tack Coat:
Emulsified Asphalt, Grade RS-1, SS-1, SS-1h, Grade CSS-1 or CSS-1h 902.01.02
Hot Mix Asphalt (12.5M64) 902.02
Construction Barrier 904.01
Signs 911.01
Sign Posts 911.02.01
Timber Sign Supports 911.02.03
Top and Side Mounted Delineators 911.03
Latex Paint 912.04.01
Temporary Pavement Marking Tape 912.04.02.A
Removable Black Line Masking Tape 912.04.02.B
Temporary Pavement Markers 912.04.03
Box Beam for Construction Barrier Curb 913.04
Polymerized Joint Adhesive 914.03

Provide temporary crash cushions, inertial barrier systems as specified in 611.02. Provide temporary compressive crash cushions as specified for compressive crash cushions in 611.02.

159.02.02 Equipment

Provide equipment as specified:

Flashing Arrow Board 1001.01
Portable Variable Message Sign 1001.02
Traffic Control Truck with Mounted Crash Cushions 1001.03
Vibratory Drum Compactor 1003.06
Bituminous Material Distributor 1003.07
HMA Plant 1009.01
HMA Trucks 1009.02

159.03 PROCEDURE

159.03.01 Traffic Control Coordinator

Before starting Work, submit to the RE the name, training, work experience, and contact information of an employee assigned as the on-site Traffic Control Coordinator (TCC). The TCC must be certified as having successfully completed the Rutgers CAIT Traffic Control Coordinator Program, or an equivalent course as approved by the NJDOT Office of Capital Project Safety. The TCC must also successfully complete an approved Traffic Coordinator refresher course every 2 years. The TCC is a full-time position and the employee designated as TCC must be available on a 24 hour a day, 7 days a week basis. The TCC shall have the responsibility for and authority to implement and maintain all traffic operations for the Project on behalf of the Contractor. The TCC's responsibilities and duties shall include the following:

1. Overseeing traffic control operations, including those performed by subcontractors.
2. Coordinating traffic control with subcontractors, other contractors, and Utilities.

3. Ensuring that set-up and removal is performed according to the Contract.
4. Performing daily traffic control inspections and providing written reports to the RE documenting the inspections, including detailed findings and corrections made.
5. Performing inspections at night and on weekends to ensure compliance with the TCP and providing written reports to the RE documenting the inspections, including detailed findings and corrections made.
6. Ensuring that traffic control devices are correctly positioned and spaced.
7. Ensuring that signs are properly covered or uncovered.
8. Maintaining or replacing traffic control devices to ensure traffic control devices are in an acceptable condition and good working order. Maintenance also includes replacing lights bulbs and electrical components and refueling, recharging, or replacing batteries.
9. Ensuring that excavations and lateral drop-offs greater than 2 inches in depth are eliminated or protected by barrier or emergency escape ramps during non-working periods.
10. Ensuring that routine road maintenance is performed, including debris removal and road cleaning.
11. Ensuring that construction operations do not create flooding or icing conditions for lanes open to traffic.
12. Identify and correcting traffic control deficiencies immediately. Correct traffic control deficiencies directed by the RE within 2 hours of notification.
13. Ensuring that vehicles, equipment, and material stored adjacent to the road are behind barriers or stored at least 30 feet from the traveled way.
14. Ensuring that Contractor vehicles for material delivery enter or exit the traveled way in a safe manner.

Provide additional employees to assist the TCC as approved by the RE. The RE may request the TCC or additional employees to demonstrate their competency at any time. Notify the RE before performing daily inspections to provide the RE with the opportunity to observe the inspections.

159.03.02 Traffic Control Devices

Ensure that FHWA category 1, 2, 3, and 4 traffic control devices conform to the requirements of NCHRP 350. Provide each device's NCHRP 350 test results and FHWA Acceptance letter to the RE. Ensure that traffic control devices meet or exceed an acceptable condition as described in the ATSSA guide Quality Standards for Work Zone Traffic Control Devices. Traffic control devices need not be new but must be in good condition. Provide traffic control devices according to MUTCD.

Erect traffic control devices before beginning construction operations. Trim vegetation that obscures the sight distance of traffic control devices. Keep the traffic control devices clean, and maintain in acceptable condition until no longer required. Relocate traffic devices as directed by the RE. Place traffic control devices as directed to provide traffic control for Township personnel doing inspections, sampling, testing, and taking measurements required for the Project.

1. **Construction Signs.** Install anchor posts with soil anchor plates, except when installing in rock or in concrete.

   If construction signs are required for less than 3 days, the Contractor may place construction signs on portable sign stands instead of sign posts with the approval of the RE.

   When construction signs or existing signs do not reflect work zone traffic conditions, cover the signs with black polyethylene sheeting. Ensure that the cover is opaque under all lighting conditions and completely conceals the entire front of the sign panel. Securely attach the cover to the back side of the sign without damaging the reflective sheeting. Do not tape the cover to the face of the sign. Ensure that the cover remains secure in all weather conditions. Overhead signs and large guide signs with areas greater than 200 square feet do not need a cover over the entire sign, but require a cover over the conflicting information. Do not alter the face of a sign with revised messages. Remove construction signs when no longer required, and restore the post hole to match the surrounding conditions.

2. **Flashing Arrow Board.** Provide a flashing arrow board as specified in 1001.01.

3. **Portable Variable Message Sign (PVMS).** Place the PVMS at the locations directed by the RE. Ensure that a designated representative familiar with the operation and programming of the unit is available on the Project. Only display messages authorized by the Township for the Project. Repair or replace malfunctioning PVMS within 12 hours of notification by the RE.

159.03.03 Temporary Pavement Markers

Apply temporary pavement markers with butyl adhesive pads to clean, dry pavement surfaces free of cracking, checking, or spalling. If the layout locates a marker at a joint or defect, relocate the marker longitudinally at least 2 inches beyond the joint or defect. Replace lost or damaged temporary pavement markers.

Only remove temporary pavement markers that will be replaced by striping in the same day. If striping cannot be finished in the same day, reinstall temporary pavement markers before opening the road to traffic.

159.03.04 HMA Patch

The RE may direct the Contractor to sawcut existing HMA pavement to the depth of the area to be repaired. Sawcut lines parallel and perpendicular to the roadway baseline and 3 inches away, at the closest point, from the damaged area to be repaired. Remove loose material within the boundary of the repair, and clean the area. Reuse removed material as specified in 202.03.03.C.1. Ensure that the remaining pavement is not damaged.

Apply polymerized joint adhesive or tack coat to the vertical surfaces of the openings. Ensure that the temperature of the HMA when placed is at least 250 °F. Place HMA in 4 inch maximum lifts, and compact with a vibratory drum. For small areas, the RE may approve hand compacting methods. Compact until the top of the patch is flush with the adjacent pavement surface.

159.03.05 Traffic Direction

A. **Flagger.** Provide a flagger that has received formal training in flagging operations and the proper use of the STOP/SLOW paddle. The flagger must meet MUTCD qualifications and, when requested, demonstrate competency to the RE. Immediately replace flaggers who fail to demonstrate competency with a competent flagger. Ensure that flaggers wear a 360 degree high-visibility retroreflective orange safety garment meeting ANSI/ISEA Class 3, Level 2 standards. Ensure that the flagger is equipped with a STOP/SLOW paddle and follows MUTCD flagging procedures.

B. **Police.** Unless designated as local police at the preconstruction conference, police will be on-duty New Jersey State Police. Police are either provided by the RE as employees of the State, or by the local government as a vendor to the State. The use of police services by the RE does not relinquish or diminish the Contractor's responsibilities for work zone safety.

Submit a request for police services to the RE 72 hours before beginning construction operations that require police services. Activities requiring police services include:

1. Traffic direction through signalized intersections, where the integrity of the existing traffic signal system is impacted or where an override of the signal is required.
2. Rolling slow-down or temporary closure of all lanes on state highways and interstates.

Emergency situations may prevent police from arriving at the scheduled date or time. The RE will not permit construction operations that, by law, require police services if police are unavailable. The Township will not accept claims for interruptions or delays resulting from any failure of police to arrive as requested.

The RE must notify State and local police of cancellations 24 hours in advance. At least 24 hours before the scheduled start of work, notify the RE of any work cancellation for which police services were requested.

159.04 MEASUREMENT AND PAYMENT

The Township will measure and make payment for Items as follows:

Item	*Pay Unit*
MAINTENANCE & PROTECTION OF TRAFFIC	LUMP SUM

Except for unforeseen weather conditions, if the Contractor cancels work without providing at least 24 hour notice, the Township will deduct the cost of police services (4 hours for each police officer scheduled) from the Contract.

BID ITEM #1 – CLEARING SITE

201.01 DESCRIPTION

This Section describes the requirements for clearing site including: the removal and disposal of all curing, sidewalk and asphalt within the work areas, the removal and resetting of residential fencing within the project limits, the removal of all obstructions including shrubbery, and timber retaining walls within the Public ROW, the trimming and removal of any overhanging tree limbs, the removal of any tree stumps resulting from tree removal operations that exist within the project limits that hinder construction, the protection and repair of any utility boxes within the Project limits, providing and distributing notices to affected property owners, attendance of preconstruction and any project status meetings, providing and maintaining potable sanitary facilities, daily, weekly and final clean-up activities, obtaining and securing any material storage areas that may be necessary, the protection and repair of any residential sprinkler system or underground dog fencing within the project limits.

201.02 MATERIALS

Provide materials as specified:

Soil Aggregate (I-14) 901.11
Concrete 903.03
Caution Fence 913.02.02
Polyethylene Sheeting 919.12

Provide a commercially available basement waterproofing.

201.03 CONSTRUCTION

201.03.01 Clearing Site

A. **Preparation.** Construct SESC measures, as specified in 158.03.02, before clearing site. Before beginning excavation or embankment construction, clear the site within the limits of construction. Clear the ground surface of designated trees, brush, weeds, roots, matted leaves, small structures, debris, and other objectionable material, vegetation, and growth.

B. **Clearing and Grubbing.** In cut sections, grub out tree stumps within the limits of the total cut area. In fill sections, the Contractor may leave tree stumps extending less than 1 foot above the original ground surface in those areas where the proposed subgrade, or proposed finished grade in non-pavement sections, is greater than 3 1/2 feet above the original ground surface. Grub out tree stumps that lie within 5 feet horizontally or vertically from any proposed structure, pipe, or duct.

Do not remove trees, shrubs, and other landscape features that do not interfere with the Work or are designated for preservation. Prevent damage or injury to existing trees, plants, and other vegetation that are to remain within or adjacent to the Project Limits.

Backfill and compact depressions in excavation areas that lie below the finished subgrade to finished subgrade using the directed method as specified in 203.03.02.B.3.

Clear slopes in areas of cuts, embankments, ditches, channels, waterbodies, and structures, both old and new, of brush, hedges, weeds, heavy vegetation, and other objectionable material or growth. Clear to a maximum of 8 feet beyond the top of slopes of roadway excavation and 5 feet beyond the top of slopes of ditches and channels, except do not clear outside ROW.

Conduct clearing and removal activities in areas identified as containing regulated material according to the pre-excavation plans as specified in 202.03.05.1.

Dispose of material and debris as specified in 201.03.01.H.

C. **Mailbox and Sign Relocation.** Remove and reset residential and commercial mailboxes at locations acceptable to the owners and according to United States Postal Service (USPS) requirements. Notify the USPS before relocating USPS mailboxes.

Remove local street and road signs and reset at locations and in the manner acceptable to local authorities. Ensure that Tourist Oriented Directional Signs and logo signs remain visible to motorists during and after stages of construction. Remove from the immediate work site and safely store existing signs that are to be reset.

D. **Plugging Pipe.** Seal abandoned pipes and conduits using concrete. Construct the plugs to a depth equal to the diameter of the pipe or conduit, or 2 feet, whichever is less.

E. **Removing Sidewalks, Driveways, Curbs, and Gutters.** Sawcut full depth at the limits of removal. Remove sidewalks, driveways, vertical curbs, sloping curbs, barrier curbs, designated for removal and reuse as specified in 202.03.03.C. Repair damage to adjacent pavement courses caused by removal operations.

F. **Disposal of Materials.** Dispose of or recycle removed materials and debris according to Solid Waste Management Act (N.J.S.A. 13:1E-1) and N.J.A.C 7:26 *et seq.* and according to the solid waste management district of origin. Submit proper documentation from the disposal facility to the RE and the county of origin within 15 days of acceptance at the disposal facility.

201.04 MEASUREMENT AND PAYMENT

The Township will measure and make payment for Items as follows:

Item	*Pay Unit*
CLEARING SITE	LUMP SUM

BID ITEM #5 – HMA DRIVEWAY RESTORATION, 3.5" THICK

401.01 DESCRIPTION

This Section describes the requirements for replacing unsuitable areas of restoration of residential HMA driveways affected by the proposed improvements, preparing HMA driveways for paving, constructing base course, and surface course of HMA.

401.02 MATERIALS

401.02.01 Materials

Provide materials as specified:

Tack Coat 64-22, PG 64-22	902.01.01
Prime Coat, Grade CSS-1	902.01.02
Tack Coat:	
Emulsified Asphalt, Grade RS-1, RS-1h, CRS-1, or CRS-1h	902.01.02
Polymer Modified Tack Coat:	
Polymer Modified Emulsified Asphalt	902.01.03
HMA	902.02
HMA HIGH RAP	902.13
Joint Sealer, Hot-Poured	914.02
Polymerized Joint Adhesive	914.03

Use HMA specified for the roadway surface as patching material for HMA pavement repair. The Contractor may use a commercial type of cold mixture as patching material for filling core holes if HMA surface course is not being placed when coring. The Contractor may use an approved HMA surface course to fill core holes, provided the material remains hot enough to compact.

401.02.02 Equipment

Provide equipment as specified:

Materials Transfer Vehicle (MTV)	1003.01
HMA Paver	1003.03
HMA Compactor	1003.05
Vibratory Drum Compactor	1003.06
Bituminous Material Distributor	1003.07
Sealer Application System	1003.08
Milling Machine	1008.01
Mechanical Sweeper	1008.03
Vacuum Sweeper	1008.03
Hot-Air Lance	1008.06
HMA Plant	1009.01
HMA Trucks	1009.02

Provide a thin-lift nuclear density gauge according to ASTM D 2950.

401.03 CONSTRUCTION

401.03.01 Sealing Cracks in HMA Surface Course

Seal cracks that are 1/4 inch wide or wider. Clean cracks to a depth of 1 inch using a random crack saw, carbide-tipped, rotary-impact router, commercial power-driven wire brush, or by other RE approved means. Provide acceptable protective screening if the cleaning operation causes damage to or interference with traffic in adjacent lanes.

Immediately before applying sealant, clean cracks and dry further with a hot-air lance.

At least 10 days before beginning the work, submit to the RE a copy of the manufacturer's recommendations for heating and applying the sealant. Seal cracks with hot-poured joint sealant according to the manufacturer's recommendations. Cut sealant into small pieces to facilitate slow and uniform melting with constant stirring. Ensure that the temperature of the sealant in the field application equipment does not exceed the recommended safe heating temperature. Do not heat sealant material at the pouring temperature for more than 6 hours and do not reheat.

Pour sealant into the cracks so that, upon completion of the work, the surface of the sealant is flush with or not more than 1/4 inch lower than the surface of the adjacent HMA surface course. If the sealant subsides to a lower level, perform another pouring. When more than 1 pour is required to fill the cracks, perform succeeding pours immediately after shrinkage of the previous pouring. If spilling or overfilling occurs, immediately squeegee the crack. If the RE determines that the overfilled crack or spilled sealant creates a slippery, hazardous, or otherwise undesirable condition, initially correct the area by sprinkling a light application of abrasive (sand or grit material) to absorb the excess material, restore skid-resistance, and abate the condition caused by the overpour. After the excess material has been absorbed, hand sweep the area clean, and restore to its original condition or texture to the RE's satisfaction.

Do not allow traffic or construction equipment over the poured cracks until the sealant has hardened sufficiently to resist pickup. The RE may direct sprinkling of dry sand over poured areas to provide additional pickup resistance.

401.03.02 HMA Base Repair

Arrange a project site meeting with the RE to establish the limits of HMA pavement repair. Additional repairs, not delineated on the Plans or by the RE during the project site meeting, may be required if the need is established by the RE.

If potholes are discovered, notify the RE immediately. The RE may immediately direct repairs of small areas. The RE may require further evaluation of a large area to determine the need for additional milling and paving.

Perform HMA repairs as a separate operation before milling, paving, and other surface treatments. The Contractor may request approval of the RE to perform the repair work as one operation with the paving or surface treatment.

HMA repairs may be performed on full depth HMA pavement or on composite pavement (HMA over concrete pavement). For full depth HMA pavement, sawcut existing HMA pavement to a depth of 8 inches. For composite pavement, sawcut existing HMA to a depth of 8 inches or up to the top of concrete, whichever is less. Sawcut lines parallel and perpendicular to the roadway baseline and 3 inches away, at the closest point, from the damaged area to be repaired.

Remove damaged and loose material within the boundary of the sawcuts to form rectangular openings with vertical sides to a depth of 8 inches for HMA pavement, or to the top of concrete for composite pavement. A milling machine may be used to remove damaged pavement to form the repair areas if approved by the RE.

After the existing damaged HMA and loose material has been removed, the RE will examine underlying material to determine its condition.

If the base of the repair area is unbound material, then shape and compact the unbound material to produce a firm and level base.

If water exists in the area, remove the underlying material to the depth as directed by the RE. Place geotextile, then place and compact coarse aggregate to required grade to provide for a minimum 8 inch thick HMA pavement repair. Compact coarse aggregate as specified in 203.03.02.B.3.

If the base of the repair is HMA or concrete pavement, then ensure that the remaining pavement is cleaned and dry prior to applying tack coat.

Apply tack coat at an application rate of 0.15 gallons per square yard to the vertical surfaces and base of the opening. Spread and grade HMA surface course mix in the opening as specified for the roadway surface or a HMA surface course mix approved by the RE. Ensure that the temperature of the HMA when placed is at least 250 °F, and compact as specified in 401.03.07.F. Compact areas not accessible to rollers with a flat face compactor. Compact until the top of the patch is flush with, or 1/8 inch higher than, the adjacent pavement surface.

Reuse removed material as specified in 202.03.03.C.1.

401.03.03 Polymerized Joint Adhesive

Construct polymerized joint adhesive as specified in 401.03.07.E.

401.03.04 Tack Coat

Clean the surface of foreign and loose material. **A vacuum type sweeper must be utilized immediately prior to any tack coat application. No tack shall be applied until the Township Engineer has approved the milled surface.** Immediately before beginning paving operations, ensure that the surface is dry. Do not place tack coat unless the weather restrictions, as specified in 401.03.07.B, are met.

Do not apply tack coat to asphalt-stabilized drainage course.

For curbs, gutters, manholes, and other similar structures, do not apply tack coat. Clean the exposed surfaces of these

structures and apply a uniform coating of polymerized joint adhesive to contact surfaces before paving as specified in 401.03.07.E.

A spray paver may be used to apply tack coat, or polymer modified tack coat, and HMA in a single operation. When paving HMA with a spray paver, use tack coat. When paving polymer modified HMA with a spray paver, use polymer modified tack coat. When using a spray paver, apply tack coat at a rate of 0.10 to 0.15 gallons per square yard and at a temperature as specified in Table 401.03.05-1.

In areas inaccessible to distributor spray bars, use hand spraying equipment for tack coat. Do not allow traffic on tack coated surfaces. Treat surfaces as follows:

1. **Tack Coat.** Uniformly spray tack coat when placing HMA on paved surfaces. Apply tack coat only to areas to be paved in the same day. Apply tack coat as specified in Table 401.03.05-1:

Table 401.03.05-1 Tack Coat Application

Material	Spraying Temp, °F	Gallons per Square Yard	Season
Emulsified Asphalt:			
RS-1, RS-1h	125 to 185	0.05 to 0.15	All year
CRS-1, CRS-1h	125 to 185	0.05 to 0.15	All year

Correct uncoated or lightly coated areas. Blot areas showing an excess of tack coat with sand or other similar material. Remove blotting material before paving. Ensure that the material is not streaked or ribboned.

Before paving, allow tack coat to cure to a condition that is tacky to the touch.

2. **Tack Coat 64-22.** When precipitation has occurred within 24 hours before application, the RE will determine whether to allow the work to proceed, or to wait until the surface is completely dry. Only apply tack coat that can be paved over in the same day. Apply tack coat 64-22 at a rate of 0.06 to 0.14 gallons per square yard and at a spraying temperature of 325 °F. Adjust the spraying temperature and application rate to produce a uniform coating, with no excess material.

   Correct uncoated or lightly coated areas and remove excess tack coat from affected areas. Ensure that the material is not streaked or ribboned.

3. **Polymer Modified Tack Coat.** When paving polymer modified HMA, apply polymer modified tack coat with a spray paver at a temperature of 140 to 185 °F. Continuously monitor rate of spray, ensuring a uniform application rate over entire width to be overlaid. Apply at the rate of 0.10 to 0.15 gallons per square yard. For ultra-thin friction course, modified open-graded friction course and asphalt-rubber open-graded friction course, apply at a rate of 0.20 to 0.25 gallons per square yard. For bridge deck waterproof surface course, apply at a rate of 0.15 to 0.20 gallons per square yard. Do not allow traffic, equipment, tools, or any other disturbance to the polymer modified tack coat before placing the HMA material.

Clean and remove any tack coat material displaced or tracked in any areas as directed by the RE.

401.03.05 Prime Coat

Clean the surface of foreign and loose material where the HMA is to be placed. Immediately before beginning paving operations, ensure that the surface is dry. Do not place prime coat unless the weather restrictions, as specified in 401.03.07.B, are met.

Do not apply prime coat to asphalt-stabilized drainage course.

For curbs, gutters, manholes, and other similar structures, do not apply prime coat. Clean the exposed surfaces of these structures and apply a uniform coating of polymerized joint adhesive to contact surfaces before paving.

In areas inaccessible to distributor spray bars, use hand spraying equipment for prime coat. Do not allow traffic on prime coated surfaces. Treat surfaces as follows:

Apply prime coat of emulsified asphalt on unpaved surfaces as follows:

Table 401.03.06-1 Prime Coat Application

Material	Spraying Temp, °F	Gallons per Square Yard	Season
Emulsified Asphalt:			
CSS-1	70 to 140	0.1 to 0.50	All year

Apply prime coat at least 12 hours before placement of the HMA and when the base courses are not saturated or frozen.

Unless the prime coat is under asphalt-stabilized drainage course, the RE may waive the application of prime coat if more than 5 inches of HMA is placed on the unbound aggregate course before the roadway is opened to traffic. Take measures to prevent prime coat from entering into the drainage system or extending beyond the area to be paved.

Clean and remove any prime coat material displaced or tracked in any areas as directed by the RE.

401.03.06 HMA Courses

A. **Paving Plan.** At least 20 days before beginning placing HMA, submit a detailed plan of operation to the RE for approval that includes the following:

1. Asphalt paving construction technologist (APCT), certified by the Society of Asphalt Technologists of New Jersey, Inc. The Department will accept the equivalent certification by the Mid-Atlantic Regional Technician Certification Program.
2. Size and description of crew.
3. Number, type, and model of equipment. Innovative equipment features to be utilized such as but not limited to intelligent compaction rollers, paver mounted infrared thermal profile system, and other Global Position System (GPS) located construction equipment.
4. Lighting plan for nighttime operations as specified in 108.06.
5. Longitudinal joint layout plan, quality control, and construction practices.
6. Manufacturer's recommendations for heating and applying joint sealant.
7. Paving procedures for maintaining continuous operation as specified in 401.03.07.D.
8. Manufacturer's recommended laydown temperature for modified binders.
9. Paving sequence and paver automation use plan. Ensure that the HMA surface course is constructed for the full width of the traveled way, shoulder, and auxiliary lanes as a single paving operation.
10. Schedule, hours of operation, and production rates for the Project.
11. Plant locations.
12. Method of maintaining HMA temperature during transportation.
13. Method of constructing and compacting joints as specified in 401.03.07.E.
14. Quality control plan outlining the test strip, the use of the thin lift nuclear density gauge, quality control cores, and the control of the compaction process.
15. If applicable, the warm mix asphalt additive or process being used.
16. Proposed location for test strip.

Do not begin paving until the RE approves this plan. Submit an adjusted pavement plan before making adjustments to the paving operation.

When using HMA HIGH RAP submit for Township approval a plan of the location for the HMA HIGH RAP on the project.

B. **Weather Limitations.** Do not place HMA if it is precipitating. Do not allow trucks to leave the plant when precipitation is imminent. The Contractor may resume operations when the precipitation has stopped and the surface is free of water.

When placing HMA, ensure that the base temperature meets the minimum temperature requirements specified in Table 401.03.07-1.

Table 401.03.07-1 Minimum Base Temperature

Lift Thickness, inches (t)	Minimum Base Temperature, °F
$t \leq 1$	50
$1 < t < 2$	41
$t \geq 2$	32

C. **Test Strip.** Construct a test strip for each HMA mix for contracts with more than a total of 5,500 tons of HMA. For HMA HIGH RAP, construct the test strip at least 14 days prior to production. Test strips are not necessary for temporary pavement. Ensure that the tack coat or prime coat has been placed as specified in 401.03.05 and 401.03.06, before placing HMA. Transport and deliver, spread and grade, and compact as specified in 401.03.07.D, 401.03.07.E, and 401.03.07.F, respectively, and according to the approved paving plan. Construct a test strip for the first 700 to 1,200 square yards placed for each job mix formula. While constructing the test strip, record the following information and submit to the RE:

1. **Ambient Temperature.** Measure ambient temperature at the beginning and end of each day's paving operation.
2. **Base Temperature.** Measure the surface temperature of the existing base before paving.

3. **HMA Temperature.** Measure the temperature of the HMA immediately after placement.

4. **Roller Pattern.** Provide details on the number of rollers, type, and number of passes used on the test strip.

5. **Nuclear Density Gauge Readings.** Obtain the maximum density from the plant and input it into the nuclear density gauge. Use the nuclear density gauge to read the bulk density and percent air voids.

6. **Quality Control Core Density Test Results.** Take 5 randomly selected quality control cores to test for the bulk specific gravity and the maximum specific gravity.

   Use drilling equipment with a water-cooled, diamond-tipped masonry drill bit that produces 6 inch nominal diameter cores for the full depth of the pavement. Remove the core from the pavement without damaging it. After removing the core, remove all water from the hole. Fill the hole with HMA or cold patching material, and compact the material so that it is 1/4 inch above the surrounding pavement surface.

   Compare the nuclear density gauge readings and the core test results to establish a correlation. Use this correlation as a guide for the continued use of the nuclear density gauge for density control.

7. **Warm Mix Asphalt.** Note the warm mix asphalt additive or process, if used.

   When a spray paver is used, during the test strip or prior to starting the paving operation, operate spray paver without mix to verify tack coat application rate and demonstrate full tack coat coverage to the RE for the project. Only after the RE approves the tack coat application and coverage, then proceed with the test strip.

   Upon completion of the test strip, the Contractor may continue paving except when paving HMA HIGH RAP. If the Contractor does not continue paving, the Township will accept the test strip as the first lot regardless of size.

   If the test strip does not meet requirements, make adjustments and construct a second test strip. If the second test strip does not meet requirements, suspend paving operations until written approval to proceed is received.

   Before making adjustments to the paving operations, notify the RE in writing. If any changes are made to the paving plan after the beginning of the paving operation, construct an additional test strip.

D. **Transportation and Delivery of HMA.** Deliver HMA using HMA trucks in sufficient quantities and at such intervals to allow continuous placement of the material. Do not allow trucks to leave the plant within 1 hour of sunset unless nighttime lighting is provided as specified in 108.06. The RE will reject HMA if the HMA trucks do not meet the requirements specified in 1009.02. The RE will suspend construction operations if the Contractor fails to maintain a continuous paving operation. Before the truck leaves the plant, obtain a weigh ticket from a fully automatic scale. Before unloading, submit for each truckload a legible weigh ticket that includes the following:

1. Name and location of the HMA plant.
2 Contractor.
3. Project title.
4. Load time and date.
5. Truck number.
6. Mix designation.
7 Item and Item number.
8. Plant lot number.
9. Tare, gross, and net weight.

Ensure that weigh tickets are signed and sealed by a certified weighmaster.

In the event of breakdown of an automatic printer system, the RE will accept weigh tickets showing the tare, gross, and net weight of each truck, as entered and certified by a weighmaster for a period not exceeding the necessary repair time as certified by a licensed repairman.

When using an automated batching plant, obtain weigh tickets from the printer used in conjunction with an automated batching and mixing system. Ensure the printed ticket shows the individual weights of the various components of the HMA in a batch, the total weight of each batch, and the sum of all batch weights in the truckload. At the completion of each day's work, provide certification from the weighmaster that the total net weight supplied was correct.

E. **Spreading and Grading.** Use a stringline or other linear reference system to ensure proper line and grade when spreading material. Ensure that the system is in place and approved by the RE before placing HMA. Ensure that the underlying surface meets line and grade as specified in 202.03.03.D. Before placing HMA, ensure that the tack coat or prime coat has been placed as specified in 401.03.05 and 401.03.06 to the full width of the HMA. Obtain RE approval of the underlying surface far enough in advance of spreading HMA to allow 1 day's paving operations.

Ensure that the certified APCT is present during paving operations.

Before beginning, ensure that the temperature of the screed on the HMA paver is heated to at least the laydown temperature of the HMA. Using the MTVs and HMA pavers, construct paving courses in lifts of at least 4 times the nominal maximum aggregate size of the HMA being constructed. Ensure the paver vibratory screed is on when paving and that the paver automation is used as per the paving plan. Ensure the paver and auger speed are coordinated and operated at the proper speed to allow for a uniform head of material across the entire width of the paver. Ensure that the proper paver and auger speed are maintained. Ensure that the grade and profile are maintained.

Use HMA having a nominal maximum aggregate size of 3/8 inch or less in transition (run out) areas. On areas where irregularities or unavoidable obstacles make use of a paver impractical, spread, rake, and lute HMA with hand tools. For these areas, dump, spread, and screed the HMA to obtain the required compacted thickness.

Construct joints as follows:

1. **Longitudinal Joints.** Perform paving with the spring-loaded end plates of the paver in the "down" position and ensure that they are firmly seated on the pavement surface. Ensure augers and tunnels are extended to within 12 to 18 inches of the end plates and that a continual supply of hot material flows out to the end plates and the material is not segregating. Ensure the longitudinal joint in 1 lift offsets that in the lift immediately below by approximately 6 inches. Offset the joint in the surface course from the lane lines by 6 inches. When constructing a joint between lanes of opposing traffic, offset the joint by 6 inches into either lane.

    a. **Echelon Paving.** If a single paver does not spread the HMA the entire width of the roadway, use 2 or more pavers in echelon. Ensure that the trailing paver follows within 300 feet of the lead paver. Extend the screed and end gate of the trailing paver 1 inch over the uncompacted HMA placed by the lead paver. Ensure that the uncompacted HMA elevation from the trailing paver is equal to that from the lead paver at the joint. The Contractor may construct either a butt joint or a wedge joint. Do not rake the joint.

    b. **Cold Joint Paving.** If echelon paving is not possible, construct the pavement using cold longitudinal joints. When constructing the first lane, compact so the line and grade of the edges of the HMA are not displaced. Construct longitudinal joints parallel to the centerlines within a tolerance of ±1 inch per 100 linear feet. If this tolerance is not met, trim or mill the edge of the HMA mat as necessary. Before paving the abutting lane, ensure longitudinal joints are straight and free from dust and debris.

    For surface course only, uniformly apply polymerized joint adhesive to longitudinal cold joint. Apply a 1/8 inch thick coating of polymerized joint adhesive over the entire joint face. Apply slowly to ensure an even coating thickness. Apply polymerized joint adhesive to the vertical faces, curb, and utility structures.

    When maintaining traffic with a lift thickness greater than 2 inches, construct a wedge joint. The RE will permit a butt joint for lift thickness 2 inches or less when maintaining traffic, or for lift thickness greater than 2 inches when maintaining traffic is not required. Maintain a uniform width and depth of overlapped material at all times. Position the paver so that the HMA overlaps the edge of the lane previously placed by 1/2 to 1 inch. Leave the material sufficiently high to allow for compaction. Do not lute the HMA material. Do not broadcast HMA material at the joint across the new HMA mat.

    When compacted, ensure that the new mat at the joint is even or slightly higher (maximum 1/8 inch) than the previously placed adjoining mat. If the newly compacted mat results in a depression at the joint of more than 1/8 inch, suspend paving operations until corrective action is taken to prevent reoccurrence.

2. **Transverse Joints.** Construct transverse joints to provide a smooth riding surface. When using a bulkhead to form the joint, ensure that the bulkhead forms a straight line and vertical face. If a bulkhead is not used to form the joint, make the joint by sawing the compacted HMA for a sufficient distance behind the end of the placement to ensure full thickness and a smooth surface at the joint. Remove the full lift thickness of HMA ahead of the sawed joint. Paint the joint face with polymerized joint adhesive before the fresh material is placed against it. Unless prohibited by field conditions, cross roll to obtain thorough compaction of these joints.

F. **Compacting.** Compact with the minimum number of rollers as specified in the Table 401.03.07-2.

Table 401.03.07-2 Compaction Requirements

Laydown Rate (r), yd^2/day	Minimum Number of Rollers
$r \leq 2{,}000$	1
$2{,}000 < r < 4{,}000$	2
$r \geq 4{,}000$	3

Orient the drive axles of the roller towards the paver during compaction operation. Operate rollers at a slow, uniform speed not exceeding 2 1/2 miles per hour. If necessary to prevent adhesion of the HMA to the rollers, keep the wheels moistened with water mixed with very small quantities of detergent.

Begin compacting at the sides and progress gradually to the center. On superelevated curves, compact from the lower to the upper edge parallel to the centerline and uniformly overlap each preceding track until the entire surface has been compacted.

Continue rolling until roller marks are eliminated and the air voids conform to the specified requirements.

Along forms, curbs, headers, walls, and other places not accessible to the rollers, compact the HMA by a vibratory drum compactor.

Remove and replace HMA that becomes loose, broken, or otherwise defective or that shows an excess or deficiency of asphalt binder material.

When paving in echelon, keep the rollers for the first lane approximately 6 inches from the unconfined edge adjacent to the second paving operation. After HMA from the second paver is placed against the uncompacted edge of the mat from the first paver, compact the HMA on both sides of the joint.

Prevent lateral or vertical displacement of the unconfined edge during the compaction operation. Ensure that the edge of the drums of the rollers extends over the free edge of the mat by at least 6 inches.

When compacting the butt or wedge joint, while paving the adjacent lane, place the roller on the newly placed HMA and overlap the joint by approximately 6 inches.

If a test strip was not required, establish a correlation between the nuclear density gauge and the cores as specified in 401.03.07.C.6. To adjust correlation with the thin lift nuclear density gauge, take 1 additional core every week during the paving operation. The RE may approve additional coring with valid cause presented by the Contractor. On a daily basis, provide results of both the nuclear density and core testing to the RE. Provide core and nuclear density results that include the bulk specific gravity, the maximum specific gravity according to AASHTO T 209, and the percent air voids. Failure to submit the core and nuclear density test results from the previous week's paving will result in suspended paving operations.

G. **Opening to Traffic.** Remove loose material from the traveled way, shoulder, and auxiliary lanes before opening to traffic. Open HMA courses to traffic or construction equipment, including paving equipment, only after the surface temperature has cooled to less than 140 °F.

When using Warm Mix Asphalt, do not allow traffic or construction equipment on the HMA course until the surface temperature is less than 120 °F.

651.01.01 Reset Water Valve Box

Adjust the height of the existing water valve boxes so that it is set flush with the proposed grade without disturbing the existing valve.

653.01.01 Reset Gas Valve Box

Adjust the height of the existing valve box so that it is set flush with the proposed grade without disturbing the existing valve.

401.04 MEASUREMENT AND PAYMENT

The Township will measure and make payment for Items as follows:

Item	*Pay Unit*
HMA DRIVEWAY RESTORATION, 3.5" THICK	SQUARE YARD

The Township will measure HMA DRIVEWAY RESTORATION, 3.5" THICK by the square yard bounded by the sawcuts and excluding the 1' restoration included in the REINFORCED CONCRETE APRON (BID ITEM #8).

The Township will not make separate payment for water valve and gas valve resets. Contractor to provide and install the appropriate number and size valve risers to accommodate a flush finish with new asphalt pavement.

The Township will not measure BASE REPAIR or HMA BASE COURSE, 4" THICK for any areas including within the payment limits of CONCRETE CURBING (BID ITEM #6). Those costs are to be included in the unit price for that bid item.

The Township will NOT measure TACK COAT, TACK COAT 64-22, PRIME COAT, and POLYMER MODIFIED TACK COAT. Those costs are to be included in the unit price for HMA DRIVEWAY RESTORATION, 3.5" THICK.

BID ITEM #7 – CONCRETE SIDEWALK, 4" THICK
BID ITEM #8 – REINFORCED CONCRETE APRON, 6" THICK
BID ITEM #9 – DETECTABLE WARNING, EMBEDDED

606.01 DESCRIPTION

This Section describes the requirements for constructing concrete sidewalks, reinforced concrete driveway aprons, and detectable warnings, including all subbase preparation and 6" thick clean stone base beneath all concrete flatwork, 1' of HMA driveway restoration, 1' of roadway repair for concrete curbing and reinforced concrete driveway apron installation, and 1' of landscape restoration for all of these items.

606.02 MATERIALS

606.02.01 Materials

Provide materials as specified:

Dense-Graded Aggregate	901.10
Hot Mix Asphalt (9.5M64)	902.02
Concrete	903.03
Curing Materials	903.10
Reinforcement Steel	905.01
Welded Wire Reinforcement	905.01.03
Preformed Joint Filler	914.01
Hot-Poured Joint Sealer, Type 2	914.02
Sleeves	919.10
Detectable Warning Surface	919.14

For driveways, the Contractor may use Class E concrete, as specified in 903.04, in order to open the driveway to traffic in 3 days.

606.02.02 Equipment

Provide equipment as specified:

HMA Compactor	1003.05
Vibratory Drum Compactor	1003.06
Bituminous Material Distributor	1003.07
Sealer Application System	1003.08
Vibrator	1005.04
Straightedge	1008.02
Pavement Saw	1008.04
Hot-Air Lance	1008.06
HMA Plant	1009.01
HMA Trucks	1009.02
Concrete Batching Plant	1010.01
Concrete Trucks	1010.02

606.03 CONSTRUCTION

606.03.01 HMA Driveways

Excavate as specified in 202.03.03. Obtain RE approval before finishing excavation. If the RE determines that the bottom of the excavation is unstable, undercut, backfill, and compact as directed by the RE.

Place sleeves for signs and delineator posts at locations shown on the Plans. Ensure that sleeves are flush with the finished surface. Fill the sleeves with sand. Immediately before HMA placement, seal the top 1/2 inch with hot-poured joint sealer. Reseal the sleeves when sign or delineator posts are installed.

For driveways, if directed by the RE, construct a base course using DGA as specified in 302.03.01 to the thickness directed by the RE. Construct the HMA course as specified in 401.03.03. Compact using at least 1/2 ton rollers.

606.03.02 Concrete Sidewalks, Driveways



A. **Underlayer Preparation.** Excavate as specified in 202.03.03. Obtain RE approval before finishing excavation. If the RE determines that the bottom of the excavation is unstable, undercut, backfill, and compact as directed by the RE.

B. **Forms.** Each time before using, ensure that the forms are thoroughly cleaned and treated with a material that will prevent adherence of the concrete to the forms without discoloring the concrete.

C. **Sleeves.** When signs or delineators are shown, place sleeves at locations shown on the Plans. Ensure that sleeves are flush with the finished surface. Fill the sleeves with sand. Seal the top 1/2 inch with hot-poured joint sealer immediately after curing concrete. Reseal the sleeves when sign or delineator posts are installed.

D. **Welded Wire Mesh.** When reinforcement is shown for sidewalks and driveways, ensure that the welded wire mesh is free of dirt, detrimental scale, paint, oil, or other foreign substances before placing. Ensure that the welded wire mesh is halfway between the top and bottom surfaces of the concrete.

E. **Expansion Joints.** Construct 1/2 inch wide expansion joints, placed at intervals of approximately 20 feet, with preformed joint filler. If the sidewalk, driveway, or island is constructed on a concrete surface, install expansion joints directly over the expansion joints in the underlying concrete surface. Construct expansion joints around all appurtenances, such as manholes and utility poles, and between new concrete and any fixed structure, such as a curb, walls, buildings, or bridges. Ensure that the expansion joint material extends for the full depth.

Clean the top and ends of expansion joint material of all excess concrete, and trim the expansion joint material slightly below the surface of the concrete.

F. **Placing Concrete.** Obtain RE approval of forms and joint placement before placing concrete. Place concrete according to the limitations specified in 504.03.02.C. To place concrete between November 1 and March 15, submit, to RE for approval, a plan detailing the method of protecting the concrete from salt for at least 30 days after placing. Do not begin placing concrete until this plan is approved. Place concrete across the formed area to minimize rehandling. Ensure that concrete is not discharged into windrows or piles. Continuously place concrete between transverse joints without the use of intermediate bulkheads. To prevent bowing or misalignment of the transverse joints, place concrete simultaneously on both sides of transverse joints without disturbing the joints. Consolidate the concrete by hand spading or using internal mechanical vibrators. If a slab is not completed from transverse joint to transverse joint, remove the incomplete slab and replace. Terminate each day's placement at a transverse joint. If concrete becomes segregated during placement, cease operations and correct handling operations. Protect concrete as specified in 504.03.02.I.

G. **Finishing Concrete.** Strike off the concrete using a transverse template resting upon the side forms to the required cross section. Finish the concrete using floats and straightedges to obtain a smooth surface. When the surface of the concrete is free from water and just before the concrete attains its initial set, texture with a broom. Round edges using an edging tool with a 1/4 inch radius.

Divide the surface into blocks using a grooving tool. Ensure that groove lines coincide with expansion joints. Ensure that the grooves are cut to a depth of at least 1/2 inch. Finish the edges of the grooves using an edging tool with a 1/4 inch radius.

H. **Protection and Curing.** Cure concrete using curing compound as specified in 504.03.02.F. Remove forms as specified in 504.03.02.G. Ensure pedestrians do not use concrete sidewalks, islands, and driveways until 24 hours after finishing. Ensure vehicles and other loads are not placed on sidewalks, islands, and driveways until the concrete has attained compressive strength of 3,000 pounds per square inch, as determined from 2 concrete cylinders field cured according to AASHTO T 23.

I. **Backfilling.** After removing the side forms, backfill the spaces along the edges of sidewalks and driveways with suitable material. Place this material in 5 inch lifts, and compact the layers until firm.

606.03.03 Detectable Warning Surfaces

Install detectable warning surfaces according to the manufacturer's recommendations.

If the detectable warning surface is not integrally colored, apply the detectable warning surface coating according to the manufacturer's recommendation. Evenly broadcast 60 grit over the final wet coat at a rate of 0.07 pounds per square yard for skid resistance.

606.04 MEASUREMENT AND PAYMENT

The Township will measure and make payment for Items as follows:

Item	*Pay Unit*
CONCRETE SIDEWALK, 4" THICK	SQUARE YARD
CONCRETE APRON, REINFORCED, 6" THICK	SQUARE YARD
DETECTABLE WARNING SURFACE	EACH

BID ITEM #6 –CONCRETE CURBING

607.01 DESCRIPTION

This Section describes the requirements for constructing concrete curb, including all restoration materials as shown in the 'Pay Limits' on the detail sheet.

607.02 MATERIALS

607.02.01 Materials

Provide materials as specified:

Hot Mix Asphalt (9.5M64)	902.02
Concrete	903.03
Mortar	903.08.01
Curing Materials	903.10
Reinforcement Steel	905.01
Flexible Delineators	911.03
Preformed Joint Filler	914.01
Joint Sealer, Hot-Poured	914.02

For concrete curb at driveways, the Contractor may use Class E concrete, as specified in 903.04, in order to open the driveway to traffic in 3 days.

607.02.02 Equipment

Provide equipment as specified:

HMA Curb Machine	1003.02
Bituminous Material Distributor	1003.07
Sealer Application System	1003.08
Vibrator	1005.04
Straightedge	1008.02
HMA Plant	1009.01
HMA Trucks	1009.02
Concrete Batching Plant	1010.01
Concrete Trucks	1010.02

607.03 CONSTRUCTION

607.03.01 Concrete Vertical Curb and Concrete Sloping Curb

A. **Underlayer Preparation.** Excavate as specified in 202.03.03. Shape and compact the underlying material to produce a firm, even surface. Obtain RE approval before finishing excavation. If the RE determines that the bottom of the excavation is unstable, undercut, backfill, and compact as directed by the RE.

B. **Constructing Forms.** Construct forms as specified in 607.03.01.B.

C. **Installing Joints.** Install joints as specified in 607.03.01.C.

D. **Placing Concrete.** Place concrete for vertical curb and sloping curb as specified in 607.03.01.D, except that consolidation may be achieved by hand spading or internal mechanical vibrators.

E. **Finishing Concrete.** Finish the top and front face of the curb as specified in 607.03.01.E.

F. **Protecting and Curing Concrete.** Immediately after finishing the concrete, apply curing compound as specified in 504.03.02.F.1.

G. **Backfilling Curb.** Backfill and compact using the directed method, as specified in 203.03.02.B.3, against the curb.

607.03.02 Concrete Vertical Curb and Concrete Sloping Curb, Dowelled

A. **Underlayer Preparation.** Prepare the underlying surface as specified in 607.03.03.A.

B. **Constructing Forms.** Construct forms as specified in 607.03.01.B.

C. **Installing Joints.** Install joints as specified in 607.03.01.C.

D. **Placing Concrete.** Place concrete for vertical and sloping curb as specified in 607.03.02.D.

E. **Finishing Concrete.** Finish the top and front face of the curb as specified in 607.03.01.E.

F. **Protecting and Curing Concrete.** Immediately after finishing the concrete, apply curing compound as specified in 504.03.02.F.1.

G. **Backfilling Curb.** Backfill and compact using the directed method, as specified in 203.03.02.B.3, against the curb.

607.04 MEASUREMENT AND PAYMENT

The Township will measure and make payment for Items as follows:

Item	*Pay Unit*
CONCRETE CURB	LINEAR FOOT

The Township will measure curb along the face at the gutter line.

LANDSCAPE RESTORATION

803.01 DESCRIPTION

This Section describes the requirements for preparing existing soil for seeding, for preparing and placing topsoil, providing and placing pulverized limestone, fertilizer, and seed mixtures, for providing and spreading mulch, and for tacking straw mulch .

803.02 MATERIALS

Provide materials as specified:

Soil Aggregate (I-14) 901.11
Topsoil 917.01

803.03 CONSTRUCTION

803.03.01 Preparation of Existing Soil

Clear the surface of the existing soil of all stumps, brush, weeds, and debris. Cultivate the soil to a depth of 3 to 4 inches to prepare a seed bed. Where depressions exceed 8 inches in depth, backfill with I-14 soil aggregate and cover with 4 inches of topsoil. Bring the entire area to a smooth grade, free from any depressions that would collect water. If necessary, use additional topsoil to fill depressions.

Dispose of waste material and debris resulting from preparation of existing soil as specified in 201.03.01.H.

804.01 MATERIALS

Provide materials as specified:

Topsoil 917.01

804.02 CONSTRUCTION

804.02.01 Topsoil Spreading

Store topsoil obtained from stripping in stockpiles as specified in 202.03.03.B.

Scarify the subsoil to a depth of 12 inches, in the area to be topsoiled, to improve porosity and to improve the bond between slope and topsoil. Remove from the scarified area stones 2 inches or larger in any dimension and other debris such as wires, cables, tree roots, pieces of concrete, clods, and lumps. For slopes of 2H:1V or steeper, and the RE will direct the depth of scarification to create ridges (such as by a dozer track) in the subsoil surface parallel to the bottom of the slope.

After the RE has approved the prepared surface elevations, spread topsoil and smooth to grade to produce the required thickness. For slopes of 2H:1V or steeper, create ridges (such as by a dozer track) in the topsoil surface parallel to the bottom of the slope to hold the seed in place and to retain moisture.

Ensure that ground areas are not damaged by the delivery, handling, or storage of materials, by washouts due to drainage diversion, by workers, or by equipment. Repair such damage by grading, scarifying the subsoil to a depth of 12 inches, fertilizing, seeding, and mulching as specified in 806.03.01.

804.02.02 Borrow Topsoil

If the quantity of topsoil obtained from stripping operations is insufficient for topsoil spreading, provide borrow topsoil from off-site sources. Store borrow topsoil in stockpiles as specified in 202.03.03.B.

806.01 MATERIALS

Provide materials as specified:

Fertilizer 917.02.02
Pulverized Limestone 917.02.03
Grass Seed Mixture 917.03.01
Mulch 917.04
Tackifiers 917.05
Water 919.08

Provide hardwood stakes that are relatively knot free. Provide coarse sand that is clean, dry, and salt-free.

806.02 CONSTRUCTION

806.02.01 Fertilizing and Seeding

A. **Optimal Seeding Seasons.** Seed from March 1 to May 15 and from August 15 to October 15. When weather and soil conditions are suitable, the RE may allow seeding at other times for soil erosion and sediment control. Notify the RE 24 hours before the seeding operation.

B. **Soil Preparation.** When the topsoil to be seeded has a pH value of less than 5.8, incorporate sufficient pulverized limestone to increase the soil pH value to 6.5. Test soil for appropriate application of N-P-K in fertilizer in accordance with NJ Fertilizer Law P.L. 2010, Chapter 112. Provide the test results to the RE for approval.

Recommended quantities of total oxides (calcium and magnesium) to raise the pH of a 4 inch layer of soil to approximately 6.5 as specified in Table 806.03.01-1.

Table 806.03.01-1 Recommended Quantities of Total Oxides per Soil Class (Pounds per Acre)

Soil (pH)	Loamy Sand	Sandy Loam	Loam	Silty Loam
5.7	300	600	900	1200
5.3 to 5.6	600	1035	1500	1800
4.9 to 5.2	900	1500	2100	2400
4.5 to 4.8	1200	1800	2700	3000
4.1 to 4.4	1500	2100	3300	3600

Ensure that the quantity of pulverized limestone required is in proportion to its total oxide content.

Cultivate areas to be seeded to provide a reasonably firm but friable seedbed to a depth of 3 to 4 inches. On slopes steeper than 3H:1V, the RE may reduce the depth of cultivation. Remove all vegetation, stones 2 inches or larger in any dimension, and other debris from areas to be seeded.

C. **Seed and Fertilizer Application.** Sow grass seed mixtures at the rate of 200 pounds per acre. Use only one type of fertilizer to establish turf throughout the Project Limits. At the time of seeding, apply fertilizer at the per acre rate in accordance with the NJ Fertilizer Law P.L. 2010, Chapter 112. When seeding to establish temporary or permanent turf falls within the period that fertilizer is not allowed to be applied, apply fertilizer in the next allowable period.

Place seed and fertilizer by either of the following methods:

1. **Hydraulic Method.** Mix the seed and fertilizer in water, and then apply under pressure at the specified rates. Retreat all areas inadequately covered.

2. **Dry Method.** Spread fertilizer in dry form separately from seed at the specified rates based on soil test results. Use mechanical spreaders to achieve even distribution. For areas inaccessible to mechanical spreaders, use hand-operated spreaders. Smooth finished seeded areas to the grades shown on the Plans.

D. **Mulching.** Mulch seeded areas as specified in 809.03.01. Apply straw or fiber mulch at a minimum of 2,500 pounds per acre as a separate operation after areas have been seeded.

E. **Turf Establishment.** Protect and maintain seeded areas. Repair damage to seeded areas caused by pedestrian or vehicular traffic or other causes.

Apply a second application of fertilizer approximately 6 months after the initial application in accordance with the NJ Fertilizer Law P.L. 2010, Chapter 112.

Ensure a total grass coverage of 95 percent weed free and containing plants in proportion to the various kinds of seed in the grass seed mixture with no bare areas larger than 25 square feet. If a stand of grass does not meet this criteria, mow unacceptable grass and weeds to a height of 2 inches, remove unacceptable cut vegetation, prepare a viable seed bed, refertilize, reseed, and remulch until a satisfactory stand of grass is established.

809.01 CONSTRUCTION

809.01.01 Straw Mulching

Uniformly spread straw mulch in 1 to 1 1/2 inch loose layers over turf areas (approximate equivalent of 2,500 pounds per acre) within 7 days of seeding. Bind the mulch in place using one of the following tackifiers:

1. **Synthetic Plastic Emulsion.** Apply synthetic plastic emulsion using hydraulic pressure equipment at a rate of 30 gallons (264 pounds) of undiluted material per acre. Dilute the synthetic plastic emulsion with water at a ratio of 1:15. Do not apply synthetic plastic emulsion in precipitation or in freezing weather.

2. **Vegetable-Based Gels.** Mix vegetable-based gels with water, and apply using hydraulic pressure equipment. Apply vegetable-based gels as recommended by the manufacturer, except thoroughly mix at least 40 pounds of the dry material with 750 gallons of water per acre. Do not apply vegetable-based gels in precipitation or in freezing weather.

When immediate protection of newly graded slopes is necessary at times other than during optimum seeding seasons, apply straw mulch with a temporary seed mixture.

Leave straw mulch in place and allow to disintegrate. If straw mulch is displaced before the grass reaches a height of 1 1/2 inches, refertilize, reseed, and remulch the area.

809.01.02 Fiber Mulching

The Contractor may only use fiber mulch during the optimum seeding seasons and with the approval of the Township. Apply fiber mulch over turf areas within 7 days of seeding. Mix fiber mulch with water, and apply using hydraulic pressure equipment. Following the manufacturer's recommendations, apply a minimum of 2,500 pounds of dry fiber mulch per acre.

Leave fiber mulch in place and allow to disintegrate. If fiber mulch is displaced before the grass is 1 1/2 inches high, refertilize, reseed, and remulch the area.

806.04 MEASUREMENT AND PAYMENT

The Township will NOT measure or make payment for Landscape Restoration, the cost of which must be included in the bid unit items .

DIVISION 900 – MATERIALS
SECTION 901 – AGGREGATES

901.01 SOURCE

Use aggregates from a single source and geological classification in any one construction item unless otherwise authorized. Use only sources of aggregate that are listed on the QPL.

The ME may allow aggregates from different sources if they are of the same geological classification and have similar specific gravities and aggregate properties.

Use test methods for gradation according to the appropriate provisions of AASHTO T 11 or T 27, unless otherwise noted. Gradations of aggregates in the various tables of this and other Sections are the percentages passing by weight.

The aggregate producer shall submit annually, to the ME for approval, a quality control plan for the aggregate products. The aggregate producer may obtain guidelines for developing the quality control plan from the ME upon request.

901.02 STOCKPILES

Provide an area for each stockpile of adequate size, reasonably uniform in cross section, well drained, and cleared of foreign materials.

At concrete and HMA mixing plants, stockpile a sufficient quantity of aggregate to provide for a minimum of 1 day's operations. Place the aggregate stockpiles on a firm, hard surface, such as a compacted aggregate, HMA, or concrete surface. Construct the stockpile by placing the aggregates in layers of not more than 3 feet thick.

Locate the piles so that there is no contamination by foreign material and no intermingling of aggregates from adjacent piles. Do not use steel-tracked equipment on the stockpiles.

Do not store aggregates from different sources, geological classifications, or of different gradings in stockpiles near each other unless a bulkhead is placed between the different materials. If blending aggregates of different gradings and from different sources, proportion through weigh hoppers. The ME may allow loader blending of aggregate stockpiles if included in the approved aggregate producer's quality control plan. The Township will reject aggregates found segregated or contaminated. If a stockpile is rejected for segregation, the Contractor may reconstruct it for further evaluation. Use methods that prevent segregation when charging aggregates from stockpiles.

Do not use washed aggregates sooner than 24 hours after washing or until the surplus water has drained out and the material has a uniform moisture content.

Do not stockpile RAP higher than 15 feet. Cover or otherwise protect stockpiles of RAP for use in HMA to prevent buildup of moisture.

901.03 COARSE AGGREGATE

Obtain coarse aggregate as specified in 901.01. Use coarse aggregate that is broken stone or washed gravel graded as specified Table 901.03-1. Stockpile coarse aggregate as specified in 901.02. The ME will sample coarse aggregate as specified in Table 901.03-2.

Table 901.03-1 Standard Sizes of Coarse Aggregate

		Amounts Finer than Each Laboratory Sieve, Percentage by Weight													
No.	Nominal Size	4"	3 1/2"	3"	2 1/2"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8	No. 16	No. 50	No. 100
1	3 1/2" – 1 1/2"	100	90-100		25-60		0-15		0-5							
2	2 1/2" – 1 1/2"			100	90-100	35-70	0-15		0-5							
3	2" – 1"				100	90-100	35-70	0-15		0-5						
4	1 1/2" – 3/4"					100	90-100	20-55	0-15		0-5					
5	1" – 1/2"						100	90-100	20-55	0-10	0-5					
57	1" – No. 4						100	95-100		25-60		0-10	0-5			
67	3/4"– No. 4							100	90-100		20-55	0-10	0-5			

7	1/2" – No. 4								100	90-100	40-70	0-15	0-5			
8	3/8" – No. 8									100	85-100	10-30	0-10	0-5		
9	No. 4 – No. 16										100	85-100	10-40	0-10	0-5	
10	No. 4 – No. 200										100	85-100				10-30

Table 901.03-2 Coarse Aggregate Sampling

Coarse Aggregate, No.	Sample Size (pounds)	Frequency
1	150	1000 tons or 830 cubic yards
2	100	1000 tons or 830 cubic yards
3	90	1000 tons or 830 cubic yards
4	70	1000 tons or 830 cubic yards
5 & 57	50	500 tons or 415 cubic yards
67	30	500 tons or 415 cubic yards
7	20	250 tons or 200 cubic yards
8, 9, & 10 (stone sand)	10	250 tons or 200 cubic yards

901.03.01 Broken Stone

Use broken stone that is uniform in texture and quality, and that conforms to the requirements specified in Table 901.03.01-1.

Table 901.03.01-1 Requirements for Broken Stone

Aggregate Property	Test Method	Maximum Percent
Weathered and deleterious stone	NJDOT A-3	5
Broken stone other than that classification approved for use	NJDOT A-3	5
Flat and elongated pieces for graded material No. 67 and larger (length greater than 5 times the thickness or width)	ASTM D 4791	10
Absorption in cold water:		
No. 9 and larger	AASHTO T 85	1.8
Stone sand only (No. 10)	AASHTO T 84	2.0
Sodium sulfate soundness, loss	AASHTO T 104	10
Adherent fines in coarse aggregates:		
HMA	NJDOT A-4	1.5
Concrete	NJDOT A-4	1.0
Percentage of wear (Los Angeles Abrasion Test):		
HMA surface course	AASHTO T 96	40
HMA intermediate or base course	AASHTO T 96	45
Concrete surface course and bridge decks	AASHTO T 96	40
Concrete, other	AASHTO T 96	50
Dense-graded aggregate base course	AASHTO T 96	50

The geologic classifications are as follows:

1. **Argillite.** A thoroughly indurated and cohesive rock composed predominantly of silt size or smaller particles of clay, quartz, and feldspar or the fine-grained thermal recrystallization products of this assemblage (hornfels). Ensure rock is bedded thickly enough so as not to break into thin pieces at planes of stratification.

2. **Carbonate Rock.** A thoroughly indurated and cohesive rock composed predominantly of calcite and dolomite,

bedded thickly enough so as not to break into thin pieces at planes of stratification. Minerals insoluble in hot hydrochloric acid are discrete grains of quartz, clay, and mica.

3. **Gneiss.** A metamorphic rock consisting principally of quartz and feldspar. Ensure rock has a dense structure, with a uniform distribution of minerals that will not break into thin pieces at lines of stratification.

4. **Granite.** An equigranular or porphyritic igneous rock consisting principally of quartz and feldspar.

5. **Quartzite.** A metamorphic rock composed principally of quartz. Quarry rock so that only the nonarkosic, uniformly compacted quartzites are included in the graded products. Ensure quartzite is not schistose in structure.

6. **Trap Rock.** An igneous rock, locally, either basalt or diabase, with a uniform distribution of constituent minerals. Amygdaloidal or vesicular basalt is not considered trap rock and is considered a deleterious material for testing purposes.

901.03.02 Washed Gravel

Use washed gravel that is either crushed or uncrushed as specified and that conforms to the requirements specified in Table 901.03.02-1.

Table 901.03.02-1 Requirements for Washed Gravel

Aggregate Property	Test Method	Maximum Percent
Weathered and deleterious gravel	NJDOT A-3	5
Sodium sulfate soundness, loss	AASHTO T 104	10
Soft particles as determined by scratch hardness test	NJDOT A-5	5
Absorption in cold water:		
No. 9 and larger	AASHTO T 85	1.8
Stone sand only (No. 10)	AASHTO T 84	2.0
Clay lumps, organic material, coal and other foreign or deleterious matter (Percent by weight or volume, whichever is greater)	AASHTO T 112	0.5
Chloride content	AASHTO T 260	0.06
Crushed gravel material with at least 1 fractured face (Nicked gravel is not considered crushed)	ASTM D 5821	60
Adherent fines in coarse aggregates:		
HMA	NJDOT A-4	1.5
Concrete	NJDOT A-4	1.0

Quartz gravel is composed of natural pebbles, of which the majority is coarsely crystalline quartz. Ensure that the individual crystals within each pebble are intergrown into a tenacious, nonporous, interlocking texture that fractures as a single unit. Ensure that the percent of wear determined according to the Los Angeles Abrasion Test is as specified for the various uses, except that the percent maximum loss for quartz gravel is 50 percent.

When the sodium sulfate soundness and scratch hardness tests total 10 percent or more, the ME will perform a petrographic analysis to determine the amount of unsound and weathered material.

901.04 BLAST FURNACE SLAG

Obtain blast furnace slag as specified in 901.01. Use as blast furnace slag the air-cooled residue resulting from the production of pig iron. Ensure that the blast furnace slag consists of tough, durable, angular fragments that are uniform in density, absorption, and quality, and are free from flux stone, dirt, or other objectionable material. Stockpile blast furnace slag as specified in 901.02. Ensure that blast furnace slag conforms to the requirements specified in Table 901.04-1.

Table 901.04-1 Requirements for Blast Furnace Slag

Aggregate Property	Test Method	Requirement
Weight per cubic foot (loose measure), pounds	AASHTO T 19	60 minimum

Percentage of wear, Los Angeles Abrasion Test	AASHTO T 96	50 maximum
Sulfur, percentage by weight	ASTM C 563	2 maximum

901.05 AGGREGATES FOR HMA

901.05.01 Coarse Aggregate

Use coarse aggregate for HMA that is broken stone conforming to 901.03.01, except that the Contractor may use carbonate rock for the surface course only in shoulder areas, parking areas, or driveways.

901.05.02 Fine Aggregate

For HMA surface course, use fine aggregate that is manufactured stone sand or natural sand.

Manufacture stone sand from aggregates conforming to 901.03, with not more than 15 percent passing the No. 200 sieve. When the percent passing the No. 200 sieve exceeds 15 percent, blend the stone sand with another approved sand so that the combination contains no more than 15 percent passing the No. 200 sieve, based on stockpile samples theoretically combined. Feed each sand source into the plant through a separate cold feed hopper.

Use natural sand consisting of material composed of predominantly angular particles of quartz or other hard durable minerals conforming to the quality and gradation requirements specified in Table 901.05.02-1 and Table 901.05.02-2, respectively.

Table 901.05.02-1 Quality Requirements for Fine Aggregate used in HMA

Aggregate Property	Test Method	Maximum Percent
Mica	NJDOT A-2	2.0
Absorption, cold water	AASHTO T 84	2.0
Sodium sulfate soundness, loss	AASHTO T 104	5.0
Clay and clay lumps	AASHTO T 88	5.0

Table 901.05.02-2 Gradation Requirements for Fine Aggregate used in HMA

Sieve Size	Percent Passing
3/8"	100
No. 4	95 – 100
No. 8	80 – 100
No. 200	0 – 5

For HMA surface course, wash and grade the natural sand. Natural sand does not need to be washed if it conforms to the requirements of 901.06.02, except that the allowable percent passing the No. 200 sieve is 0 to 5 percent.

The ME will sample fine aggregate at a frequency of 10 pounds for each 500 tons.

901.05.03 Mineral Filler

Use mineral filler for HMA that is free from lumps and foreign materials. Produce mineral filler from broken stone conforming to 901.03.01, fly ash conforming to 903.02.03.A, kiln dust from cement manufacture, or baghouse fines from an HMA plant. Produce baghouse fines from a consistent geological source of coarse and fine aggregate.

Ensure that a HMA mixture containing the filler retains 70 percent of its initial strength after an immersion cycle of 14 days when prepared according to AASHTO T 167 and tested according to AASHTO T 165.

Use mineral filler that, when tested according to AASHTO T 37, conforms to the gradation requirements specified in Table 901.05.03-1.

Table 901.05.03-1 Gradation Requirements for Mineral Filler

Sieve Size	Percent Passing
No. 50	95 – 100
No. 200	70 – 100

901.05.04 Reclaimed Asphalt Pavement (RAP)

Process RAP for HMA through screening and crushing operations to ensure that it is 100 percent passing the maximum aggregate size for the mixture.

Use RAP containing asphalt binder that is free from solvents or other contaminating substances. Ensure that the coarse aggregate contained in the RAP conforms to the requirements of 901.03.01 for broken stone and to the requirements of 901.03.02 for gravel. Ensure that the fine aggregate contained in the RAP conforms to the quality requirements in 901.05.02.

901.05.05 Crushed Recycled Container Glass (CRCG)

Use container glass that is derived from items such as bottles. Use glass that when crushed does not produce thin sliver and flake-like fragments. Ensure that no more than 5 percent of the material is glass derived from thin walled items, suchas test tubes and other laboratory glassware, which are not considered to be container glass. Use CRCG that is 100 percent passing a 3/8 inch sieve.

Ensure that the CRCG contains no more than the maximum allowable percent of foreign materials specified in Table 901.05.05-1.

Table 901.05.05-1 Allowable Percentages of Foreign Materials in CRCG

Foreign Material	Maximum Percent[1]
Paper	2.5
Metal	3.0
Plastic	0.3
Other	0.5

1. Determine the percent by dividing the weight of a foreign material retained on the No. 4 sieve by the total weight of material retained on the No. 4 sieve.

901.05.06 Ground Bituminous Shingle Material (GBSM)

Use GBSM that is derived from pre-consumer roofing shingles and is 100 percent passing a 3/4 inch sieve and that conforms to the composition requirements specified in Table 901.05.06-1.

Table 901.05.06-1 Components of GBSM

Material	Composition by Weight
Petroleum asphalt	30 – 40%
Fibers	10% Maximum
Mineral matter	50 – 65%

Submit a certificate of compliance, as specified in 106.07, for the GBSM. Submit test methods and results along with the certification.

Add the GBSM to the mixture through a feed system that individually proportions the GBSM and is approved by the ME.

901.05.07 Remediated Petroleum Contaminated Soil Aggregate (RPCSA)

For use as a coarse aggregate, fine aggregate, or both in HMA base course, the Contractor may use a maximum of 20 percent remediated ID-27 petroleum contaminated soil, produced by a NJDEP approved "Class B" recycling center operating pursuant to N.J.A.C 7:26A, provided it conforms to all quality requirements specified in 901.05.01 and 901.05.02.

901.06 AGGREGATES FOR CONCRETE, MORTAR, AND GROUT

The ME will test aggregates used in concrete according to AASHTO T 303 for potential expansion due to alkali-silica reactivity. The ME will classify aggregates that produce expansion of 0.1 percent or more after 14 days in solution as potentially reactive. Use potentially reactive aggregate in concrete only in conjunction with remedial agents such as fly ash, slag, or low alkali cement at the minimum addition rates specified in 903.03.01.

901.06.01 Coarse Aggregate

Use coarse aggregate that is broken stone or washed gravel conforming to 901.03.01 or 901.03.02, respectively, except do not use carbonate rock for concrete surface courses, bridge approach, or bridge decks. Use coarse aggregate that is the

size or sizes shown in Table 903.03.06-1 and Table 903.03.06-2. Wash the coarse aggregate at least 24 hours before use.

901.06.02 Fine Aggregate

For all classes of concrete and mortar, use fine aggregate that is washed and sized through a sand classifier plant and composed of quartz or other hard, durable particles. Ensure that the fine aggregate is subangular to angular in shape and free of soft particles. Derive fine aggregate from either a natural sand deposit resulting from glacial or water action, or produce a manufactured stone sand from the mechanical crushing of quarried rock or gravel that conforms to 901.03. Ensure that the fine aggregate also conforms to 901.01 and 901.02 and the gradation specified in Table 901.06.02-1.

Table 901.06.02-1 Gradation Requirements for Fine Aggregate used in Concrete, Mortar, and Grout	
Sieve Size	Percent Passing
3/8"	100
No. 4	95 – 100
No. 8	80 – 100
No. 16	50 – 85
No. 30	25 – 65
No. 50	10 – 30
No. 100	1 – 10
No. 200	0.0 – 3.4

Ensure that the fine aggregate does not have more than 45 percent passing any sieve and retained on the next sieve and that the fineness modulus according to AASHTO M 6 is from 2.3 to 3.1 for concrete. Ensure that the fine aggregate conforms to the quality requirements specified in Table 901.06.02-2.

Table 901.06.02-2 Quality Requirements for Fine Aggregate used in Concrete, Mortar, and Grout			
Aggregate Property	Test Method	Minimum Percent	Maximum Percent
Mica	NJDOT A-2	–	2.0
Absorption, cold water	AASHTO T 84	–	2.0
Sodium sulfate soundness, loss	AASHTO T 104	–	5.0
Chloride content	AASHTO T 260	–	0.06
Lightweight pieces	AASHTO T 113	–	0.25
7 Day mortar strength	NJDOT A-1	75	–

The ME will test the fine aggregate for organic impurities and will reject it if it produces a color darker than the standard. Ensure that the mortar-making properties of the fine aggregate for concrete and mortar are not less than 100 percent of those of standard Ottawa sand.

The ME will sample fine aggregate at a frequency of 10 pounds for each 500 tons.

901.06.03 Lightweight Aggregate

Manufacture lightweight aggregate by expanding or sintering material such as slate or shale by the rotary kiln process. Grade the lightweight aggregate to the size designation requirements for 3/4 inch to No. 4 sieves of Table 1 of ASTM C 330. Ensure that the lightweight aggregate producer has at least 5 years experience and a record of successful production and use of such product. Submit to the ME a certification of compliance as specified in 106.07. Ensure that the lightweight aggregate conforms to ASTM C 330 and the following requirements:

1. **Sodium Sulfate Soundness.** Use a lightweight aggregate that has a sodium sulfate soundness loss of weight that does not exceed 10 percent after 5 immersion and drying cycles when tested according to AASHTO T 104. Use a sample of sufficient size to provide the amounts specified in Table 901.06.03-1 of the various sieve sizes:

Table 901.06.03-1 Sampling for Sodium Sulfate Soundness Testing	
Sieve Size	Weight
1" to 3/4"	2.20 pounds
3/4" to 1/2"	1.65 pounds
1/2" to 3/8"	1.10 pounds
3/8" to No. 4	0.66 pounds

2. **Percentage of Wear.** Use a lightweight aggregate with a loss that does not exceed 40 percent when tested according to AASHTO T 96.

901.10 DENSE-GRADED AGGREGATE (DGA)

Use a DGA that is listed on the QPL. For gradation acceptance, the ME will sample DGA according to AASHTO T 2 for each 500 cubic yards. The ME will apply the gradation requirements to the material after it has been placed and compacted on the Project.

901.10.01 Virgin

Produce virgin DGA from broken stone conforming to 901.03.01, crushed gravel conforming to 901.03.02, or blast furnace slag conforming to 901.04, except that at least 90 percent of all fragments shall contain at least one fractured face. Ensure that the DGA conforms to the following requirements and gradation:

1. **Moisture Content.** Ensure that the moisture content of DGA immediately before placement is 6 ± 2 percent based on dry weight. If dense-graded aggregate is to be paid for on a weight basis, do not deliver DGA to the Project with the moisture content exceeding 8 percent.
2. **Plasticity and Gradation.** When tested according to AASHTO T 90, ensure that the portion passing the No. 40 sieve is non-plastic. Ensure that the gradation conforms to the requirements specified in Table 901.10.01-1.

Table 901.10.01-1 Gradation Requirements for DGA

Sieve Size	Percent Passing
1 1/2"	100
3/4"	55 – 90
No. 4	25 – 50
No. 50	5 – 20
No. 200	3 – 10

901.10.02 Recycled Concrete Aggregate (RCA)

The Contractor may produce DGA from recycled concrete aggregate that conforms to the gradation and plasticity requirements specified in 901.10.01 and to the following:

1. **Composition.** Ensure that the composition, as determined according to NJDOT A-3, conforms to the requirements specified in Table 901.10.02-1.

Table 901.10.02-1 Composition Requirements for RCA

Aggregate Property	Minimum Percent	Maximum Percent
Concrete[1]	90	–
HMA	–	10
Brick, cinder block, schist, concrete washout, and other friable material	–	4
Reactive material	–	0
Wood	–	0.1

1. To meet the minimum requirement for concrete, the Contractor may add broken stone, vitreous china, or crushed gravel. Use broken stone conforming to 901.03.01 or crushed gravel conforming to 901.03.02, except that it need not be washed.

2. **Percentage of Wear.** Ensure that the loss does not exceed 50 percent when tested according to AASHTO T 96.
3. **Reporting of Recycled Materials Usage.** Report the tonnage of concrete aggregate being recycled to the Solid Waste Management District of origin, according to N.J.A.C 7:26A.

901.10.03 Virgin and RAP Mixture

The Contractor may also produce DGA by mixing a maximum of 50 percent RAP conforming to 901.05.04 with previously approved virgin DGA.

Use a method of mixing that will ensure that the blended mixture is homogeneous with regard to particle size and composition. Ensure that the blended mixture meets the following requirements:

1. **Composition.** Ensure that the composition, as determined according to NJDOT A-3, conforms to the

requirements specified in Table 901.10.03-1.

Table 901.10.03-1 Composition Requirements for Virgin DGA and RAP Mixture

Aggregate Property	Percent by Weight Maximum
RAP	50
Concrete	5
Brick, schist, and other friable material	4
Reactive material	0
Wood	0.1

2. **Plasticity and Gradation.** Use a blended material that is non-plastic when the portion passing the No. 40 sieve is tested according to AASHTO T 90. Ensure that the DGA containing RAP conforms to the gradation for DGA as specified in 901.10.01, except that the percent passing the No. 200 sieve is 0 to 10 percent when tested according to NJDOT A-6.

3. **Density Control.** Perform density control as specified in 302.03.01, except for the method for determining the dry density. After determining the wet density according to AASHTO T 310 (Direct Transmission Mode), the ME will take a 1,000 gram sample of the DGA for subsequent weighing, drying, and reweighing in the laboratory to determine the moisture content. The ME will calculate the dry density using the wet density measured according to AASHTO T 310 and the moisture content measured from the lab tested sample. The ME will use the dry densities to determine the Q statistic for acceptance of the density.

901.11 SOIL AGGREGATE

Use soil aggregates that are natural or prepared mixtures consisting predominately of hard, durable particles of stone, gravel, or sand. Mixtures may contain some silt, clay, or stone dust. Ensure that stone conforms to 901.03.01, and that gravel is crushed or uncrushed and conforms to 901.03.02. Use sand that is either natural sand resulting from the weathering process or stone sand produced by grinding or crushing of rock. Ensure that stone sand is manufactured from an aggregate source as specified in 901.03. Provide natural sand consisting of material composed of predominantly angular particles of quartz or other hard, durable minerals.

The Contractor may use soil aggregate produced from RPCSA produced by a NJDEP approved "Class B" recycling center operating pursuant to N.J.A.C 7:26A.

Do not place soil aggregate obtained from subaqueous sources until the ME has determined that its moisture content is not excessive.

Ensure that soil aggregate conforms to the following:

1. **Composition of Soil Aggregate.** Ensure that the soil aggregate is free from elements or chemicals which, in the presence of water, would produce detrimental effects to pavements, structures, or utility lines, and is free of organic matter, garbage, metal, debris, lumps of clay, or other deleterious matter.

   Produce Designations I-1, I-2, I-3, I-4, I-9, I-10, I-11, I-12, I-13, and I-15 from sand, gravel, or stone.

   Produce Designation I-5 from hard, durable gravel or stone mixed with sand or stone dust so that it can be compacted into a hard, dense mass. Ensure that the coarse aggregate fraction of the I-5 is composed of at least 85 percent by weight of hard, durable aggregate of a geologic type conforming to 901.03, as determined by lithologic analysis performed according to NJDOT A-3.

   Ensure that Designations I-6, I-7, and I-8 consist of clean, free-draining sand, gravel, or stone.

   For Designation I-14, use material that is composed of soil aggregate and rock. The material may also contain recycled concrete or HMA. Ensure that the proportion of soil aggregate is sufficient to fill all voids in the rock and larger pieces of recycled material. For Designation I-14, the Contractor may use up to 30 percent steel slag by weight of the coarse aggregate portion of the soil aggregate. Obtain steel slag from a source listed on the QPL as specified in 901.01. Use steel slag that was produced as a co-product of the steel making process. Ensure that the steel slag consists of tough, durable pieces that are uniform in density and quality. Stockpile steel slag as specified in 901.02. Ensure steel slag for blending with I-14 Soil Aggregate does not exceed 0.50 percent expansion from hydration when tested according to ASTM D 4792.

2. **Gradation.** Use soil aggregate that conforms to the gradation specified in Table 901.11-1 for the various designations. The gradation requirements shall apply to the material after it has been placed and compacted on

the Project. Where compaction is not prescribed, the requirements for any given type shall apply to the material at the time of placement. Should the source contain oversize material, the RE may require the Contractor to eliminate such oversize material.

For Designation I-14, ensure that the portion of material passing the 4 inch sieve contains no more than 35 percent by weight of material passing the No. 200 sieve. Ensure that the proportion of soil aggregate is sufficient to fill all voids in the rock and larger pieces of recycled material. When embankments are constructed outside the ROW in areas where the State has purchased slope rights to construct embankments, use material that is 100 percent passing the 2 inch sieve to construct the top 2 1/2 feet. When driving piles through the embankment, use material that is 100 percent passing the 2 inch sieve.

Table 901.11-1 Standard Soil Aggregate Gradations

Gradation Designations, Percentage by Weight Passing Square Mesh Sieves													
	6"	4"	2"	1 1/2"	1"	3/4"	1/2"	No. 4	No. 8	No. 16	No. 50	No. 100	No. 200
I-1		100	70-100			50-95		30-60			5-25		0-7
I-2			100			65-100		40-75			5-30		0-7
I-3				100		60-90		40-80			10-35		0-8
I-4			100		60-100		40-100	25-100	20-100	15-85	8-45		5-10
I-5			100			70-100		30-80			10-35		5-12
I-6					100		80-100		45-100	30-90	0-20	0-3	
I-7					100		80-100		35-100	25-90	5-50	0-8	0-2
I-8							100	95-100		45-70	5-25		0-5
I-9		100	80-100			60-100		40-100		20-70	5-35	0-20	0-8
I-10		100	80-100			60-100		40-100		20-70	5-40	0-30	0-20
I-11		100	80-100			60-100		40-100			0-75		0-9
I-12		100				70-100					0-75		0-5
I-13		100						30-100					0-12
I-14	See Text.												
I-15	100	80-100						30-80			0-25		0-10

3. **Combining and Mixing.** If bank-run or other materials conforming to the requirements are not available, the Contractor may produce materials that conform to requirements by combining and mixing, or by washing. The Contractor may combine materials and mix on the grade only with RE approval. Do not blend Designation I-9 to meet gradation requirements. Perform blending on the grade using a traveling high-speed rotor mixer capable of cutting and thoroughly mixing to a minimum depth of 6 inches.

4. **Electrochemical Requirements for Designation I-15.** Ensure that Designation I-15 conforms to the electrochemical requirements specified in Table 901.11-2.

Table 901.11-2 Electrochemical Requirements for Designation I-15

Property	Test Method	Requirement
Resistivity, ohm-cm	AASHTO T 288	Greater than 3000
pH	AASHTO T 289	Acceptable Range of 5 – 10
Organic Content	AASHTO T 267	1.00% Maximum
Chloride	AASHTO T 291	Less than 100 ppm
Sulfates	AASHTO T 290	Less than 200 ppm

If the resistivity is greater than or equal to 5,000 ohm centimeter, the Department will waive the chloride and sulfates requirements.

Test Designation I-15 at a rate of once for every 1,000 cubic yards of material placed to ensure conformance to

the electrochemical limits specified in Table 901.11-2. Whenever the appearance or behavior of the material changes, the ME may require additional samples.

Ensure that the material has a sodium sulfate loss of less than 15 percent after 5 cycles as determined according to AASHTO T 104.

Provide the RE with a certification of compliance, as specified in 106.07, certifying that the Designation I-15 conforms to the requirements of this Section. Attach a copy of the test results representative of material used on the Project.

The ME will sample soil aggregate as specified in Table 901.11-3.

Table 901.11-3 Soil Aggregate Sampling

Soil Designation	Sampling/Frequency
I-1, I-2, I-3, I-4, I-5, I-6, I-7, I-8, I-9, & I-10	According to AASHTO T 2 for each 500 cubic yards
I-11, I-12, I-13, & I-15	According to AASHTO T 2 for each 500 cubic yards[1]
I-14	According to AASHTO T 2 for each 2,000 cubic yards

1. After initial 10,000 cubic yards have been sampled, the ME will take 1 sample for each 2,000 cubic yards, except if any sample fails or is borderline, then the ME will revert to 1 sample for each 500 cubic yards. The ME will continue with the 1 sample for each 500 cubic yards sampling frequency until the ME determines that the gradation requirements are consistently being met.

The ME may sample stockpiles before placement, but the Department will make the final and governing determination of conformance or nonconformance based on sampling and testing of the materials after they have been placed as specified in the Contract. Remove materials that do not conform and replace with conforming materials, or correct the deficiencies of the non-conforming materials. If corrective action has been taken, the ME will take an additional sample, and if necessary, one check sample. If the materials still do not conform after corrective action, the ME will not perform further testing until the Contractor tests and certifies that the rejected material has been corrected. After this certification, the ME will analyze an additional sample, and if this sample does not meet the requirements, the Contractor shall remove and replace the material.

SECTION 902 – ASPHALT

902.01 BITUMINOUS MATERIALS

Use the following temperature-volume correction (TVC) factors to convert the volume of bituminous materials, measured at the temperature at the point of use, to the volume at 60 °F:

1. For PG Binder, use the following equation:

$$TVC = 1.0211326242 - 3.548988118 \times 10^{-4}\,[T\,(°F)] + 4.49881 \times 10^{-8}\,[T\,(°F)]^2$$

2. For emulsified asphalts, use Table 902.01-1.

Table 902.01-1 TVC Factors for Emulsified Asphalt Material (40 – 103 °F)

Temp (°F)	Factor	Temp (°F)	Factor	Temp (°F)	Factor	Temp (°F)	Factor
40	1.0050	56	1.0010	72	0.9970	88	0.9930
41	1.0048	57	1.0008	73	0.9968	89	0.9928
42	1.0045	58	1.0005	74	0.9965	90	0.9925
43	1.0043	59	1.0003	75	0.9953	91	0.9923
44	1.0040	60	1.0000	76	0.9960	92	0.9920
45	1.0038	61	0.9998	77	0.9958	93	0.9918
46	1.0035	62	0.9995	78	0.9955	94	0.9915
47	1.0033	63	0.9993	79	0.9953	95	0.9913
48	1.0030	64	0.9990	80	0.9950	96	0.9910
49	1.0028	65	0.9988	81	0.9948	97	0.9908
50	1.0025	66	0.9985	82	0.9945	98	0.9905
51	1.0023	67	0.9983	83	0.9943	99	0.9903
52	1.0020	68	0.9980	84	0.9940	100	0.9901
53	1.0018	69	0.9978	85	0.9938	101	0.9899
54	1.0015	70	0.9975	86	0.9935	102	0.9896

55	1.0013	71	0.9973	87	0.9933	103	0.9884
104	0.9891	123	0.9845	142	0.9799	161	0.9754
105	0.9889	124	0.9843	143	0.9797	162	0.9751
106	0.9886	125	0.9840	144	0.9794	163	0.9749
107	0.9884	126	0.9838	145	0.9792	164	0.9747
108	0.9881	127	0.9835	146	0.9790	165	0.9744
109	0.9879	128	0.9833	147	0.9787	166	0.9742
110	0.9876	129	0.9830	148	0.9785	167	0.9739
111	0.9874	130	0.9828	149	0.9782	168	0.9737
112	0.9872	131	0.9826	150	0.9780	169	0.9735
113	0.9869	132	0.9823	151	0.9778	170	0.9732
114	0.9867	133	0.9821	152	0.9775	171	0.9730
115	0.9864	134	0.9818	153	0.9773	172	0.9728
116	0.9862	135	0.9816	154	0.9770	173	0.9725
117	0.9860	136	0.9814	155	0.9768	174	0.9723
118	0.9857	137	0.9811	156	0.9766	175	0.9721
119	0.9855	138	0.9809	157	0.9763	176	0.9718
120	0.9852	139	0.9806	158	0.9761	177	0.9716
121	0.9850	140	0.9804	159	0.9758	178	0.9713
122	0.9847	141	0.9802	160	0.9756	179	0.9711

902.01.01 Asphalt Binder

Use asphalt binder that conforms to AASHTO M 320, Table 1. Use Grade 64-22, except the ME may direct that an asphalt of softer grade be used when the mixture contains a high percentage of RAP and except where otherwise specified.

When specified, use PG 64E-22 asphalt binder that is storage-stable and conforms to AASHTO M 332 including compliance with the elastic response requirement in Figure 1 of AASHTO R 92.

The asphalt binder producer shall provide the asphalt binder quality control plan annually to the ME for approval. Ensure that the quality control plan conforms to AASHTO R 26.

Submit to the ME a certification of compliance, as specified in 106.07, for the asphalt binder. The ME will perform quality assurance sampling and testing of each asphalt binder lot as defined in the approved quality control plan.

902.01.02 Emulsified Asphalts

Use undiluted anionic emulsified asphalts of the rapid-setting (RS) and medium-setting (MS) types conforming to AASHTO M 140. Use undiluted cationic emulsified asphalts of the rapid-setting (CRS), quick-setting (CQS), and medium-setting (CMS) types conforming to AASHTO M 208.

For prime coats, use an anionic emulsified asphalt of the slow-setting (SS) type conforming to AASHTO M 140 or cationic emulsified asphalt of the slow-setting (CSS) type confirming to AASHTO M 208.

The emulsified asphalt producer shall provide the emulsified asphalt quality control plan annually to the ME for approval. Ensure that the quality control plan conforms to AASHTO R 77.

Submit to the ME a certification of compliance, as specified in 106.07, for the emulsified asphalt. The ME will perform quality assurance sampling and testing of each emulsified asphalt lot as defined in the approved quality control plan.

902.01.03 Polymer Modified Emulsified Asphalt

Use undiluted polymer modified emulsified asphalt of the rapid-setting (RS), cationic rapid-setting (CRS), medium-setting (MS), and cationic quick-setting (CQS) types conforming to AASHTO M 316. The polymer modified emulsified asphalt producer shall provide the polymer modified emulsified asphalt quality control plan annually to the ME for approval. Ensure that the quality control plan conforms to AASHTO R 77.

Submit to the ME a certification of compliance, as specified in 106.07, for the polymer modified emulsified asphalt. The ME will perform quality assurance sampling and testing of each polymer modified emulsified asphalt lot as defined in the approved quality control plan.

902.01.04 Warm Mix Asphalt (WMA) Additives and Processes

Use a WMA additive or process that is listed on the Northeast Asphalt User/Producer Group (NEAUPG) Qualified WMA Technologies List which can be found at the following website: http://www.neaupg.uconn.edu/.

If an approved HMA mix design is used, a separate mix design with WMA additives or processes is not required.

Submit information on the WMA additive or process with the Paving Plan required in 401.03.07.A. For controlled foaming systems, also submit the operating parameters of the system including accuracy of the meter, operating range, and temperature of the binder. Provide the target and operating tolerances for the percent water injection and temperatures for the binder. Provide a method for validating this with changing production rates.

Ensure that a technical representative of the manufacturer is on-site or available for consultation for the first day or night of production.

902.02 HOT MIX ASPHALT (HMA)

902.02.01 Mix Designations

The requirements for specific HMA mixtures are identified by the abbreviated fields in the Item description as defined as follows:

HOT MIX ASPHALT 12.5ME SURFACE COURSE

1. **"HOT MIX ASPHALT"** "Hot Mix Asphalt" is located in the first field in the Item description for the purpose of identifying the mixture requirements.
2. **"12.5"** The second field in the Item description designates the nominal maximum size aggregate (in millimeters) for the job mix formula (sizes are 4.75, 9.5, 12.5, 19, 25, and 37.5 mm).
3. **"M"** The third field in the Item description designates the design compaction level for the job mix formula based on traffic forecasts as listed in Table 902.02.03-2 (levels are L=low and M=medium).
4. **"E"** The fourth field in the Item description designates the high temperature designation of the performance-graded binder. Options are "64" for PG 64-22 and "E" for PG 64E-22.
5. **"SURFACE COURSE"** The last field in the Item description designates the intended use and location within the pavement structure (options are surface, intermediate, or base course).

902.02.02 Composition of Mixtures

Provide materials as specified:

Aggregates for Hot Mix Asphalt 901.05
Asphalt Binder 902.01.01
Warm Mix Asphalt (WMA) Additives and Processes (optional) 902.01.04

If a WMA additive is pre-blended in the asphalt binder, ensure that the asphalt binder meets the requirements of the specified grade after the addition of the WMA additive. If a WMA additive is added at the HMA plant, ensure that the addition of the additive will not negatively impact the grade of asphalt binder. Follow the manufacturer's recommendations for percentage of WMA additive needed.

Mix HMA in a plant that is listed on the QPL and conforms to the requirements for HMA Plants as specified in 1009.01.

Composition of the mixture for HMA surface course is coarse aggregate, fine aggregate, and asphalt binder, and may also include mineral filler, WMA additive, and up to 15 percent Reclaimed Asphalt Pavement (RAP). For controlled asphalt foaming system WMA, the Department may require an anti-stripping additive. Ensure that the finished mix does not contain more than a total of 1 percent by weight contamination from Crushed Recycled Container Glass (CRCG).

The composition of the mixture for HMA base or intermediate course is coarse aggregate, fine aggregate, and asphalt binder, and may also include mineral filler, WMA additive and up to 35 percent of recycled materials. For controlled asphalt foaming system WMA, the Department may require an anti-stripping additive. The 35 percent of recycled materials may consist of a combination of RAP, CRCG, Ground Bituminous Shingle Material (GBSM), and RPCSA, with the following individual limits:

Table 902.02.02-1 Use of Recycled Materials in HMA Base or Intermediate Course

Recycled Material	Maximum Percentage
RAP	25

CRCG	10
GBSM	5
RPCSA	20

Combine the aggregates to ensure that the resulting mixture meets the grading requirements specified in Table 902.02.03-1. In determining the percentage of aggregates of the various sizes necessary to meet gradation requirements, exclude the asphalt binder.

Ensure that the combined coarse aggregate, when tested according to ASTM D 4791, has less than 10 percent flat and elongated pieces retained on the No. 4 sieve and larger. Measure aggregate using the ratio of 5:1, comparing the length (longest dimension) to the thickness (smallest dimension) of the aggregate particles.

Ensure that the combined fine aggregate in the mixture conforms to the requirements specified in Table 902.02.02-2. Ensure that the material passing the No. 40 sieve is non-plastic when tested according to AASHTO T 90.

Table 902.02.02-2 Additional Fine Aggregate Requirements for HMA

Tests	Test Method	Minimum Percent
Uncompacted Void Content of Fine Aggregate	AASHTO T 304, Method A	45
Sand Equivalent	AASHTO T 176	45

902.02.03 Mix Design

Submit a mix design including a job mix formula (JMF) for each mixture on forms supplied by the ME. Include a statement naming the source of each component and a report showing that the results conform to the criteria specified in Table 902.02.03-1, Table 902.02.03-2, and Table 902.02.03-3. If a change in sources or properties of materials occur, the ME may require the HMA producer to establish a new mix design and to obtain approval before production can continue.

To establish the JMF for each mix design, determine the percentage of dry weight of aggregate passing each required sieve size and an optimum percentage of asphalt binder based upon the weight of the total mix. Determine the optimum percentage of asphalt binder according to AASHTO M 323 and R 35. Combine the aggregates to ensure that theresulting mixture conforms to the grading requirements specified in Table 902.02.03-1. In determining the percentage of aggregates of the various sizes necessary to conform to gradation requirements, exclude the asphalt binder.

Table 902.02.03-1 HMA Mixtures Nominal Maximum Size of Aggregate – Grading of Total Aggregate

Sieve Size	Nominal Maximum Aggregate Size – Control Point (Percent Passing)											
	37.5 mm		25 mm		19 mm		12.5 mm		9.5 mm		4.75 mm	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
2"	100	–	–	–	–	–	–	–	–	–	–	–
1 1/2"	90	100	100	–	–	–	–	–	–	–	–	–
1"	–	90	90	100	100	–	–	–	–	–	–	–
3/4"	–	–	–	90	90	100	100	–	–	–	–	–
1/2"	–	–	–	–	–	90	90	100	100	–	100	–
3/8"	–	–	–	–	–	–	–	90	90	100	95	100
No. 4	–	–	–	–	–	–	–	–	–	90	90	100
No. 8	15	41	19	45	23	49	28	58	32	67	–	–
No. 16	–	–	–	–	–	–	–	–	–	–	30	60
No. 200	0	6	1	7	2	8	2	10	2	10	6	12

Table 902.02.03-2 Gyratory Compaction Effort for HMA Mixtures

Compaction Level	ESALs[1] (millions)	N_{des}	N_{max}
L	< 0.3	50	75
M	≥ 0.3	75	115

1. Design ESALs (Equivalent (80kN) Single-Axle Loads) refer to the anticipated traffic level expected on the design lane over a 20 year period.

Table 902.02.03-3 HMA Requirements for Design

Compaction Levels	Required Density (% of Theoretical Max. Specific Gravity)		Voids in Mineral Aggregate (VMA), % (minimum)						Voids Filled With Asphalt (VFA)[1] %	Dust-to-Binder Ratio
			Nominal Max. Aggregate Size, mm							
	@N_{des}[2]	@N_{max}	37.5	25.0	19.0	12.5	9.5	4.75		
L	96.0	≤ 98.0	11.0	12.0	13.0	14.0	15.0	16.0	70 – 80	0.6 – 1.2
M	96.0	≤ 98.0	11.0	12.0	13.0	14.0	15.0	16.0	65 – 78	0.6 – 1.2

1. For 37.5 mm nominal maximum size mixtures, the specified lower limit of the VFA is 64 percent for all design traffic levels.
2. As determined from the values for the maximum specific gravity of the mix and the bulk specific gravity of the compacted mixture. Maximum specific gravity of the mix is determined according to AASHTO T 209. Bulk specific gravity of the compacted mixture is determined according to AASHTO T 166. For verification, specimens must be between 95.0 and 97.0 percent of maximum specific gravity at N_{des}.

For mix designs that include RAP or GBSM, also include the following based on the weight of the total mixture:

1. Percentage of RAP or GBSM.
2. Percentage of asphalt binder in the RAP or GBSM.
3. Percentage of new asphalt binder.
4. Total percentage of asphalt binder.
5. Percentage of each type of virgin aggregate.

At the ME's request, test the mix design to ensure that it meets a minimum tensile strength ratio of 80 percent, when tested according to AASHTO T 283. The ME will require tensile strength ratio testing for new aggregate sources and for aggregates or mixes suspected of stripping susceptibility.

For each mix design, submit with the mix design forms 2 gyratory specimens and 1 loose sample corresponding to the composition of the JMF. The ME will use these to verify the properties of the JMF. Compact the specimens to the design number of gyrations (N_{des}). For the mix design to be acceptable, all gyratory specimens must comply with the requirements specified in Table 902.02.03-1 and Table 902.02.03-3. The ME reserves the right to be present at the time the gyratory specimens are molded.

The ME's may verify a mix on an annual basis rather than on a project-to-project basis if the properties and proportions of the materials do not change. If written verification is submitted by the HMA supplier that the same source and character of materials are to be used, the ME may waive the requirement for the design and verification of previously approved mixes.

902.02.04 Sampling and Testing

A. General Acceptance Requirements. The RE or ME may reject and require disposal of any batch or shipment that is rendered unfit for its intended use due to contamination, segregation, improper temperature, lumps of cold material, or incomplete coating of the aggregate. For other than improper temperature, visual inspection of the material by the RE or ME is considered sufficient grounds for such rejection.

For PG 64-22, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is at least 290 °F when the ambient temperature is less than 50 °F or is at least 275 °F when the ambient temperature is greater than or equal to 50 °F. For PG 64E-22, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is at least 10 °F above the manufacturer's recommended laydown temperature. For mixes produced using a WMA additive or process, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is at least 10 °F above the WMA manufacturer's recommended laydown temperature.

Do not allow the mixture temperature to exceed 330 °F at discharge from the plant.

Combine and mix the aggregates and asphalt binder to ensure that at least 95 percent of the coarse aggregate particles are entirely coated with asphalt binder as determined according to AASHTO T 195. If the ME determines that there is an ongoing problem with coating, the ME may obtain random samples from 5 trucks and will determine the adequacy of the mixing on the average of particle counts made on these 5 test portions. If the requirement for 95 percent coating is not met on each sample, modify plant operations, as necessary, to obtain the required degree of

coating.

If used, ensure that the equipment for controlled asphalt foaming system is running according to the manufacturer's recommendations. Ensure that the metering of water to foam the asphalt is controlled to produce a uniform mixture.

B. **Sampling.** The ME will take a random sample from each 700 tons of production for volumetric acceptance testing and to verify composition. The ME will perform sampling according to AASHTO T 168, NJDOT B-2, or ASTM D 3665. During production at the plant, a sample of asphalt binder will be taken once every 3,500 tons or as directed by the ME.

C. **Quality Control Testing.** The HMA producer shall provide a quality control (QC) technician who is certified by the Society of Asphalt Technologists of New Jersey as an Asphalt Technologist, Level 2. The QC technician may substitute equivalent technician certification by the Mid-Atlantic Region Technician Certification Program (MARTCP). Ensure that the QC technician is present during periods of mix production for the sole purpose of quality control testing and to assist the ME. The ME will not perform the quality control testing or other routine test functions in the absence of, or instead of, the QC technician.

The QC technician shall perform sampling and testing according to the approved quality control plan, to keep the mix within the limits specified for the mix being produced. The QC technician may use acceptance test results or perform additional testing as necessary to control the mix.

To determine the composition, perform ignition oven testing according to AASHTO T 308 and aggregate gradation according to AASHTO T 30.

For each acceptance test, perform maximum specific gravity testing according to AASHTO T 209 on a test portion of the sample taken by the ME. Sample and test coarse aggregate, fine aggregate, mineral filler, and RAP according to the approved quality control plan for the plant.

When using RAP, ensure that the supplier has in operation an ongoing daily quality control program to evaluate the RAP. As a minimum, this program shall consist of the following:

1. An evaluation performed to ensure that the material conforms to 901.05.04 and compares favorably with the design submittal.
2. An evaluation of the RAP material performed using a solvent or an ignition oven to qualitatively evaluate the aggregate components to determine conformance to 901.05.
3. Quality control reports as directed by the ME.

D. **Acceptance Testing and Requirements.** The ME will determine volumetric properties at N_{des} for acceptance from samples taken, compacted, and tested at the HMA plant. The ME will compact HMA to the number of design gyrations (N_{des}) specified in Table 902.02.03-2, using equipment according to AASHTO T 312. The ME will determine bulk specific gravity of the compacted sample according to AASHTO T 166. The ME will use the most current QC maximum specific gravity test result in calculating the volumetric properties of the HMA.

The ME will determine the dust-to-binder ratio from the composition results as tested by the QC technician.

Ensure that the HMA mixture conforms to the requirements specified in Table 902.02.04-1, and to the gradation requirements in Table 902.02.03-1. If 2 samples in 5 consecutive samples fail to conform to the gradation or volumetric requirements, immediately initiate corrective action.

The ME will test a minimum of 1 sample per 3,500 tons for moisture, basing moisture determinations on the weight loss of an approximately 1,600 gram sample of mixture heated for 1 hour in an oven at 280 ± 5 °F. Ensure that the moisture content of the mixture at discharge from the plant does not exceed 1.0 percent.

Table 902.02.04-1 Hot Mix Asphalt Requirements for Control

Compaction Levels	Required Density (% of Theoretical Max. Specific Gravity)	Voids in Mineral Aggregate (VMA), % (minimum)						Dust-to-Binder Ratio
		Nominal Max. Aggregate Size, mm						
	@N_{des} [1]	37.5	25.0	19.0	12.5	9.5	4.75	
L, M	95.0 – 97.0	11.0	12.0	13.0	14.0	15.0	16.0	0.6 – 1.3

1. As determined from the values for the maximum specific gravity of the mix and the bulk specific gravity of the compacted mixture. Maximum specific gravity of the mix is determined according to AASHTO T 209. Bulk specific gravity of the compacted mixture is determined according to AASHTO T 166.

902.10 HOT MIX ASPHALT HIGH RAP

902.10.01 Mix Designations

The requirements for specific HMA mixtures with required minimum amounts of RAP are identified by the abbreviated fields in the Item description as defined as follows:

HOT MIX ASPHALT 12.5ME SURFACE COURSE HIGH RAP

1. **"HOT MIX ASPHALT"** "Hot Mix Asphalt" is located in the first field in the Item description for the purpose of identifying the mixture requirements.
2. **"12.5"** The second field in the Item description designates the nominal maximum size aggregate (in millimeters) for the job mix formula (sizes are 4.75, 9.5, 12.5, 19, 25, and 37.5 mm).
3. **"M"** The third field in the Item description designates the design compaction level for the job mix formula based on traffic forecasts as listed in Table 902.02.03-2 (levels are L=low and M=medium).
4. **"E"** The fourth field in the Item description designates the high temperature designation of the performance-graded binder. Options are "64" for PG 64-22 and "E" for PG 64E-22.
5. **"SURFACE COURSE"** The last field in the Item description designates the intended use and location within the pavement structure (options are surface, intermediate, or base course).
6. **"HIGH RAP"** This additional field designates that there will be a minimum percentage of RAP required for the mixture in 902.13.02.

902.10.02 Composition of Mixture

Provide materials as specified:

Aggregates for Hot Mix Asphalt..... 901.05

Use a virgin asphalt binder that will result in a mix that meets the performance requirements specified in Table 902.13.03-2. Ensure that the virgin asphalt binder meets the requirements of 902.01.01 except the performance grade. Use a performance grade of asphalt binder as determined by the mix design and mix performance testing. Submit a certificate of analysis (COA) showing the PG continuous grading (AASHTO R 29) for the asphalt binder used in the mix design.

For quality assurance testing of the asphalt binder, the ME may sample the asphalt binder during production of the mix and compare the results with the COA submitted during test strip approval. To analyze the binder the ME will test the binder at the nearest standard PG temperature then compare the results with the COA. If the high ($G^*/\sin\delta$) and low (stiffness and m value) temperature passing test results are within 5 percent of the results from the passing temperature on the COA, then the ME will consider the asphalt binder comparable to the binder used during the test strip.

Mix HMA HIGH RAP in a plant that is listed on the QPL for HMA Plants and conforms to the requirements for HMA Plants as specified in 1009.01.

Composition of the mixture for HMA HIGH RAP surface course is coarse aggregate, fine aggregate, asphalt binder, and a minimum of 20 percent Reclaimed Asphalt Pavement (RAP), and may also include mineral filler, asphalt rejuvenator, and Warm Mix Asphalt (WMA) additives or processes as specified in 902.01.04. When WMA is used it must meet the requirements as specified in 902.10. Ensure that the finished mix does not contain more than a total of 1 percent by weight contamination from Crushed Recycled Container Glass (CRCG).

The composition of the mixture for HMA HIGH RAP base or intermediate course is coarse aggregate, fine aggregate, asphalt binder, and a minimum of 30 percent Reclaimed Asphalt Pavement (RAP), and may also include mineral filler, up to 10 percent of additional recycled materials, asphalt rejuvenator, and Warm Mix Asphalt (WMA) additives or processes as specified in 902.01.04. When WMA is used it must meet the requirements as specified in 902.10. The recycled materials may consist of a combination of RAP, CRCG, Ground Bituminous Shingle Material (GBSM), and RPCSA, with the following individual limits:

Table 902.13.02-1 Use of Recycled Materials in Base or Intermediate Course

Recycled Material	Minimum Percentage	Maximum Percentage
RAP	30	–
CRCG	–	10

GBSM	–	5
RPCSA	–	20

Combine the aggregates to ensure that the resulting mixture meets the grading requirements specified in Table 902.02.03-1. In determining the percentage of aggregates of the various sizes necessary to meet gradation requirements, exclude the asphalt binder.

Ensure that the combined coarse aggregate, when tested according to ASTM D 4791, has less than 10 percent flat and elongated pieces retained on the No. 4 sieve and larger. Measure aggregate using the ratio of 5:1, comparing the length (longest dimension) to the thickness (smallest dimension) of the aggregate particles.

Ensure that the combined fine aggregate in the mixture conforms to the requirements specified in Table 902.02.02-2. Ensure that the material passing the No. 40 sieve is non-plastic when tested according to AASHTO T 90.

902.10.03 Mix Design

At least 45 days before initial production, submit a job mix formula for the HMA HIGH RAP on forms supplied by the Department, to include a statement naming the source of each component and a report showing that the results meet the criteria specified in Table 902.02.03-1 and Table 902.13.03-1.

Include in the mix design the following based on the weight of the total mixture:

1. Percentage of RAP or GBSM.
2. Percentage of asphalt binder in the RAP or GBSM.
3. Percentage of new asphalt binder.
4. Total percentage of asphalt binder.
5. Percentage of each type of virgin aggregate.

Table 902.13.03-1 HMA HIGH RAP Requirements for Design

Compaction Levels	Required Density (% of Theoretical Max. Specific Gravity)		Voids in Mineral Aggregate (VMA)[2], % (minimum)					Voids Filled With Asphalt (VFA) %	Dust-to-Binder Ratio
			Nominal Max. Aggregate Size, mm						
	@N_{des}[1]	@N_{max}	25.0	19.0	12.5	9.5	4.75		
L	96.0	≤98.0	13.0	14.0	15.0	16.0	17.0	70 – 85	0.6 – 1.2
M	96.0	≤98.0	13.0	14.0	15.0	16.0	17.0	65 – 85	0.6 – 1.2

1. As determined from the values for the maximum specific gravity of the mix and the bulk specific gravity of the compacted mixture. Maximum specific gravity of the mix is determined according to AASHTO T 209. Bulk specific gravity of the compacted mixture is determined according to AASHTO T 166. For verification, specimens must be between 95.0 and 97.0 percent of maximum specific gravity at N_{des}.
2. For calculation of VMA, use bulk specific gravity of the combined aggregate include aggregate extracted from the RAP.

The job mix formula for the HMA HIGH RAP mixture establishes the percentage of dry weight of aggregate, including the aggregate from the RAP, passing each required sieve size and an optimum percentage of asphalt binder based upon the weight of the total mix. Determine the optimum percentage of asphalt binder according to AASHTO R 35 and M 323 with an N_{des} as required in Table 902.02.03-2. Before maximum specific gravity testing or compaction of specimens, condition the mix for 2 hours according to the requirements for conditioning for volumetric mix design in AASHTO R 30, Section 7.1. If the absorption of the combined aggregate is more than 1.5 percent according to AASHTO T 84 and T 85, ensure that the mix is short term conditioned for 4 hours according to AASHTO R 30, Section 7.2 prior to compaction of specimens (AASHTO T 312) and determination of maximum specific gravity (AASHTO T 209). Ensure that the job mix formula is within the master range specified in Table 902.02.03-1.

Ensure that the job mix formula provides a mixture that meets a minimum tensile strength ratio (TSR) of 80 percent when prepared according to AASHTO T 312 and tested according to AASHTO T 283. Submit the TSR results with the mix design.

Determine the correction factor of the mix including the RAP by using extracted aggregate from the RAP in the proposed proportions when testing is done to determine the correction factor as specified in AASHTO T 308. Use extracted aggregate from the RAP in determining the bulk specific gravity of the aggregate blend for the mix design.

For each mix design, submit with the mix design forms 3 gyratory specimens and 1 loose sample corresponding to the

composition of the JMF. Ensure that the samples include the percentage of RAP that is being proposed for the mix. The ME will use these to verify the properties of the JMF. Compact the specimens to the design number of gyrations (N_{des}). For the mix design to be acceptable, all gyratory specimens must comply with the requirements specified in Table 902.02.03-1 and Table 902.13.03-1. The ME reserves the right to be present at the time the gyratory specimens are molded.

In addition, submit 11 gyratory specimens and two 5 gallon buckets of loose mix to the ME. The ME will use these additional gyratory samples for performance testing of the HMA HIGH RAP mix. The ME reserves the right to be present at the time of molding the gyratory specimens. Ensure that the additional gyratory specimens are compacted according to AASHTO T 312. Compact 6 of the specimens to 77 millimeter height, and have an air void content of 6.5 ± 0.5 percent. The ME will test 6 specimens using an Asphalt Pavement Analyzer (APA) according to AASHTO T 340 at 64 °C, 100 pound per square inch hose pressure, and 100 pound wheel load. Compact the other 5 specimens to 115 millimeter height. These 5 specimens will be cut, from the middle of each 115 millimeter height specimen, to 38 millimeter height test specimens. The air void content of the 5 cut specimen will be determined to ensure compliance with the target air void content of 6.5 ± 0.5 percent. The ME will use the five 38 millimeter height specimens to test using an Overlay Tester (NJDOT B-10) at 25 °C and a joint opening of 0.025 inch. The ME will eliminate the high and low Overlay test results then average and report the middle 3 test results. The ME will ensure that all submitted specimens are within the target air void content as tested at the Materials' Central Lab.

The ME will approve the JMF if the results meet the criteria in Table 902.13.03-2.

Table 902.13.03-2 Performance Testing Requirements for HMA HIGH RAP Design

Test	Requirement			
	Surface Course		Intermediate and Base Course	
	PG 64-22	PG 64E-22	PG 64-22	PG 64E-22
APA @ 8,000 loading cycles (AASHTO T 340)	≤ 7 mm	≤ 4 mm	≤ 7 mm	≤ 4 mm
Overlay Tester (NJDOT B-10)	≥ 200 cycles	≥ 275 cycles	≥ 100 cycles	≥ 150 cycles

If the JMF does not meet the APA and Overlay Tester criteria, redesign the HMA HIGH RAP mix and submit for retesting. The JMF for the HMA HIGH RAP mixture is in effect until modification is approved by the ME.

When unsatisfactory results for any specified characteristic of the work make it necessary, the Contractor may establish a new JMF for approval. In such instances, if corrective action is not taken, the ME may require an appropriate adjustment to the JMF.

Should a change in sources be made or any changes in the properties of materials occur, the ME will require that a new JMF be established and approved before production can continue.

902.10.04 Sampling and Testing

A. **General Acceptance Requirements.** The RE or ME may reject and require disposal of any batch or shipment that is rendered unfit for its intended use due to contamination, segregation, improper temperature, lumps of cold material, or incomplete coating of the aggregate. For other than improper temperature, visual inspection of the material by the RE or ME is considered sufficient grounds for such rejection.

Ensure that the temperature of the mix at discharge from the plant or storage silo meets the recommendation of the supplier of the asphalt binder, supplier of the asphalt modifier, and WMA manufacturer. For HMA, do not allow the mixture temperature to exceed 330 °F at discharge from the plant. For WMA, do not allow the mixture temperature to exceed 300 °F at discharge from the plant.

Combine and mix the aggregates and asphalt binder to ensure that at least 95 percent of the coarse aggregate particles are entirely coated with asphalt binder as determined according to AASHTO T 195. If the ME determines that there is an ongoing problem with coating, the ME may obtain random samples from 5 trucks and will determine the adequacy of the mixing on the average of particle counts made on these 5 test portions. If the requirement for 95 percent coating is not met on each sample, modify plant operations, as necessary, to obtain the required degree of coating.

B. **Sampling.** The ME will take 5 stratified random samples of HMA HIGH RAP for volumetric acceptance testing from each lot of approximately 3,500 tons of a mix. When a lot of HMA HIGH RAP is less than 3,500 tons, the ME will take samples at random for each mix at the rate of one sample for each 700 tons. The ME will perform sampling according to AASHTO T 168, NJDOT B-2, or ASTM D 3665. During production at the plant, a sample of asphalt binder will be taken once every 3,500 tons or as directed by the ME.

Use a portion of the samples taken for volumetric acceptance testing for composition testing.

C. **Quality Control Testing.** The HMA HIGH RAP producer shall provide a quality control (QC) technician who is certified by the Society of Asphalt Technologists of New Jersey as an Asphalt Technologist, Level 2. The QC technician may substitute equivalent technician certification by the Mid-Atlantic Region Technician Certification Program (MARTCP). Ensure that the QC technician is present during periods of mix production for the sole purpose of quality control testing and to assist the ME. The ME will not perform the quality control testing or other routine test functions in the absence of, or instead of, the QC technician.

The QC technician shall perform sampling and testing according to the approved quality control plan, to keep the mix within the limits specified for the mix being produced. The QC technician may use acceptance test results or perform additional testing as necessary to control the mix.

To determine the composition, perform ignition oven testing according to AASHTO T 308.

For each acceptance test, perform maximum specific gravity testing according to AASHTO T 209 on a test portion of the sample taken by the ME. Sample and test coarse aggregate, fine aggregate, mineral filler, and RAP according to the approved quality control plan for the plant.

Ensure that the supplier has in operation an ongoing daily quality control program to evaluate the RAP. As a minimum, this program shall consist of the following:

1. An evaluation performed to ensure that the material conforms to 901.05.04 and compares favorably with the design submittal.
2. An evaluation of the RAP material performed using a solvent or an ignition oven to qualitatively evaluate the aggregate components to determine conformance to 901.05.
3. Quality control reports as directed by the ME.

D. **Acceptance Testing and Requirements.** The ME will determine volumetric properties at N_{des} for acceptance from samples taken, compacted, and tested at the HMA plant. The ME will compact HMA HIGH RAP to the number of design gyrations (N_{des}) specified in Table 902.02.03-2, using equipment according to AASHTO T 312. The ME will determine bulk specific gravity of the compacted sample according to AASHTO T 166. The ME will use the most current QC maximum specific gravity test result in calculating the volumetric properties of the HMA HIGH RAP.

The ME will determine the dust-to-binder ratio from the composition results as tested by the QC technician.

Ensure that the HMA HIGH RAP mixture conforms to the requirements specified in Table 902.13.04-1, and to the gradation requirements in Table 902.02.03-1. If 2 samples in a lot fail to conform to the gradation or volumetric requirements, immediately initiate corrective action.

The ME will test a minimum of 1 sample per lot for moisture, basing moisture determinations on the weight loss of an approximately 1,600 gram sample of mixture heated for 1 hour in an oven at 280 ± 5 °F. Ensure that the moisture content of the mixture at discharge from the plant does not exceed 1.0 percent.

Table 902.13.04-1 HMA HIGH RAP Requirements for Control

Compaction Levels	Required Density (% of Theoretical Max. Specific Gravity) @N_{des}[1]	Voids in Mineral Aggregate (VMA), % (minimum)					Dust-to-Binder Ratio
		Nominal Max. Aggregate Size, mm					
		25.0	19.0	12.5	9.5	4.75	
L, M	95.0 – 98.5	13.0	14.0	15.0	16.0	17.0	0.6 – 1.3

1. As determined from the values for the maximum specific gravity of the mix and the bulk specific gravity of the compacted mixture. Maximum specific gravity of the mix is determined according to AASHTO T 209. Bulk specific gravity of the compacted mixture is determined according to AASHTO T 166.

E. **Performance Testing for HMA HIGH RAP.** Provide 11 gyratory specimens that are compacted according to AASHTO T 312 and 2 boxes of loose mix. Compact 6 of the specimens to 77 millimeter height and an air void content of 6.5 ± 0.5 percent. Compact the other 5 specimens to 115 millimeter height. These 5 specimens will be cut, from the middle of each 115 millimeter height specimen, to 38 millimeter height test specimens. The air void content of the 5 cut test specimens will be determined to ensure compliance with the target air void content of 6.5 ± 0.5 percent.

The ME will use the boxes of loose mix to determine the maximum specific gravity of the mix according to AASHTO T 209. The ME will use the gyratory samples for performance testing of the HMA HIGH RAP mix. The ME will test six 77 millimeter height specimens using an Asphalt Pavement Analyzer (APA) according to AASHTO T 340 at 64 °C, 100 pound per square inch hose pressure, and 100 pound wheel load. The ME will use

the five 38 millimeter height specimens to test using an Overlay Tester (NJDOT B-10) at 25 °C and a joint opening of 0.025 inch. The ME will eliminate the high and low Overlay test result then average and report the middle 3 test results. The ME will ensure that all submitted specimens are within the target air void content as tested at the Materials' Central Lab.

Ensure that the first sample is taken during the construction of the test strip as specified in 406.03.01.C. Thereafter, sample every lot or as directed by the ME. If the test strip is done within the Project Limits and the performance testing results are acceptable to the ME, the results will be included into the first lot. A lot is defined as material placed on the traveled way within the Project Limits.

If a sample does not meet the criteria for performance testing as specified in Table 902.13.03-2, the Department will assess a pay adjustment as specified in Table 902.13.04-2 and Table 902.13.04-3. If a lot fails to meet requirements for both APA and Overlay Tester, the Department will assess pay adjustments for both parameters or may require removal and replacement of the lot. The Department will calculate the pay adjustment by multiplying the percent pay adjustment (PPA) by the quantity in the lot and the bid price for the HMA HIGH RAP item. If samples received are not within the target air void range, 6.5 ± 0.5 percent, the Department will consider the samples untestable and assess a PPA of -100 percent for APA specimens and/or Overlay specimens or may require removal and replacement of the lot. PPA for both APA and Overlay are cumulative and may not exceed -100 percent in total. If the Department requires removal and replacement, then the replacement work is subject to the same requirements as the initial work.

Table 902.13.04-2 Surface Course Performance Testing Pay Adjustments for HMA HIGH RAP

	Surface Course		PPA
	PG 64-22	PG 64E-22	
APA @ 8,000 loading cycles, mm (AASHTO T 340)	$t \geq 7$	$t \leq 4$	0
	$7 < t \leq 10$	$4 < t \leq 7$	PG 64-22: -50(t-7)/3 PG 64E-22: -50(t-4)/3
	$t > 10$	$t > 7$	-100 or Remove & Replace
Overlay Tester, cycles (NJDOT B-10)	$t \geq 200$	$t \geq 275$	0
	$200 > t \geq 150$	$275 > t \geq 200$	Surface PG 64-22: -(200-t) Surface PG 64E-22: -(275-t)/1.5
	$t < 150$	$t < 200$	-100 or Remove & Replace

Table 902.13.04-3 Intermediate and Base Course Performance Testing Pay Adjustments for HMA HIGH RAP

	Intermediate and Base Course		PPA
	PG 64-22	PG 64E-22	
APA @ 8,000 loading cycles, mm (AASHTO T 340)	$t \leq 7$	$t \leq 4$	0
	$7 < t \leq 10$	$4 < t \leq 7$	PG 64-22: -50(t-7)/3 PG 64E-22: -50(t-4)/3
	$t > 10$	$t > 7$	-100 or Remove & Replace
Overlay Tester, cycles (NJDOT B-10)	$t \geq 100$	$t \geq 150$	0
	$100 > t \geq 75$	$150 > t \geq 110$	Intermediate PG 64-22: -(2t-200) Intermediate PG 64E-22: -1.25(150-t)
	$t < 75$	$t < 110$	-100 or Remove & Replace

SECTION 903 – CONCRETE

903.01 CEMENT

Use cement, listed on the QPL, that is either portland cement or blended hydraulic cement and conforms to the following:

Portland Cement, Type I, II, and Type III..... ASTM C150
Blended Hydraulic Cement, Type IS and IP..... ASTM C 595

The Contractor may only use Type III portland cement for Class V concrete, prestressed Items, or precast Items.

For blended hydraulic cement, the Contractor may use portland cement pre-blended with a maximum of 25 percent fly ash, by weight, or a maximum of 5 percent silica fume by weight, or with a maximum of 50 percent slag by weight. If more than 30 percent slag is used, ensure that a scaling test according to ASTM C 672 is completed on the mix design and the concrete has a visual rating less than 3 after 50 cycles.

When blended hydraulic cement is used, do not add additional mineral admixtures at the concrete plant unless approved by the ME.

Do not mix different brands of cement, the same brand of cement from different mills, or different types of cement.

Provide suitable means for storing and protecting the cement against dampness. The ME will reject cement that has become partially set or that contains lumps of caked cement. Ensure that the temperature of the cement at the time of delivery to the mixer does not exceed 160 °F.

903.02 CONCRETE ADMIXTURES

903.02.01 Air-Entraining Admixtures

Use air-entraining admixtures for concrete that are listed on the QPL and conform to AASHTO M 154, except that the tests for bleeding and volume change are not required.

The ME will test for uniformity through the use of infrared spectrophotometry, pH values, solids content, and specific

gravity for liquid admixtures.

For pH test of non-liquid admixture, dissolve 1.28 grams of powder in 128 milliliter of distilled water. Keep all bulk storage tanks inside a heated area with an ambient temperature of not less than 32 °F. Do not reuse air-entraining admixture that has been allowed to freeze until it has been agitated and retested.

903.02.02 Chemical Admixtures

Use chemical admixtures for concrete that are listed on the QPL and conform to AASHTO M 194.

Use chemical admixtures of the following types:

1. Type A – Water-reducing admixtures
2. Type B – Retarding admixtures
3. Type C – Accelerating admixtures
4. Type D – Water-reducing and retarding admixtures
5. Type E – Water-reducing and accelerating admixtures
6. Type F – Water-reducing, high range admixtures
7. Type G – Water-reducing, high range, and retarding admixtures

Do not use chemical admixtures that contain calcium chlorides or any other chlorides that may initiate or promote corrosion of the reinforcement steel.

Locate all bulk storage tanks for chemical admixtures inside a heated area with an ambient temperature of not less than 32 °F. Do not use chemical admixtures that have been allowed to freeze until they have been agitated and retested.

The ME may require certification from the manufacturer stating that the material is identical to that originally approved and has in no way been changed or altered. The ME will test for uniformity through the use of infrared spectrophotometry, pH values, specific gravity, and solids content.

903.02.03 Mineral Admixtures

A. **Fly Ash.** Ensure that fly ash for use as a pozzolan in concrete is listed on the QPL and conforms to ASTM C 618, Class C or Class F, except that the loss on ignition shall not exceed 3 percent. Use Class F fly ash to control alkali-silica reactivity.

The supplier shall determine conformance to the requirements for loss on ignition and fineness for each truck load of fly ash delivered to the mixing site and shall include the test values on the delivery ticket.

Submit certificate of compliance as specified in 106.07.

B. **Slag.** Slag for use as a cementitious material is ground, granulated blast furnace slag. Use slag that is listed on the QPL and conforms to the requirements of AASHTO M 302, Grade 120. The Contractor may use Grade 100 with the written permission of the ME.

The Contractor may use slag as a replacement for cement as specified in 903.01, up to a maximum replacement level of 50 percent by weight of the total cementitious material. If more than 30 percent of cement is replaced, test the concrete mix design for scaling as specified in ASTM C 672, and ensure that it complies with a visual rating less than 3.

Submit certificate of compliance, as specified in 106.07, indicating that the slag conforms to the requirements of AASHTO M 302, Grade 120.

C. **Silica Fume Admixture.** Ensure that silica fume admixture for use in concrete is listed on the QPL and conforms to AASHTO M 307. Use only 1 brand of silica fume admixture for the entire duration of the Contract. The Contractor may supply silica fume admixture either in dry or in slurry form. If the slurry form is used, ensure that it is homogeneous and agitated to prevent separation.

Submit certificate of compliance as specified in 106.07.

903.02.04 Viscosity Modifying Admixture

Use a viscosity modifying admixture that is listed on the QPL and that, when evaluated according to the test methods and mix design proportions in AASHTO M 194, conforms to the following physical requirements:

1. For initial and final set times, the allowable deviation of the test concrete from the reference concrete is not more than 1.0 hour earlier or 1.5 hours later.

2. For compressive and flexural strengths, the minimum allowable strength of the test concrete is 90 percent of the reference concrete strength at 3, 7, and 28 days.

3. The maximum allowable length change of the test concrete is 135 percent of the reference concrete. However, if the length change of the reference concrete is less than 0.030 percent, the maximum allowable length change of the test concrete is 0.010 percentage units more than the reference concrete.
4. The minimum allowable relative durability factor of the test concrete is 80 percent.

903.02.05 Corrosion Inhibitor Admixture

When required, use a calcium nitrite based corrosion inhibitor admixture to reduce the potential of corrosion of embedded steel. Use the following guidelines for calcium nitrite:

1. Ensure that the calcium nitrite does not contact other admixtures before entering the concrete mix. Use air-entraining, water reducing, and retarding admixtures that are compatible with the calcium nitrite solution. Thoroughly mix the calcium nitrite solution before incorporating it into the concrete mix.
2. Strictly adhere to the manufacturer's written recommendations regarding the use of the calcium nitrite admixture including storage, transportation, and method of mixing. The manufacturer of the calcium nitrite admixture shall have a representative available to assist the Contractor.
3. The ME will test for the presence of the calcium nitrite admixture in the plastic concrete as specified in NJDOT C-3. Provide the test kit that is required to perform the plastic test to the ME.
4. Use admixture that is 30 ± 2 percent calcium nitrite by weight of solution. Include a high range water reducing chemical admixture in the concrete when using a calcium nitrate admixture.
5. Add the calcium nitrite at a rate of 3 gallons per cubic yard of concrete.
6. Use a calcium nitrite admixture listed on the QPL.

903.03 CONCRETE

903.03.01 Composition

Compose concrete of cement, coarse aggregate, fine aggregate, admixtures, and water. Concrete may include fly ash, slag, or silica fume. Provide materials as specified:

Aggregates	901.06
Cement	903.01
Admixtures:	
Air-Entraining	903.02.01
Chemical	903.02.02
Mineral	903.02.03
Corrosion Inhibitor	903.02.05
Water	919.08

Use chemical admixtures according to the admixture manufacturer's recommendation for the mix design and anticipated field conditions, including the admixture dosage rate and the location and method for introducing it into the mixture.

If fly ash is added to control alkali-silica reactivity, use at least 15 percent fly ash by weight of the total cementitious material. If AASHTO T 303 testing results in an expansion greater than 0.40 percent, use at least 20 percent fly ash. If slag is used to control alkali-silica reactivity, use at least 25 percent slag by weight of the total cementitious material. If a low alkali cement is used to control alkali-silica reactivity, use cement with equivalent alkali of less than 0.60 percent.

Use the combined weight of fly ash, slag, silica fume, and cement content to determine compliance with the minimum cement content and water-cement ratio requirements specified in Table 903.03.06-3. Include free water from the aggregates and the water in the admixtures and additives along with the mixing water when calculating the water-cement ratio.

903.03.02 Mix Design and Verification

Design at least 1 mix to equal or exceed the required verification strengths specified in Table 903.03.06-3 for each class of concrete included on the Project. A single mix design may satisfy the requirements for more than 1 class of concrete. Compute and set up the designs according to ACI Standard 211.1 or 211.2, as applicable.

At least 45 days before the start of concrete placement, submit each mix design on concrete mix design forms provided by the ME. Identify the sources of materials and test data on the forms.

The ME will be present at the time of verification batching to confirm that the proportions and ingredients batched are according to the proposed mix designs. If directed by the ME, mix at least 3 cubic yards of concrete in a central mix plant or transit truck for verification. The ME will direct that the verification batch be mixed in the top half of the allowable slump and air content ranges. Test for and report the slump and air content of the trial batch. The ME will reject the verification batch if the slump, air content, or yield is not acceptable. Prepare at least six 4 × 8 inch test cylinders from each acceptable batch and cure according to AASHTO T 23 or AASHTO R 39. Between 2 and 5 days after molding, deliver the cylinders to the ME for testing. The ME will test 3 cylinders at 7 days and 3 cylinders at 28 days to determine the 7 day and 28 day compressive strengths, respectively.

At the ME's option, verification may be done on an annual basis for a concrete plant rather than on a project-to-project basis, provided the properties and proportions of the materials do not change. If the Contractor submits written verification that the same source and character of materials are to be used, the ME may waive the requirement for the design and verification of previously approved mixes.

Provide concrete conforming to the approved mix design. If using a previously approved mix design, notify the ME at least 1 day before making the change. Do not change the source, type, or proportions of materials until approved and the requirements for design and verification have been satisfied.

903.03.03 Mixing for Central-Plant and Transit Mixing

A. Handling, Measuring, and Batching Materials. Mix concrete at a concrete plant that is listed on the QPL and conforms to the requirements specified in 1011.01. Ensure that the plant's location, layout, equipment, and provisions for transporting material will ensure a continuous supply of concrete to the work.

Stockpile aggregates as specified in 901.02. Separately weigh the fine aggregate and each size of coarse aggregate into hoppers according to the amounts in the job mix design.

Measure cement by weight, using separate scales and hoppers with a device to indicate the complete discharge of the batch of cement into the batch box or container. Ensure that the weighing hopper and scale are of adequate size, completely encased, and have provisions for locking. Operate the weighing hopper discharge gate so as to not affect the scale balance. Suspend the discharge chute, boot, or other such device from the encasement, not from the weighing hopper. Discharge the cement so that it does not lodge in the weighing hopper and there is no loss of cement by air currents. Ensure that the required cement content is added to each batch.

Store mineral admixtures, unless pre-blended cement is supplied, at the batching plant in a separate storage facility. Batch mineral admixtures to tolerances equivalent to those specified for cement. When mineral admixtures are weighed cumulatively with the cement, add the mineral admixtures last in the batching sequence.

When silica fume and dyes are added, demonstrate, prior to production, that the batching sequence will produce a uniform mix. If using mineral admixtures packaged in bags, empty the bag into the mix. Do not put degradable bags in the mix.

Add chemical, air-entraining, and corrosion inhibiting admixtures to the mixing water or sand. Use a water measuring device that automatically registers and stops the flow of the water when the designated quantity has been delivered into the mixing drum.

B. Batch Tolerances. For individual batches, conform to the following tolerances based on the required scale reading:

1. Cement and Mineral Admixtures: ±1.0 percent of the required weight of material or ±0.3 percent of scale capacity, whichever is greater.
2. Aggregates 1 1/2 inches or smaller: ±2.0 percent of the required weight of material or ±0.3 percent of the scale capacity, whichever is greater.
3. Aggregates larger than 1 1/2 inches: ±3.0 percent of the required weight of material or ±0.3 percent of scale capacity, whichever is greater.
4. Water: ±1.0 percent of the required weight of material.
5. Chemical, Air-entraining, and Corrosion Inhibiting Admixtures: ±3.0 percent of the required weight of material or ±1 ounce, whichever is greater.

C. Delivery Tickets. Supply a delivery ticket for each load of concrete. Ensure that the delivery ticket contains the following information:

1. Use tickets that are serially numbered and bear the printed heading of the supplier and the location of the batch plant.
2. Show the name of the Project, the name of the Contractor, the quantity and class of concrete, the batch time as imprinted on the ticket by an automatic clock, the date, and the truck number.
3. After the truck has been discharged, fill in the time when the concrete was completely discharged, the amount of mixing water and the amount of tempering water, if used, and the total number of mixing revolutions for transit mix.
4. An authorized representative of the supplier shall sign each ticket and give copies to the ME and the RE.

In addition, for each truck or batch, provide a batching ticket to the ME, indicating the amount, brand name, and type of cementitious material; the amount and source of the fine aggregate; the amount, sizes, and sources of the coarse aggregates; the amount of mixing water; and the amounts, brand names, and types of admixtures.

D. Mixing Requirements. Do not allow the elapsed time from batching to the discharge of all the concrete from the mixer to exceed 90 minutes, except that under conditions contributing to quick stiffening of the concrete or when the temperature of the concrete is above 85 °F, the time limit is changed to 60 minutes. Under very severe conditions, the RE may further reduce the time limits. Measure batching time from the time cement is introduced to the mixer.

If the concrete cannot be entirely discharged within 10 minutes, keep the concrete in the drum plastic and workable by revolving the truck drum at the manufacturer's designated speed for agitation for at least 2 minutes in each 10 minute period.

Use one of the following mixing methods unless mixing on the Project as specified in 903.03.04:

1. **Mixing at a Central-Mixing Plant.** For central-mix concrete, proportion and mix concrete at a central-plant and transport to the point of use in an agitator approved by the ME. If approved by the ME, non-agitating vehicles may be used to transport concrete at precast/prestressed concrete fabricators. Use central-mixing plant mixers that are of the type and capacity capable of combining the required materials into a thoroughly mixed and uniform mass within the specified mixing time and of discharging the mixture with a satisfactory degree of uniformity. Operate the plant according to N.J.A.C 7:27-6.1 *et seq.*

   Mix for at least 1 minute, with mixing time measured from the time all cement and aggregates are in the drum. Charge the batch into the mixer so that sufficient water enters in advance of cement and aggregates to prevent caking. Ensure that all water is in the drum by the end of the first quarter of the mixing time.

   When the temperature of the mixing water exceeds 100 °F, modify the loading sequence by mixing all the water and the aggregates and then the cement. Begin mixing immediately following the complete charging of the drum, and continue for not less than 1 minute.

   Restrict the volume of mixed concrete in the agitating truck to not exceed the manufacturer's rating or 80 percent of the gross drum volume, whichever is less.

   Before acceptance testing, the Contractor may add mixing water, air-entraining agent, or chemical admixture incrementally in order to achieve the proper slump or air content range as specified in Table 903.03.06-1 or Table 903.03.06-2.

2. **Transit Mixing.** For transit mix concrete, proportion materials, including water, into a truck mixer from a 1-stop or 2-stop batching plant and mix in the truck. A 1-stop batching plant is a plant where the dry ingredients for each batch of concrete are loaded into the mixer truck while water is being introduced. A 2-stop batching plant is a plant where the ingredients for each batch of concrete are loaded into the mixer truck at 2 separate locations.

   When loaded for mixing concrete, restrict the volume of concrete to no more than 63 percent of the gross drum volume of the transit truck mixer.

   Immediately begin mixing after the complete charging of the drum and continue for not less than 50 or more than 100 revolutions of the drum at the mixing speed recommended by the manufacturer of the transit truck mixer. After completing the minimum number of mixing revolutions at the plant, reduce the speed of the drum to the agitation speed recommended by the manufacturer. When using Type F or G admixtures, mix the load at the minimum specified number of mixing revolutions as recommended by the manufacturer.

Before acceptance testing, the Contractor may add mixing water, air-entraining agent, or chemical admixture incrementally in order to achieve the proper slump or air content range as specified in Table 903.03.06-1 or Table 903.03.06-2.

E. Rejection Criteria. The RE will reject concrete for any of the following reasons:

1. The information for batching and delivery tickets is not complete, does not agree with the mix design, or is not supplied to the ME.
2. The mixer fails to maintain the manufacturer's stated speed of rotation for both mixing and agitation, or is not able to properly discharge the concrete.
3. The RE observes improper batching, lack of uniform distribution of constituents throughout the load, or balling of the cement and aggregates.
4. Water has been added while the truck is en route to the work site.
5. The concrete is not discharged within the specified time limit, or if the revolution counter shows a total of more than the 300 revolutions. However, if the load has been partially discharged and if the concrete yet to be discharged conforms to the specified ranges for slump and entrained air without further addition of water or admixtures, then the RE may allow the use of the concrete.
6. The slump or air content does not comply with requirements specified in 903.03.05.C.
7. The concrete has been tempered after the ME has performed the final acceptance testing.
8. Water is added after the truck has partially discharged regardless of ME testing.
9. The indicator on the revolution counter shows that the instrument has been turned off or tampered with.
10. The temperature of the concrete does not comply with requirements.
11. The water-cement ratio of the load is greater than the allowable maximum water-cement ratio for the class of concrete.

903.03.04 Mixing on the Project

A. Mobile Mixers. Mix the concrete in a mixing unit that is part of the truck carrying the dry ingredients and conforms to the requirements for a mobile mixer as specified in 1010.03. Use a mixing unit that is an auger type incorporated in the truck's discharge chute or other approved mixing mechanism. Produce concrete of uniform consistency and discharge the mix without segregation.

Provide a means for storing the additives on the truck and incorporating them into the mix. Include a way to check the rate of flow of the additive into the mix and a meter to register the total volume of additive incorporated into the mix during each mixing operation. The ME will not allow use of trucks not having functional meters on the Project.

Handle, measure, and batch materials according to the following:

1. Stockpile aggregates as specified in 901.02.
2. Proportion, measure, and batch cement and aggregates by a volumetric weight equivalent method. Mix the materials in the continuous-mixing-type truck mixer.
3. Provide delivery tickets to the ME for each truckload of ingredients. On the delivery tickets, show the brand name and type of cement, the calibrated cement constant of the mixer in terms of the indicator revolution count, the source of aggregates, and the size of the coarse aggregate. A responsible officer or employee of the concrete supplier shall sign the delivery tickets. For each class of concrete and for each separate mixing operation, the mixer operator shall enter on the tickets the name of the Project, the name of the Contractor, the revolution counter indicator readings indicating the volumetric weight equivalent of cement discharged during that mixing operation, the concrete additive meter reading indicating the total volume of additive discharged into the mix during that mixing operation, the aggregate dial settings, the water and concrete additive flow rates, and the class of concrete delivered. The operator shall sign each completed ticket and provide a copy to the ME.

B. Small Mixers. With the RE's approval, use small mixers only for small quantities of concrete that must be mixed on the Project. Unless provisions are made for accurately weighing bulk cement, use full bags of cement in each batch. Only use pre-blended mineral admixtures. Proportion aggregates and water by weight unless a calibrated volumetric method has been approved by the RE. Use accurate volumetric measuring devices to proportion chemical and air-entraining admixtures.

Charge the mixer with the aggregates and part of the mixing water, and begin mixing. Add cement and admixtures with another portion of the mixing water. Mix until uniform. Temper with the remaining allowable mixing water to obtain the necessary consistency. Do not exceed the quantity of water required by the mix design.

903.03.05 Control and Acceptance Testing Requirements

A. **Sampling and Testing Methods.** Use the sampling and testing methods for concrete as specified in Table 903.03.05-1.

Table 903.03.05-1 Sampling and Testing Methods

Designation	Test Method
AASHTO T 22[1]	Compressive Strength of Cylindrical Concrete Specimens (Including the Annex providing for use of neoprene caps)
AASHTO T 23[2]	Making and Curing Concrete Test Specimens in the Field
AASHTO T 24[3]	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
AASHTO T 97	Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
AASHTO T 119	Slump of Hydraulic Cement Concrete
AASHTO T 121	Weight Per Cubic Foot, Yield and Air Content (Gravimetric) of Concrete
AASHTO T 141[4]	Sampling Fresh Mixed Concrete
AASHTO T 152	Air Content of Freshly Mixed Concrete by the Pressure Method
AASHTO T 196	Air Content of Freshly Mixed Concrete by the Volumetric Method
AASHTO T 303	Accelerated Detection of Potentially Deleterious Expansion of Mortar Bars Due to Alkali-Silica Reaction
AASHTO R 39	Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 567	Unit Weight of Structural Lightweight Concrete
ASTM C 311[5]	Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
NJDOT C-1	Determination of Yield of Concrete Produced by Mobile Truck Mixers

1. Use 4 × 8 inch (diameter × height) compression test cylinders, except use 6 × 12 inch (diameter × height) test cylinders for concrete mixes containing coarse aggregate sizes exceeding a nominal maximum size of 1 inch.
2. Cure compression test cylinders for strength acceptance according to the Standard Cure Method in AASHTO T 23. For determining early strength for form removal, early loading of members, or opening to traffic, cure compression test cylinders according to the Field Cure Method in AASHTO T 23.
3. Obtain and prepare cores for compressive strength testing according to AASHTO T 24, except for the provisions for moisture conditioning. For moisture conditioning, soak cores in a lime bath at 73.4 ± 3 °F for at least 40 hours immediately prior to testing. After making any necessary corrections to the core results for ratio, the ME will divide each core result by 0.85 before reporting the final compressive strength.
4. Sample according to AASHTO T 141, except do not take a composite sample to represent a truck. Take the sample after approximately 1 cubic yard of concrete has been discharged from the truck to be sampled.
5. The Department may modify the sampling rate for individual and composite samples.

B. **Quality Control.** The concrete supplier shall have a quality control plan approved annually by the ME. The producer shall ensure that the plan conforms to the "Requirements for a Portland Cement Concrete Plant Quality Control Plan", which may be obtained from the ME. During production of concrete for the Project, the supplier shall perform quality control testing as required in the approved plan. If a concrete supplier does not have an approved plan or does not follow the approved plan, the ME will remove the supplier from the QPL.

Ensure that the QC technician, certified by ACI as a Concrete Field Technician, Grade 1, is present at the plant or the Project Limits during production. During production of concrete for the Project, perform quality control testing as required in the approved plan and as needed to ensure compliance with the requirements for the concrete.

C. **Acceptance Testing Procedures for Slump and Air Entrainment.** The ME will perform sampling and testing for slump (AASHTO T 119) and air entrainment (AASHTO T 152 or T 196), except for precast, prestressed concrete Items, for which the Contractor shall perform sampling and testing for slump and air entrainment. For pumped concrete, take the sample of concrete at the point of discharge and deliver it to the ME.

At a minimum, the ME will perform slump and air-entrainment tests at the rate specified for strength tests in Table 903.03.06-4 and on the same samples of material from which the compressive tests cylinders are molded. The ME will perform additional slump and air-entrainment tests as necessary to ensure the quality of the concrete. While

these tests are being performed, halt discharge from the truck. Discharge from other trucks not scheduled for testing may proceed unless otherwise directed by the ME.

If the measured value of either slump or air entrainment exceeds the upper limit, the ME will perform a second test on a different portion of material from the same load. If the average of the 2 test results for either slump or air entrainment exceeds the upper limit, the ME will reject the load. Remove rejected loads from the Project Limits.

If neither of the measured values of the slump or air entrainment exceeds the upper limit, the Contractor may temper the concrete once, prior to discharge into the work. Temper by addition of water, air-entraining agent, or any chemical admixture included in the mix design as recommended by the manufacturer. Ensure that quantities added will result in slump and percent air entrainment within the specified ranges throughout the duration of discharge of the load. After tempering, rotate the drum at the recommended mixing speed for a minimum of 30 revolutions. Meet the specified maximum water-cement ratio and comply with the time and revolution limits specified in 903.03.03. Report quantities added to the ME.

Following any allowed tempering, the ME will disregard the original test results and perform a single test for slump and air entrainment. If the measured values for slump and air-content are not within the ranges specified in Table 903.03.06-1 or Table 903.03.06-2, the RE will reject the load of concrete.

Do not make additions to the load after the acceptance testing has been completed. For loads not scheduled for acceptance testing, make additions as specified in 903.03.03 before discharge into the work.

D. General Acceptance Testing Requirements for Strength. The ME will perform sampling and testing for strength, except for precast, prestressed concrete Items for which the Contractor shall perform sampling and testing for strength. For pumped concrete, take the sample of concrete at the point of discharge and deliver it to the ME.

Provide, for the sole use of the ME, a sufficient number of curing facilities for the storage and curing of concrete test cylinders within the Project Limits for the first 24 hours according to AASHTO T 23. Ensure that the curing facilities are provided with minimum-maximum thermometers and are securable with lock and key. During the period from May 1 through October 31, provide water tanks or tubs of sufficient capacity and rigidity to hold the cylinders in an upright position, fully submerged and without contact between cylinders. During the remaining months of the year, or as directed by the RE, provide securable, insulated boxes, of similar capacity and rigidity. During the initial 24 hours, ensure that the test specimens are undisturbed and maintained within the specified temperature range. If, within 10 days of the RE's request, the facilities are not provided, do not place any concrete.

The ME will cure concrete test specimens that are to be used for determination of early strengths for removing forms, opening to traffic, or otherwise placing the concrete into service according to the field curing provisions in AASHTO T 23.

An initial strength test result is defined as the average strength of two 4 × 8 inch compression test cylinders, cured for 28 days, and tested by the ME. The Contractor may have cylinders for precast concrete tested at the fabricator's plant under the supervision of the ME. The ME will sample and test at the rate specified in Table 903.03.06-4. If either of the cylinders comprising a test shows definite evidence (other than low strength) of improper sampling, molding, handling, curing, or testing, the ME will discard it and use the strength of the remaining cylinder as the test result. If the difference in compressive strength between 2 cylinders comprising a test equals or exceeds 600 pounds per square inch, the ME will disregard the lower value and use the higher value as the test result. If both cylinders comprising a test are discarded, the ME will evaluate the lot on the basis of the reduced number of tests.

If the ME takes additional unscheduled compression cylinders, as specified in 106.05, the ME will include the results with the regularly scheduled compression cylinder results and will evaluate the lot on the basis of the increased number of tests.

E. Acceptance Testing for Strength for Pay Adjustment Items. The Special Provisions will identify the concrete Items, if any, that are subject to pay adjustment and their base prices.

The ME will test the cylinders in the lot of concrete and compute the pay adjustment in the following steps:

1. **Compute Average Lot Strength (ALS) and Standard Deviation (S).** If only a single test result is available, the standard deviation (S) is assumed to equal 200 pounds per square inch.

$$ALS = \frac{\sum X_i}{N}$$

$$S = \sqrt{\frac{\sum (X_i - ALS)^2}{N - 1}}$$

Where:

$\sum$ = Summation

X_i = Individual test result (average strength of a test cylinder pair)

N = Number of test results for the lot

2. **Compute Quality Index (Q).**

$$Q = \frac{ALS - CDS}{S}$$

Where:

CDS = Class design strength in pounds per square inch from Table 903.03.06-3 for the specified class of concrete.

3. **Determine Percent Defective (PD).** Using NJDOT ST for the appropriate sample size, the ME will determine PD associated with Q calculated in the previous step.

4. **Compute Percent Pay Adjustment (PPA).**

	Quality	Percent Pay Adjustment
Equation 1	PD < 50	PPA = 3.0 − 0.3 PD
Equation 2	PD ≥ 50	PPA = 26.0 − 0.76 PD

The amount of pay adjustment in dollars is the product of the Item base price times the lot quantity times the percent pay adjustment (expressed as a decimal) given by Equation 1 or 2.

For lots having percent defective (PD) levels less than 10 percent, Equation 1 provides positive adjustments to the contract price. For lots having exactly 10 percent defective, there is no adjustment to the contract price. For lots having greater than 10 percent defective, Equations 1 or 2, as appropriate, subtract progressively larger amounts from the contract price.

If, based on the initial series of tests, the lot quality of a pay adjustment item is estimated to be PD = 50 or greater, the ME may reevaluate by coring or other suitable means. When this provision is applied to precast/prestressed concrete, the ME will evaluate each item in the bed separately.

If the re-evaluation is accomplished by a method other than coring, the ME will use the results only to determine what further action is to be taken. If all non-core test results equal or exceed the class design strength, the ME may elect to accept the lot at 100 percent payment.

If the Department elects not to core, the Contractor may accept the PPA calculated by Equation 1 or 2, as appropriate, or, when approved by the Department, the Contractor may take cores as specified in Table 903.03.06-4. Take the cores within 90 days from the date of concrete placement. The Department will not award a positive pay adjustment based on core samples taken more than 90 days from the date of concrete placement. If electing to core, perform the coring as directed by the ME, and provide the cores to the ME for testing.

If cores are taken, the Department will use the core results to determine the final disposition of the lot. If, based on the core results, the lot is determined to be at a quality level of PD < 75, the Department will compute the pay adjustment by Equation 1 or 2, as appropriate. If the lot is confirmed to be at a quality level of PD ≥ 75, the ME will reject the lot and the RE may do one of the following:

1. Require the Contractor to remove and replace the defective lot.
2. Allow the Contractor to leave the defective lot in place and receive a PPA computed by Equation 2.
3. Allow the Contractor to submit a plan, to the RE for approval, for corrective action.

F. **Acceptance Testing for Strength for Non-Pay Adjustment Items.** Non-pay adjustment Items are those concrete Items not specifically designated as pay adjustment Items, as specified in 903.03.05.E, but may be accepted by pay adjustment under certain circumstances. Such an Item is eligible for 100 percent payment (PPA = 0) if each individual

test result in a lot meets the retest limit specified in Table 903.03.06-4.

If any individual test value (average of a cylinder pair) falls below the retest limit for non-pay adjustment concrete in Table 903.03.06-4, the ME may reevaluate by coring or other suitable means. When this provision is applied to precast/prestressed concrete, the ME will evaluate each item in the bed separately.

If the re-evaluation is accomplished by a method other than coring, the ME will use the results only to determine what further action is to be taken. If all non-core test results equal or exceed the class design strength, the ME may elect to accept the lot at 100 percent payment.

If the Department elects not to core, the Department may allow the Contractor to take cores as specified in Table 903.03.06-4. Take the cores within 90 days from the date of concrete placement. If electing to core, perform the coring as directed by the ME, and provide the cores to the ME for testing.

If cores are taken, the Department will use the core results to determine the final disposition of the lot. If, based on the core results, the lot is determined to be at a quality level of PD < 75, the Department will compute the pay adjustment as specified in 903.03.05.E. The Department will not award positive pay adjustment for non-pay adjustment Items. If the lot is confirmed to be at a quality level of PD $\geq$ 75, the ME will reject the lot and the RE may do one of the following:

1. Require the Contractor to remove and replace the defective lot
2. Allow the Contractor to leave the defective lot in place and receive a PPA computed by Equation 2.
3. Allow the Contractor to submit a plan, for approval, for corrective action.

If retesting is not performed by the Department or the Contractor, the Department will calculate the PPA as for a pay adjustment Item as specified in 903.03.05.E, except that the Department will use the Item bid price instead of an Item base price in the computation of the pay adjustment.

When computing a pay adjustment for any of the Items listed in Table 903.03.05-2, which are only partially composed of concrete, the ME will multiply the amount of pay adjustment, if any, by the Estimated Percentage of Concrete (expressed as a decimal) as shown in Table 903.03.05-2.

Table 903.03.05-2 Estimated Percentage of Concrete in Items

Item	Estimated Percentage of Concrete
INLET, TYPE ___	30
INLET, TYPE___, USING EXISTING CASTING	30
MANHOLE,___' DIAMETER	30
MANHOLE, USING EXISTING CASTING	30
MANHOLE, SANITARY SEWER	30
MANHOLE, SANITARY SEWER, USING EXISTING CASTING	30
GRANITE CURB	25
RESET GRANITE CURB	25
BEAM GUIDE RAIL TERMINALS AND ANCHORAGES	25
CHAIN-LINK FENCE,___' HIGH	25
CHAIN-LINK FENCE, ALUMINUM-COATED STEEL,___' HIGH	25
CHAIN-LINK FENCE, PVC-COATED STEEL,___' HIGH	25
GATE, CHAIN-LINK FENCE,___' WIDE	25
GATE, CHAIN-LINK FENCE, ALUMINUM-COATED STEEL,___' WIDE	25
GATE, CHAIN-LINK FENCE, PVC-COATED STEEL,___' WIDE	25
TEMPORARY CHAIN-LINK FENCE,___' HIGH	25
GUIDE SIGN, TYPE GA, BREAKAWAY SUPPORTS	20
GUIDE SIGN, TYPE GA, NON-BREAKAWAY SUPPORTS	20

The amount of pay adjustment for Items not listed in Table 903.03.05-2 is the product of the unit bid price times the lot quantity times the percent pay adjustment determined according to Equation 1 or 2.

903.03.06 Tables

Table 903.03.06-1 Requirements for Roadway Concrete Items

	Concrete Class	Slump[1] (inch)	Percent Air Entrainment for Coarse Aggregate1	
			No. 57 and No. 67	No. 8
Cast-in-Place Items				
Surface Course, Base Course	B	2 ± 1	6.0 ± 1.5	7.0 ± 1.5
Inlets, Manholes, Headwalls, Sidewalks, Driveways, Islands	B	3 ± 1	6.0 ± 1.5	7.0±1.5
Slope Gutters, Vertical Curb, Sloping Curb, Barrier Curb, Concrete Islands	B	4 ± 1	6.0 ± 1.5	7.0 ± 1.5
Foundations for: Inlets, Manholes and Electrical Items	B	3 ± 1	7.5 max	8.5 max
Signs	B	3 ± 1	6.0 ± 1.5	7.0 ± 1.5
Footings for: Fence Post, Beam Guide Rail Terminals, and Anchorages	B	3 ± 1	7.5 max	8.5 max
Culverts	A	3 ± 1	6.0 ± 1.5	7.0 ± 1.5
Monuments	A	3 ± 1	7.5 max	8.5 max
Slope Protection	B	2 ± 1	6.0 ± 1.5	7.0 ± 1.5
Pipe Bedding, Thrust Blocks, Pipe Plugs, Encasements, Saddles	B	3 ± 1	7.5 max	8.5 max
Precast Items				
Culverts	P	3 ± 1	6.0 ± 1.5	7.0 ± 1.5
Inlets, Manholes, Junction Boxes, Headwalls, Reinforced Concrete End Sections	B	3 ± 1	6.0 ± 1.5	7.0 ± 1.5
Concrete Barrier Curb	B	3 ± 1	7.0 ± 2.0	8.0 ± 2.0
Slip-Form Items				
Surface Course, Base Course	B	1-1/2 ± 1	6.0 ± 1.5	7.0 ± 1.5

1. When using a Type F or G admixture, change the requirements for Slump and Air Content for the given concrete item as follows:
   1.1 Slump: 6 ± 2 inches
   1.2 Air Content: Increase both the target value and tolerance percentages by 0.5.

Table 903.03.06-2 Requirements for Structural Concrete Items

	Concrete Class	Slump[1] (inches)	Percent Air Entrainment for Coarse Aggregate[1]	
			No. 57 & No. 67	No. 8
Cast-in-Place Items				
Bridge Approach	A	3 ± 1	6.0 ± 1.5	7.0 ± 1.5
Footings, Piles	B	3 ± 1	7.5 max	8.5 max
Abutments, Wing Walls, Pier Shafts, Retaining Walls	B	3 ± 1	6.0 ± 1.5	7.0 ± 1.5
Drilled Shafts[2]	A	7 ± 1[2]	–	7.5 ± 1.5
Concrete Barrier Curb, Bridge	B	4 ± 1	7.0 ± 2.0	8.0 ± 2.0
Pier Columns and Pier Caps, Arch Spans, Culverts	A	3 ± 1	6.0 ± 1.5	7.0 ± 1.5
Decks, Sidewalks, Curbs, Parapets, Concrete Patch	A	3 ± 1	6.0 ± 1.5	7.0 ± 1.5
Seal (Tremie) Concrete	S	7 ± 2	7.5 max	8.5 max
Prestressed Items				
Beams	P, P-1 & P-2	2 ± 1	5.0 ± 1.5	5.0 ± 1.5
Piles	P	2 ± 1	6.0 ± 1.5	7.0 ± 1.5
Precast Items				
Piles	B	3 ± 1	6.0 ± 1.5	7.0 ± 1.5
Culverts, Parapet	P	3 ± 1	6.0 ± 1.5	7.0 ± 1.5
Modular Bin Units, MSE Wall Panels, Leveling Pads	P	2 ± 1	6.0 ± 1.5	7.0 ± 1.5
Slip-Form Items				
Parapet	A	1 ± 1/2	6.0 ± 1.5	7.0 ± 1.5

1. When using a Type F or G admixture, change the requirements for Slump and Air Content for the given concrete item as follows:
   1.1 Slump: 6 ± 2 inches
   1.2 Air Content: increase both the target value and tolerance percentages by 0.5.
2. For drilled shaft concrete, use Type F or G admixture to achieve the required slump. If concrete in the drilled shaft is placed under a drilling fluid, the required slump is changed to 8 ± 1.

Table 903.03.06-3 Mix Design Requirements

	Class A	Class B	Class S	Class P	Class P-1	Class P-2
Class Design Strength[2] (28 days, psi)	4600	3700	2000	5500	6000	6500
Verification Strength[2] (28 days, psi)	5400	4500	–	6000	6500	7000
Maximum Water-Cement Ratio[3] (lb/lb)	0.443	0.488	0.577	0.400	0.400	0.400
Minimum Cement Content (lb/cy)	611	564	658	1	1	1

1. According to *PCI MNL-116*.
2. Record all concrete test results to the nearest 10 psi.
3. When a Type F or G water-reducing, high range admixture is used as specified in Table 903.03.06-1 and Table 903.03.06-2, reduce the maximum water-cement ratio by 0.043 for all classes of concrete except for Classes P, P-1 and P-2.

Table 903.03.06-4 Lot Sizes, Sampling Rates, and Retest Limits

Lot Size[1, 2] (maximum)	Class A	Class B	Class S	Class P	Class P-1	Class P-2
	Day's Production			Day's Production of a Single Steam Bed		
Pay Adjustment Items						
Initial Sampling Rate[3, 4]	5/Lot	5/Lot	–	5/Lot	5/Lot	5/Lot
Retest Sampling Rate[5] (minimum)	5/Lot	5/Lot	–	5/Unit or Load Test		
Non-Pay Adjustment Items						
Initial Sampling Rate [3, 4]	3/Lot	2/Lot	1/Lot	5/Lot	5/Lot	5/Lot
Retest Limit (psi)	4400	3600	2000	5400	5900	6400
Retest Sampling Rate[5]	5/Lot	5/Lot	5/Lot	5/Lot	5/Lot	5/Lot

1. The lot sizes are maximums. The ME may subdivide a lot into 2 or more smaller lots. When a subdivision is made, the specified sampling rate applies to each of the smaller lots.
2. The ME will not include more than 1 class of concrete in a lot.
3. An initial sample is defined as 2 cylinders taken from a concrete sample.
4. The ME will sample at the specified sampling rates except that no more than 1 test per truckload or batch of concrete will be required (except for air and slump tests when retempering). The ME may accept nonstructural concrete lots consisting of 20 cubic yards or less without strength tests.
5. A retest sample is defined as 1 core.

903.06 SELF-CONSOLIDATING CONCRETE (SCC)

903.06.01 SCC For Precast Concrete

A. Composition. Produce SCC conforming to the composition requirements specified in 903.03.01, except use a Type F admixture or a combination of a Type F and a viscosity modifying admixture (VMA). Use Type F and VMA admixtures, as specified in 903.02.02 and 903.02.04, at a dosage to produce a flowable concrete that does not require vibration for consolidation. Proportion the aggregates so that the fine aggregate is less than 50 percent by weight of the total aggregate.

B. Mix Design and Verification. Design the mix, as specified in 903.03.02 or 903.05.02, to conform to the strength, water-cement ratio, and air content requirements for the specified class of concrete for the item that is being cast. In addition, ensure that the SCC conforms to the requirements specified in Table 903.06.02-1.

Table 903.06.02-1 Requirements for SCC for Precast Concrete

Property	Test Method	Requirement
Slump Flow	NJDOT C-4	16 to 24 inches
Visual Stability Index		
Plastic Concrete	NJDOT C-4	1 maximum
Hardened Concrete	NJDOT C-5	1 maximum

Perform mix design verification as specified in 903.03.02 or 903.05.02. For the verification batch, ensure that the air content is in the top half of the allowable range and the slump flow is between 22 and 24 inches. Perform air content, slump flow, and visual stability index (plastic concrete) testing on the verification batch. Make concrete cylinders for compression testing as specified in 903.03.02 or 903.05.02 and make 2 additional 4 × 8 inch cylinders for visual stability index on the hardened concrete. Saw the additional cylinders length-wise according to NJDOT C-5. The ME will perform the compressive strength testing and the visual evaluation to assign a visual stability index in order to approve the mix.

C. Mixing. Mix SCC as specified in 903.03.03.

D. Control and Acceptance Testing. Perform quality control testing as specified in 903.03.05.

The ME will perform acceptance testing as specified in 903.03.05 for specified class of concrete for the item, except that

the provisions for slump testing are replaced with requirements for slump flow testing and visual stability index on the plastic concrete. The ME will perform the slump flow testing and the visual stability index according to NJDOT C-4, at the sampling rate specified for slump testing for the specified class of concrete. The ME will perform visual stability index on the hardened concrete according to NJDOT C-5 at a rate of at least 1 per day. If the visual stability index on the hardened concrete does not conform to the criteria specified in Table 903.06.02-1, the ME will require redesign of the mix.

In the performance of quality control or acceptance testing, without remixing the sample, fill cylinder molds, slump flow cones, and air buckets in one lift. Do not vibrate, rod, or tap to consolidate the SCC.

903.07 MORTAR AND GROUT

903.07.01 Mortar

To produce mortar, mix 1 part cement to 2 parts fine aggregate. Add water to form the proper consistency. Do not temper or use mortar after it has begun to set.

Provide materials as specified:

Fine Aggregate	901.06.02
Cement	903.01
Water	919.08

903.07.02 Grout

A. **Non-Shrink Grout.** Use non-shrink grout of a plastic consistency that is listed on the QPL and conforms to ASTM C 1107 with the following amendments:

1. Ensure that the grout has a working time of at least 30 minutes from the time the water is added.
2. Match the color of the hardened grout, where visible, to the color of the adjacent hardened concrete.
3. Include 1 day strength tests as part of the performance requirements of ASTM C 1107.
4. Ensure that the grout contains no more than 0.05 percent chlorides or 5.0 percent sulfates by weight.

B. **Epoxy Grout.** Use epoxy grout that is listed on the QPL and conforms to the requirements of ASTM C 881, Type 1, Grade 3, Class B or C.

903.09 CONTROLLED LOW STRENGTH MATERIAL (CLSM)

Provide materials as specified:

Fine Aggregate	901.06.02
Cement	903.01
Chemical Admixtures	903.02.02
Water	919.08

Use CLSM that consists of a mixture of cement, water, fine aggregate, and admixtures. Proportion the CLSM mixture to provide a backfill material that is self-compacting and capable of being excavated with hand tools at a later date. Proportion the CLSM to produce a 28 day compressive strength of 50 to 150 pounds per square inch. If fast-setting CLSM is required, use an accelerating admixture to produce a fast setting flowable mixture. Ensure that the CLSM for backfilling of conduit and piping has a permeability of $1.7 \times 10^{-3} \pm 0.2 \times 10^{-3}$ centimeters per second when tested according to ASTM D5084.

At least 45 days before the start of any CLSM placement, prepare trial batches of CLSM of the same materials and proportions proposed for use in the Contract. Submit each mix design on concrete mix design forms provided by the Department, naming the sources of materials and test data.

The ME will be present at the time of verification batching to confirm that the proportions and materials batched conform to the proposed mix designs. Prepare at least six 6 × 12 inch compression test cylinders for each batch to be tested according to ASTM D 5971 for 28 day strengths except for fast setting mixes. Test fast-setting CLSM at the specified cure time. If fly ash is used in the CLSM, the ME will take an additional set of cylinders to ensure that the strength of the CLSM does not exceed 150 pounds per square inch in 90 days.

For acceptance testing, the ME will take 1 sample per day but may waive the testing if less than 20 cubic yards is placed in a day. If strength does not comply, the ME may require a new mix design for the CSLM.

903.10 CURING MATERIALS

903.10.01 Burlap Cloth

Use burlap cloth made from jute or kenaf conforming to AASHTO M 182, Class 4. The ME may sample 1 square yard of burlap cloth from each source for testing. If requested by the RE, submit a certification of compliance as specified in 106.07.

903.10.02 Liquid Membrane-Forming Compound

Use liquid membrane-forming compounds conforming to AASHTO M 148, Type 1-D, clear or translucent with fugitive dye. The ME may sample 1 quart of liquid membrane-forming compound from each lot for testing. If requested by the RE, submit a certification of compliance as specified in 106.07.

903.10.03 White Polyethylene Sheeting

Use white polyethylene sheeting conforming to AASHTO M 171 for white opaque polyethylene film. The ME may sample a 1 foot strip (cut across full width) from each source for testing. If requested by the RE, submit a certification of compliance as specified in 106.07.

SECTION 904 – PRECAST AND PRESTRESSED CONCRETE

904.01 NON-STRUCTURAL PRECAST CONCRETE

904.01.01 Component Materials

Provide materials as specified:

Concrete	903.03
Self-Consolidating Concrete (SCC)	903.06.02
Mortar	903.08.01
Curing Materials	903.10
Reinforcement Steel	905.01

Welded steel wire fabric used for reinforcement need not be galvanized. For Precast Concrete, the minimum cement content specified in Table 903.03.06-3 is not required for Class A or Class B concrete.

904.01.02 Fabrication

Fabricate precast concrete at a plant as specified in 1011.01 and listed on the QPL.

1. **Placing Reinforcement Steel.** Before placing the concrete, place reinforcement steel in position as shown on the approved working drawings and as specified in 504.03.01. Firmly tie the reinforcement to prevent displacement during placing of the concrete.
2. **Placing Concrete.** Place concrete as specified in 504.03.02.B, 504.03.02.C, 504.03.02.D and 504.03.02.E. Before placing concrete, ensure that reinforcement steel and any other embedded materials are free of loose rust, frost, dirt, oil, or contaminants that may prevent a bond with the concrete. Consolidate concrete with internal vibrators. The fabricator may use external vibration to supplement internal vibration. If using SCC, minimize or eliminate the use of vibrators to prevent segregation.

904.01.03 Curing

Cure according to the PCI MNL-116, except for steam curing. Do not strip forms until the piece has attained a stripping strength of 2,000 pounds per square inch.

If steam curing, delay the application of steam within the enclosure for 4 hours or until the concrete has attained an initial set as determined according to ASTM C 403. Maintain an ambient temperature between 50 °F and 90 °F during the delay. Ensure that the maximum rate of temperature increase in the enclosure is 40 °F per hour. Monitor the temperature in the enclosure using recording thermometers placed at a minimum of 2 locations. Ensure that the enclosure temperature is maintained between 90 °F and 150 °F until 2 concrete test cylinders, field cured according to AASHTO T 23, have attained the stripping strength.

904.01.04 Removing Forms and Finishing

Ensure that items remain in forms for the duration of the curing operation. Remove forms when concrete has attained the stripping strength. If handling devices are used, remove and fill the holes with concrete or mortar. Provide a Class 1 finish as specified in 504.03.02.H.1. Complete surface finishing operations before placing the piece in storage.

904.01.05 Shipping and Handling

Store, stack, and transport the pieces using methods that do not cause the development of cracks or other damage. Do not ship pieces until the class design strength as specified in Table 903.03.06-3 has been attained.

904.01.06 Quality Control and Acceptance Requirements

Notify the ME, in writing, at least 21 days before start of production.

For quality control, keep applicable records according to PCI Division 1, Quality Control, or NPCA requirements, and supply copies of these records to the ME as requested. Ensure that the quality control technician performing all tests is certified as an ACI Field Testing Technician, Grade 1. Submit Quality Control Plan to ME for review and approval.

Follow the Department approved Buy America Compliance Plan. Provide documentation of compliance when requested by the ME.

Submit certification of compliance as specified in 106.07.

If the concrete piece is spalled, honeycombed, chipped, or otherwise defective, the ME or RE will reject the piece.

SECTION 905 – REINFORCEMENT METALS

905.01 REINFORCEMENT STEEL

Provide reinforcement steel manufactured at an AASHTO NTPEP (National Transportation Product Evaluation Program) certified mill. For a list of NTPEP certified mills, see the following webpage: https://data.ntpep.org/REBAR/Audits.

For reinforcement steel, submit a certification of compliance as specified in 106.07. Attach copies of the mill certifications for each heat of reinforcement steel. The ME will randomly sample and test heats of reinforcement steel for quality assurance. The ME will randomly inspect and sample galvanized and epoxy coated reinforcement steel for quality assurance.

905.01.01 Reinforcement Bars

Use deformed bars according to ASTM A 615, Grade 60. Fabricate using the detailing dimensions for hooks, bends, and tolerances according to the CRSI Manual of Standard Practice. Bend bars using the cold method with positive powered machines in the shop or field. Compute the weight of reinforcement steel according to ASTM A 615.

If specified, galvanize according to ASTM A 767, Class I. Fabricate bends and details before galvanizing. If specified, apply epoxy coating according to ASTM A 775.

905.01.02 Welded Wire Reinforcement

Use plain or deformed steel welded wire reinforcement according to ASTM A 1064. When used for concrete pavement, use welded wire reinforcement mats at least 5 feet in width.

When approved as an alternate to galvanized reinforcement bars, use galvanized welded wire reinforcement that meets the requirements of ASTM A 641, Table 1, Class 1.

SECTION 908 – BOLTS AND BOLTING MATERIAL

908.01 STEEL BOLTING MATERIALS

Before using, submit a sample of each size of bolt, anchor, washer, and nut to the ME for testing and approval. Provide a mill certification for each heat.

908.01.01 Bolts

Use steel bolts conforming to ASTM A 307. If galvanizing is specified, use the hot-dipped method according to ASTM A 153.

908.01.02 Nuts and Washers

Use nuts and washers according to ASTM A 194 or ASTM A 563. Ensure that plain nuts are Grade 2H, DH, DH3, 2, C, D, or C3. Ensure that galvanized nuts are Grade 2H, DH, or DH3. Use washers with high-strength steel bolts conforming to ASTM F 436.

If galvanizing is specified, use the hot-dipped method according to ASTM A 153.

SECTION 909 – DRAINAGE

909.01 PIPE BEDDING

909.01.01 Class A Bedding

Use concrete as specified in 903.03.

909.01.02 Class B Bedding

Use sand or sandy soil with 100 percent passing the 3/8 inch sieve and no more than 10 percent passing the No. 200 sieve.

909.01.03 Class C Bedding

Use a granular soil conforming to the gradation requirements in Table 909.01-1.

Table 909.01-1 Gradation for Class C Bedding

Sieve Size	Percent Passing
1 inch	100
No. 4	80 – 100
No. 200	0 – 12

909.01.04 Class D Bedding

Use coarse aggregate No. 8 as specified in 901.03.

909.02 PIPE

909.02.01 Reinforced Concrete Pipe

Manufacture reinforced concrete pipe at a plant listed on the QPL. In the manufacture of reinforced concrete pipe, use concrete that is composed of cement, coarse aggregate, fine aggregate, and water. Concrete may include admixtures, fly ash, or slag. Provide materials as specified:

Aggregates 901.06
Cement 903.01
Admixtures:
Air-Entraining 903.02.01
Chemical 903.02.02
Fly Ash ..... ASTM C 618, Class C or F
Slag 903.02.03.B
Water 919.08

If fly ash is used to control alkali-silica reactivity, use Class F fly ash.

Manufacture reinforced concrete culvert pipe, storm drain, and sewer pipe to conform to AASHTO M 170, Class III, Wall B, unless otherwise designated. For jacked pipe, use reinforced concrete culvert pipe conforming to AASHTO M 170, Class V, Wall B. Manufacture reinforced concrete elliptical culvert, storm drain, and sewer pipe to conform to AASHTO M 207, Class HE-III, unless otherwise designated.

If required for watertight flexible joints, use preformed flexible joint sealants conforming to AASHTO M 198.

Follow the Department approved Buy America Compliance Plan. Provide documentation of compliance when requested by the ME.

For concrete pipe that is less than 60 inches in diameter, submit a certification of compliance as specified in 106.07. The ME will randomly inspect and test small-diameter concrete pipe for quality assurance.

For concrete pipe that is 60 inches or more in diameter, notify the ME at least 2 weeks before shipping pipe to the Project. The ME will inspect and approve large-diameter pipe in the supplier's yard after manufacture. Perform 3 point loading in the supplier's yard as directed by the ME. If the ME does not inspect the concrete pipe, submit certifications of compliance as specified in 106.07.

909.02.02 HDPE Pipe

Use corrugated HDPE drainage pipe that conforms to AASHTO M 294 and is Type S (smooth interior with annular corrugations) with gasketed silt-tight joints.

Use HDPE pipe from a manufacturer who is an AASHTO NTPEP (National Transportation Product Evaluation Program) certified manufacturer. For a list of NTPEP certified manufacturers, see the following webpage: https://data.ntpep.org/.

Submit a certification of compliance, as specified in 106.07, for HDPE pipe.

909.02.03 Plastic Drainage Pipe

Use corrugated polyethylene drainage pipe according to AASHTO M 252, or use PVC drainage pipe according to AASHTO M 304.

Use plastic drainage pipe from a manufacturer who is an AASHTO NTPEP (National Transportation Product Evaluation Program) certified manufacturer. For a list of NTPEP certified manufacturers, see the following webpage: https://data.ntpep.org.

Submit a certification of compliance, as specified in 106.07, for plastic drainage pipe.

909.02.04 Ductile Iron Water Pipe

Use ductile iron water pipe conforming to ANSI/AWWA C151/A21.51. Use threaded flanges conforming to ANSI/AWWA C115/A21.15, and fittings conforming to ANSI/AWWA C110/A21.10 or C153/A21.53. Do not field weld ductile iron pipe. Perform required welding of a ductile iron pipe assembly in a fabrication shop.

Submit a certification of compliance, as specified in 106.07, for ductile iron water pipe.

909.02.05 Fiberglass Pipe for Bridge Storm Drainage

Fabricate fiberglass pipe conforming to ASTM D 2996, RTRP-12EA1-2122 and fiberglass pipe fittings conforming to ASTM D 3840.

Ensure that all fiberglass pipe, fittings and adhesives use pigmented resin throughout the wall and the color is concrete gray or designated color with UV stabilized resin. Painted gel-coat or exterior coating is not acceptable.

Ensure that adhesives are in accordance with the pipe manufacturer and adhesive manufacturer's recommendations.

909.03 CASTINGS AND COMPONENTS FOR DRAINAGE STRUCTURES

Ensure that castings, grates, extension rings, extension frames, and covers for inlets and manholes are capable of withstanding HS-25 loading when tested as a complete, assembled unit and conform to the following:

1. **Gray Iron Castings.** Use gray iron castings conforming to AASHTO M 306, except that the manufacturer may use gray cast iron conforming to AASHTO M 105, Class 30B or Class 35B. Ensure that castings are true to pattern in form and dimensions and are free from pouring faults, sponginess, cracks, blowholes, and other defects in composition affecting their strength or integrity.

   To present a smooth, clean, and uniform surface, sandblast or clean the castings to remove sand and scale.

2. **Carbon Steel Extension Frames and Rings.** Use carbon steel extension frames and rings for inlets and manholes. When specified, galvanize the extension frames and rings according to AASHTO M 111. Perform welding of fabricated steel shapes and structures according to AWS D1.1. Do not punch, drill, ream, weld, or cut extension frames and rings in the field. Repair any damage to the galvanized coating.

3. **Scuppers and Other Bridge Drainage.** Use structural steel shapes and carbon steel castings conforming to AASHTO M 103, Grades 65-35 or 70-36, and carbon steel forgings conforming to AASHTO M 102, Class D.

4. **Ductile Iron Castings.** Use ductile iron castings conforming to ASTM A 536, Grade 65-45-12 or Grade 80-55-06.

5. **Epoxy Bedding Compound.** Use an epoxy bedding compound that is listed on the QPL and is a 2 part, non-sag gel, rapid-setting epoxy adhesive conforming to the requirements of ASTM C 881, Type 4, Grade 3, Class B or C and is listed on the QPL. Use the epoxy in an ambient temperature range of 40 to 100 °F.

6. **Ladder Rungs.** For ladder rungs, use steel reinforced copolymer polypropylene. Use a 1/2 inch diameter reinforcement steel bar conforming to ASTM A 615, Grade 60, and a polypropylene coating conforming to classification PP0344B33534Z02 according to ASTM D 4101.

For gray iron castings, notify the ME at least 2 days before shipping to the Project. The ME will inspect and approve castings in the supplier's yard after fabrication. For approval of the gray iron casting, perform proof load or test bar testing according to AASHTO M 306 in the supplier's yard at a frequency directed by the ME.

For Items other than gray iron castings, submit certifications of compliance as specified in 106.07.

SECTION 910 – MASONRY UNITS

910.01 CLAY OR SHALE BRICK

Use clay or shale brick conforming to AASHTO M 114, Grade MW, with the dimensions as specified in Table 910.01-1.

Table 910.01-1 Dimensions of Clay or Shale Brick

Length	7 3/4 – 8 1/4 inches
Width	3 1/2 – 3 7/8 inches
Depth	2 1/8 – 2 3/8 inches

Submit a certification of compliance as specified in 106.07.

910.02 CONCRETE BLOCK FOR INLETS AND MANHOLES

In the manufacture of concrete block, use cement as specified in 903.01 and aggregates conforming to the requirements for concrete aggregates as specified in 901.06. Manufacture concrete block according to ASTM C 139. The manufacturer shall sample and test concrete block according to ASTM C 140.

Manufacture blocks to be either rectangular in shape or curved with the inside and outside surfaces curved to the required radii, whichever is appropriate for the shape of the structure. Ensure that the length is between 12 and 18 inches, the height is between 5 and 8 inches, and the width is at least 6 inches.

For the reduction of cross sectional area of the cones or tops of manholes, the Contractor may use blocks of special shapes and heights. The Contractor may also use blocks of special shapes and heights in the top courses of all structures so that the head castings is set at the required elevation on a mortar bed not more than 1/2 inch thick without cutting the blocks.

Ensure that all blocks have an interlocking-type joint at the ends and are sound and free from cracks or other defects. Submit a certification of compliance as specified in 106.07.

910.03 CONCRETE BRICK

In the manufacture of concrete brick, use cement as specified in 903.01 and aggregates conforming to the requirements for concrete aggregates as specified in 901.06. Manufacture concrete brick to conform to ASTM C 139 and to the dimensions specified in Table 910.01-1. The manufacturer shall sample and test concrete brick according to ASTM C 140.

Submit a certification of compliance as specified in 106.07.

910.04 STONE CURB

Use stone curbs that are of a lithology, color, and texture as specified in the Special Provisions. Fabricate stone curb from a commercially available material with an established history of satisfactory durability and resistance to weathering. Use curb stones from a single quarry with the same color and texture. The Department may allow reasonable variations in color and texture if the variations do not affect the architectural qualities or the structural properties of the stone.

1. **Quarry-Split Stone.** Ensure that the top face of quarry-split stone for curbs is machine-finished or dressed to an even surface, without depressions or projections of more than 3/8 inch below or above the plane of the face. Ensure that the edges are straight and even, and the ends are cut square for the entire depth of the exposed curb face. Dress curb stones so that joints are not more than 3/8 inch wide from top to gutter line and not more than 1 inch wide below the gutter line.

2. **Dressed Stone.** Ensure that dressed stone for curbs is dressed to an even, smooth finish on the top face, on the front face for the entire depth of the exposed curb face, on the back face to a depth of 2 inches, and on the ends to a depth of 1 inch. Ensure that projections and depressions on the various faces do not exceed the allowances in Table 910.04-1.

Extend the rough-dressed part of end faces to 1 inch below the gutter line. Ensure that the back edge of the top is parallel to the front face, the top and front faces are sloped, and the front edge is rounded. Fabricate the stones to have the width specified at the top, and to have a bottom width of not less than 1 and not more than 3 inches different from the top width. Provide stones in lengths of between 4 and 8 feet.

Table 910.04-1 Maximum Allowable Deviations for Dressed Stone

	Depression (inches)	Projection (inches)
Top	1/4	1/4
Front, dressed part	1/4	1/4
Front, undressed part	1 1/2	1/2
Back, dressed part	1/2	1/2
Back, undressed part	1 1/2	1 1/2
Ends, dressed part	1/4	1/4
Ends, rough-dressed part	1/2	1/4
Ends, undressed part	1 1/2	1/4

The Contractor may use straight-cut stone for curved curb having a radius of more than 50 feet, but shall dress the curb to true radius after it is set in place. For curved curb having radii smaller than 50 feet, cut the stone to the required radius, and cut the ends so that the joints are less than 1/4 inch wide for the full depth.

Submit a certification of compliance as specified in 106.07.

910.05 STONE PAVING BLOCK

For stone paving block, use new or used stone block of good quality. Ensure that the color, texture, and uniformity conform to the requirements specified in the Special Provisions. Ensure that reclaimed blocks are free of bituminous and cement grout coatings and other foreign matter.

Submit a certification of compliance as specified in 106.07.

SECTION 911 – SIGNS, SIGN SUPPORTS, AND DELINEATORS

911.01 SIGNS

911.01.01 Materials

A. Aluminum Components. Use aluminum materials conforming to the requirements in Table 911.01.01-1.

Table 911.01.01-1 Aluminum Sign Components

Aluminum Items	Test Method	Alloy and Temper
Flat Sign Sheets[1] (0.080", 0.100", 0.125" thicknesses)	ASTM B 209	5052-H38 or 6061-T6
Extruded Sign Panels[1,2]	ASTM B 221	6063-T6
Demountable Letters, Numerals, Symbols (0.040" thickness)	ASTM B 209	5052-H38 or 6061-T6
Bars and Rods	ASTM B 221	6063-T6
Washers, Alclad	ASTM B 209	2024-T4
Flange Splicing Material	ASTM B 209	6061-T6
Shims	ASTM B 209	1100-O
Posts, Truss Chords, Truss Bracing Members	ASTM B 221	6061-T6
Post and Chord Caps	ASTM B 26	356.0-T6
Post Clips	ASTM B 26	356.0-T6
Structural Shapes (Z-Bar Reinforcement)	ASTM B 308	6061-T6
Nuts, 5/16 inch and larger	ASTM B 211	6061-T6
Tamperproof Nuts, 1/4 inch and under	ASTM B 211	2017-T4
Rivets (size and length recommended by the manufacturer)	ASTM B 316	5052-0
Bolts (finished bolts with at least 0.002" chromated sealed anodic coating)	ASTM B 211	2024-T4

1. For flat sign sheets and extruded sign panels, ensure that aluminum is chromate conversion coated according to ASTM B 449, Class 2.
2. For extruded panels, use lightweight panels.

B. Retroreflective Sheeting. Use retroreflective sheeting that is listed on the QPL and conforms to ASTM D 4956. Use sheeting types as specified in Table 911.01.01-2.

If overlay film is used, ensure that the combination of the overlay film with the background retroreflective sheeting conforms to the requirements of ASTM D 4956 for the required type of sheeting as specified in Table 911.01.01-2. Ensure that the color combination of the retroreflective sheeting with the overlay film meets the required color for the sign background. Use retroreflective sheeting and overlay film from the same manufacturer.

Table 911.01.01-2 Allowable Sign Sheeting Types

Sign Type	Test Method	Type
Regulatory and Warning Signs	ASTM D 4956	Type III
Guide Signs Mounted on Steel "U" Posts	ASTM D 4956	Type III
Guide Signs Mounted on Overhead Sign Structures, Breakaway Sign Supports, or Non-breakaway Sign Supports	ASTM D 4956	Type VIII or Type IX

C. Color Processing Ink. If a screening process is used for non-retroreflective legends and borders, use only inks recommended by the retroreflective sheeting manufacturer.

911.01.02 Fabrication

A. **Sign Panels.** Use flat sign panels or extruded panels to fabricate signs. Ensure that cut edges are true and smooth and free from excessive burrs or ragged breaks. Do not flame cut aluminum.

Fabricate flat sheet signs from a single piece of sheet aluminum without joints, using the thicknesses specified in Table 911.01.02-1. Drill or punch 3/8 inch diameter holes in the sign blank for attachment to sign supports. Locate holes according to the MUTCD Manual of Standard Highway Signs. If the panel is larger than 5 feet in any dimension, reinforce the panel with z-bars.

Table 911.01.02-1 Requirements for Sheet Aluminum Thickness for Flat Panel Signs

Sign Type	Thickness (inches)
Signs measuring less than 8.0 square feet (except One-Way signs)	0.080
Signs measuring 8.0 square feet or greater	0.100
One Way Signs	0.125

For multiple panel signs, use 1 foot wide extruded sections bolted together. Join sign panel sections together at the flanges with 3/8 inch bolts. Attach the sign panels to vertical supports, ensuring that the span between vertical supports is a maximum of 18 feet. Do not use extruded sign panels with steel "U" post sign supports. Use the same material and color for trim molding that is used for the sign face.

B. **Applying Retroreflective Sheeting.** Apply sheeting according to the manufacturer's recommendations. If necessary, use 2 or more pieces of retroreflective sheeting to cover the sign face. Match color at the time of sign fabrication to provide uniform appearance. If using overlay film, use retroreflective sheeting that is the color of the proposed lettering or border. Butt-splice the sheeting and ensure that the gap between sheets does not exceed 1/32 inch. Cut sheeting flush with the edges of the panel.

C. **Legends and Borders.** The legend for each sign consists of letters, numerals, shields, and other symbols. Use Series E Modified 2000 lettering that conforms to the MUTCD Manual of Standard Highway Signs. Ensure that the lettering is aligned, spaced and sized according to MUTCD Manual of Standard Highway Signs and the working drawings. Apply the legend and borders using the following methods:

1. **Demountable.** Use sheeting type to match the required retroreflective sheeting for the sign. Apply the sheeting to cutout aluminum for demountable sign legend or border. Mount legend and border to the sign face.
2. **Direct Applied Retroreflective Sheeting.** Using sheeting type to match the required retroreflective sheeting for the sign, cutout legend, or border from the sheeting. Apply the legend or border according to the manufacturer's recommendations.
3. **Overlay Film.** If using overlay film to color background retroreflective sheeting, computer generate legend cutouts in the overlay film. Apply the overlay film according to the manufacturer's recommendations.
4. **Non-Retroreflective Legend and Border.** The fabricator may apply non-retroreflective legend or border using ink and application technique according to the retroreflective sheeting manufacturer's recommendations.

911.01.03 Packaging, Storing, and Shipping

Package, ship, and store panels on edge and according to the sheeting manufacturer's recommendations. Ensure that all signs are packaged so that they are protected from moisture and damage during shipment and storage.

911.01.04 Acceptance Inspection

Notify the ME at least 3 days before shipping to the Project so that arrangements for inspection can be made. The ME will reject signs not fabricated according to the MUTCD Manual of Standard Highway Signs and the Plans. The ME will ensure that finished signs are clear and legible without smudging, blisters, delamination, loose edges, or other blemishes. The ME will also ensure that the colors have a consistent chromaticity across all signs of the same color.

At the time of the inspection, provide copies of mill certifications for the aluminum components and copies of certification of compliance, as specified in 106.07, for the sign sheeting.

911.02 SIGN SUPPORTS

911.02.01 Steel "U" Post Sign Supports

Use steel "U" post sign supports conforming to ASTM A 499, Grade 50 or 60, with the length of post and minimum pounds per foot as shown on the Plans. Provide 18-8 stainless steel 5/16 × 18 UNC hexagonal headed bolts and nuts conforming to ASTM A 320, Grade B8, Class 1, for securing the signs to the steel "U" post. Provide sign mounting bolts that are sized to extend beyond the end of each nut by no more than 3/4 inches when fully tightened.

Submit a certification of compliance, as specified in 106.07, for "U" posts.

911.02.02 Breakaway Sign Supports for Ground Mounted Signs

Fabricate and construct breakaway sign supports for ground mounted signs using materials conforming to the requirements in Table 911.02.02-1.

Table 911.02.02-1 Materials for Breakaway Sign Supports

Item	Test Method	Type or Grade	Galvanizing
Aluminum Materials (other than bracket)	911.01.01	–	–
Bracket	B 308	6061-T6	–
Structural steel shapes	ASTM A 709	Grade 36	ASTM A 123
Steel Sheet	ASTM A 1011	Grade 36	ASTM A 653
Bolts (except special bolt for coupling)	ASTM F 3125	Grade A 325	ASTM A 153
Special bolt for coupling	ASTM A 449	–	ASTM A 153
Cap Screw	ASTM A 307	–	ASTM A 153
Lock Washer	ANSI B 18-21-1	–	ASTM A 153
Nut	ASTM A 563	Grade DH	ASTM A 153
Coupling	AMS 6378 F	–	ASTM A 153
Steel Hinge Plate	AISI 4130	–	ASTM 123
Anchor Rod	AISI 1045	–	–
Anchor Coil	AISI 1008	–	–
Anchor Washer	908.04	–	–
Anchor Ferrule	908.04	–	–

Submit mill certificates for the component materials.

911.02.03 Timber Sign Supports

Use timber posts conforming to the requirements for sawn timber posts as specified in 915.01.

911.03 FLEXIBLE DELINEATORS

Ensure that flexible delineator units are made of a fiberglass reinforced, thermosetting, high-density polymer resin or an extruded polycarbonite resin, which are resistant to ultraviolet and infrared radiation, and which meet the following minimum physical and performance requirements:

1. **Delineator Dimensions.**

   a. **Ground Mounted.** Ensure that the unit for ground mounted flexible delineators has a minimum width of 3 inches and a minimum thickness of 1/8 inch. Use delineators that have a length to allow the top of the reflective area to be positioned 4 feet above the near roadway edge.

   b. **Guide Rail Mounted.** Ensure that the unit for beam guide rail mounted flexible delineators has a minimum width of 3 inches and a minimum thickness of 0.100 inch. Use units of a height that will ensure

that the top of the reflective area is 5 ± 2 inches above the top of post.

Design the base of the unit to mount over the I-beam blockout or to the top of a wood or synthetic blockout, of the beam guide rail.

c. **Barrier Curb Mounted.** For barrier curb mounted flexible delineators, use a delineator that is 3 1/2 × 3 1/2 inches, with a minimum thickness of 0.100 inch, and that has a base that forms a "T" shape with the panel for mounting on the side of the barrier curb, and is flexible or hinged so as to return to its original position after being struck.

d. **Construction Barrier Curb Mounted.** For construction barrier curb top mounted flexible delineators, use a delineator that is 6 x 12 inches with a minimum thickness of 0.100 inch. For construction barrier curb side mounted flexible delineators, use a delineator that is 3 1/2 x 3 1/2 inches with a minimum thickness of 0.100 inch, and that has a base that forms a "T" shape with the panel for mounting on the barrier curb and is flexible or hinged so as to return to its original position after being struck.

2. **Delineator Color.** Use flexible delineators that are white in color.

3. **Impact Resistance for Ground Mounted Delineators.** Use flexible delineator units that are self-erecting to within 10 degrees of original upright position within 15 minutes after 5 vehicle impacts traveling at 55 miles per hour. Ensure that the re-erected unit retains the original cross section, shows no evidence of shredding or splintering, and retains 80 percent of its original retroreflective sheeting when tested for both bumper impacts and wheel impacts and in both cold and hot weather.

4. **Retroreflective Sheeting.** Use retroreflective sheeting that is listed on the QPL and conforms to ASTM D 4956, Type VII or VIII. Affix yellow or white retroreflective sheeting to the traffic-facing side of the delineator according to the manufacturer's recommendations.

   a. **Ground Mounted.** Ensure that sheeting is a maximum of 2 inches from the top of the delineator and is at least 3 × 12 inches.

   b. **Guide Rail Mounted.** Ensure that the sheeting is a minimum of 3 inches square and is mounted on the upper portion of the delineator.

   c. **Barrier Curb Mounted.** Ensure that the sheeting is 3 1/2 × 3 1/2 inches.

   d. **Construction Barrier Curb Mounted.** Ensure that the sheeting for top mounted flexible delineators is 6 x 12 inches and the sheeting for side mounted flexible delineators is 3 1/2 x 3 1/2 inches.

Submit a certification of compliance, as specified in 106.07, for delineators.

SECTION 912 – PAINTS, COATINGS, TRAFFIC STRIPES, AND TRAFFIC MARKINGS

912.01 PAINTS AND STAINS

912.01.01 Aluminum Paint

Use aluminum paint conforming to AASHTO M 69, Type II. Submit certifications of compliance as specified in 106.07.

912.01.02 Coal Tar Epoxy Paint

Use coal tar epoxy-polyamide paint that conforms to SSPC-Paint No. 16 and is black or dark red in color. Submit certifications of compliance as specified in 106.07.

912.01.03 Concrete Stain

To stain concrete, use a penetrating stain that is a single component, water-based, thermoplastic acrylic emulsion that carries its color and water repellent protection into the concrete. Ensure that the stain conforms to the requirements in Table 912.01.04-1.

Table 912.01.04-1 Requirements for Concrete Stain

Property	Test Method	Requirement
Solids By Weight	ASTM D 2369	57 ± 2 percent
Gloss	ASTM G 23	Flat

Viscosity	ASTM D 562	70 – 75 Krebs Units

Submit certifications of compliance as specified in 106.07.

912.02 COATINGS

912.02.01 Galvanizing (Zinc Coating)

Apply hot-dip galvanized coating to iron and steel plates, pipe, tube, and structural shapes according to ASTM A 123.

Apply hot-dip galvanized coating to iron and steel hardware according to ASTM A 153.

Repair hot dipped galvanized coating on iron and steel plates, pipe, tube, structural shapes, and hardware according to ASTM A 780.

912.03 PERMANENT TRAFFIC STRIPES AND MARKINGS

912.03.01 Traffic Stripes

A. **Epoxy Resin.** For pavement striping, use an epoxy resin that is a 2 component, 100 percent solids formulation conforming to the following requirements:

1. **Color.** Ensure that the material conforms to the initial color requirements in ASTM D 6628.
2. **Yellowness Index.** When tested according to ASTM E 313 (with glass beads), ensure that the white epoxy resin exhibits a maximum 20.00 yellowness index after 72 hours of QUV exposure.
3. **Directional Reflectance.** Ensure that the epoxy resin compound (without glass beads) has a minimum directional reflectance, relative to a magnesium oxide standard, of 80 percent for white and 50 percent for yellow when tested according to ASTM E 1347.
4. **Drying Time.** Ensure that the epoxy resin compounds, when tested according to ASTM D 711, exhibit no pick-up after a 15 minute drying time.
5. **Abrasion Resistance.** When the epoxy resin material is tested according to ASTM C 501, with a CS-17 wheel under a load of 1,000 grams for 1,000 cycles, ensure that the abrasive wear index is no greater than 80. The abrasive wear index is the weight in milligrams that is abraded from the sample under the specified test conditions.
6. **Hardness.** After the epoxy resin material has cured between 72 and 96 hours at 70 °F, ensure that the Shore D hardness is between 75 and 100 when tested according to ASTM D 2240.
7. **Composition.** Ensure that the epoxy resin meets the composition requirements in Table 912.03.01-1.

Table 912.03.01-1 Composition of Epoxy Resin		
Pigment Composition	Percent By Weight	
	Minimum	Maximum
White:		
Titanium Dioxide[1] (ASTM D 476, Type II or III)	18.0	25.0
Epoxy Resin	75.0	82.0
Yellow:		
Organic Non-Lead Yellow	7.0	8.0
Epoxy Resin	75.0	79.0
Titanium Dioxide (ASTM D 476, Type II or III)	14.0	17.0

1. Use titanium dioxide for the entire pigment composition for white epoxy.

8. **Packaging and Shipping.** Ensure that the epoxy resin material is shipped in appropriate containers and plainly marked with the following information:

   a. Manufacturer's Name and Address.
   b. Name of Product.
   c. Lot/Batch Number.
   d. Color.
   e. Net Weight and Volume of Contents.
   f. Date of Manufacture.
   g. Date of Expiration.
   h. Mixing Proportions and Instructions.
   i. Safety Information.

9. **Sampling and Certified Analysis.** Test each batch of material for composition and IR mapping. Do not use material that deviates from the master IR curve. At least 15 days before use, submit to the ME the manufacturer's certified test results for each batch of epoxy resin material to be used on the Project. In addition, the ME will randomly sample epoxy resin for testing.

B. **Glass Beads.** Submit certifications of compliance as specified in 106.07 for each lot of glass beads used on the Contract. For each lot of glass beads, submit test results indicating the parts per million of lead, antimony and arsenic as determined by testing according to Environmental Protection Agency testing method 3052 and testing method 6010B or 6010C. Ensure that glass beads do not contain more than 200 parts per million of lead, 200 parts per million of antimony, or 100 parts per million of arsenic.

1. **Small Glass Beads.** Use small beads conforming to AASHTO M 247, Type 1, with a moisture resistant coating.

2. **Large Glass Beads.** Ensure that the large beads conform to AASHTO M 247, except as follows:

   1. Provide beads with a silane adherence coating.
   2. Ensure that the gradation is as specified in Table 912.03.01-2.

Table 912.03.01-2 Gradation Requirements for Large Glass Beads	
Sieve Size	Percent Passing by Weight[1]
No.10	100
No. 12	95 – 100
No. 14	80 – 95
No. 16	10 – 40
No. 18	0 – 5
No. 20	0 – 2

1. According to ASTM D 1214

912.03.02 Traffic Markings

For traffic markings, use either preformed or hot extruded thermoplastic conforming to AASHTO M 249, except that for preformed thermoplastic, the minimum thickness requirement is 90 mils. Use beads conforming to AASHTO M 247, Type 1, with a moisture resistant coating. Ensure that glass beads do not contain more than 200 parts per million of lead, 200 parts per million of antimony, or 100 parts per million of arsenic.

Submit certifications of compliance, as specified in 106.07, for each batch of materials used on the Contract. For each lot of glass beads, submit test results indicating the parts per million of lead, antimony and arsenic as determined by testing according to Environmental Protection Agency testing method 3052 and testing method 6010B or 6010C.

912.03.03 Raised Pavement Markers (RPM)

Use raised pavement markers (RPMs) made of ductile iron castings with a 2 way, snow-plowable, replaceable prismatic reflector conforming to the following requirements:

1. **Castings.** Provide a ductile iron casting conforming to ASTM A 536, hardened to between 52 and 54 Rockwell "C". Ensure that the castings provided are between 9.25 and 10 inches long, 5.5 and 5.85 inches wide, and 1.70 and 1.92 inches high, and weigh approximately 5.5 pounds. Ensure that each casting is permanently marked with the manufacturer's name and model number.
2. **Epoxy Resin Adhesive.** Set castings in the pavement surfaces using an epoxy resin adhesive conforming to AASHTO M 237, Type IV.
3. **Lenses.** Provide a lens conforming to ASTM D 4383 and Table 912.03.03-1.

Table 912.03.03-1 Requirements for Lenses

Property	Requirement
Nominal Dimensions	4 × 2 × 0.5 inch
Slope of reflecting surface	30 to 35 degrees
Area of each reflecting surface	1.44 to 1.87 square inches

Ensure that the lens has a thin untempered glass bonded to the front surface of the prismatic retroreflective lens face.

4. **Lens to Casting Adhesive.** Attach the reflector to the casting with an adhesive according to the reflector manufacturer's recommendations.

Submit a certification of compliance as specified in 106.07.

912.04 TEMPORARY TRAFFIC STRIPES AND MARKINGS

912.04.01 Latex Paint

For temporary traffic stripes, use latex traffic paint that is a fast-drying white, or non-lead yellow, ready-mixed pigmented binder emulsified in water and capable of anchoring reflective glass beads that are separately applied. Ensure that the color matches FED-STD-595B color chip No. 33538 for yellow and No. 37886 for white. Ensure that the paint has a maximum no-track time of 120 seconds when applied in a wet film. In addition, ensure that the finished product meets the following:

1. Volume of solids is a minimum 61 percent.
2. Total solids are a minimum of 77.5 percent total non-volatiles by weight, when tested according to ASTM D 2369.
3. Weight per gallon is a minimum 14 ± 0.2 pounds per gallon for each color.
4. Hegman Grind is a minimum of 2 Hegman when tested according to ASTM D 1210.
5. Viscosity is between 70 and 95 Krebs Units at 77 °F, when tested according to ASTM D 562.

Use glass beads conforming to AASHTO M 247, Type 1, with a moisture resistance coating. Ensure that glass beads do not contain more than 200 parts per million of lead, 200 parts per million of antimony, or 100 parts per million of arsenic.

Submit a certification of compliance, as specified in 106.07, for latex and glass beads. For each lot of glass beads, submit test results indicating the parts per million of lead, antimony and arsenic as determined by testing according to Environmental Protection Agency testing method 3052 and testing method 6010B or 6010C.

912.04.02 Removable Pavement Marking Tape

A. Temporary Pavement Tape. Use removable pavement marking tape consisting of polymeric backing materials with a retroreflective surface. Ensure that the underside of the tape is pre-coated with a pressure sensitive adhesive to bond the tape to the roadway surface and is capable of withstanding traffic immediately after installation and for the duration of the intended service. Use a primer only if recommended by the manufacturer.

Provide tape that has a minimum skid resistance of 35 British Petroleum Number (BPN) when tested according to ASTM E 303. Do not use lead based pigment in traffic tape. Provide tape that conforms to the requirements specified in Table 912.04.02-1.

Table 912.04.02-1 Requirements for Temporary Pavement Tape

Property	White	Yellow
Minimum Specific Luminance (mcd/sq foot/foot-candles) ASTM D 4061[1]	500	300
Minimum Tensile Stress (psi)[2] ASTM D 638	40	40
FED-STD-595B Color Chip No.	37778	33538

1. Use an entrance angle of 88.76° and an observation angle of 1.05°.
2. Perform tensile stress testing with a testing speed of 6 inches per minute.

Use removable tape that is capable of being removed manually, intact or in large pieces, without the use of solvents, burning, grinding, or blasting and without damage to the underlying surface.

If requested by the RE, provide a certification of compliance, as specified in 106.07, for temporary pavement tape.

B. Removable Black Line Masking Tape. Use black line masking tape that is black in color, non-retroreflective, and a pliant polymer material. Ensure that the color conforms to FED-STD-595B color chip No. 37030. Provide tape that does not produce a sheen under day, night, or wet conditions. Ensure that the tape is capable of masking the underlying stripes so that they do not reflect through. Provide tape that has a minimum skid resistance of 30 BPN when tested according to ASTM E 303. Ensure that the underside of the tape is pre-coated with a pressure sensitive adhesive to bond the tape to the roadway surface and is capable of withstanding traffic immediately after installation and for the duration of the intended service.

Ensure that the removable tape is capable of being removed manually, intact or in large pieces, at temperatures above 40 °F, without the use of solvents, burning, grinding, or blasting and without damage to the underlying surface.

If requested by the RE, provide a certification of compliance, as specified in 106.07, for removable black masking tape.

912.04.03 Temporary Pavement Markers

Provide temporary pavement markers that have a maximum width of 4 inches perpendicular to traffic and a maximum height of 3/4 inch. Mold marker castings using acrylonitrile butadiene styrene, acrylic, polycarbonate, or high impact polystyrene of the same color as the retroreflective lens.

Use either mono-directional white or bi-directional yellow retroreflective lenses as shown on the Plans. Ensure that the lenses used for the retroreflective material are molded of methylmethacrylate conforming to ASTM D 788, PMMA0131V0, or PMMA0231V0 and meet the retroreflectance values specified in Table 912.04.03-1:

Table 912.04.03-1 Retroreflectance Requirements for Temporary Pavement Markers

Observation Angle (Degrees)	Entrance Angle (Degrees)	White (mcd/foot-candles)	Yellow (mcd/foot-candles)
0.2	0.0	2.0	1.4
0.2	20	1.0	0.7

Ensure that the underside of the marker is precoated with a pressure sensitive adhesive to bond the marker to the roadway surface and is capable of withstanding traffic immediately after installation and for the duration of the intended service. Ensure that markers are capable of being removed without damage to the underlying surface.

If requested by the RE, provide a certification of compliance, as specified in 106.07, for temporary pavement markers.

SECTION 913 – GUIDE RAIL, FENCE, RAILING, AND BOX BEAM

913.01 BEAM GUIDE RAIL

913.01.01 Rail Element

Fabricate rail element according to AASHTO M 180, Class A, Type I in Table 2. Ensure that the weight of the zinc coating conforms to AASHTO M 180, Type I in Table 1.

Submit a certification of compliance as specified in 106.07.

913.01.02 End Treatments

For 27 1/4 inch high guide rail, use non-gating guide rail end treatment that is NCHRP 350 test level 3 (TL-3) tested, approved, and are listed on the QPL.

For 31 inch high Midwest Guardrail System (MGS), use non-gating guide rail end treatment that is MASH test level 3 (TL-3) tested, approved, and are listed on the QPL.

Submit a certification of compliance as specified in 106.07.

913.02 Posts and Blockouts

For steel posts and blockouts, use structural steel conforming to ASTM A 709, Grade 36, that is galvanized according to ASTM A 123.

Use wood timber blockouts and posts as specified in 915.01.

For 27 1/4 inch high guide rail, use synthetic routed blockouts that are NCHRP 350 test level 3 (TL-3) tested, approved, and are listed on the QPL. Ensure that the name of the manufacturer and model number are stamped on each blockout and that the blockouts are of the same material and dimensions as the spacers that were NCHRP tested.

For 31 inch high Midwest Guardrail System (MGS), use synthetic routed blockouts that are MASH test level 3 (TL-3) tested, approved, and are listed on the QPL. Ensure that the name of the manufacturer and model number are stamped on each blockout and that the blockouts are of the same material and dimensions as the spacers that were MASH tested.

Provide certifications of compliance, as specified in 106.07.

913.02.01 Rub Rail

For rub rail, use steel channels or bent plate of structural steel conforming to ASTM A 36 and galvanized according to ASTM A 123.

Submit a certification of compliance as specified in 106.07.

913.02.02 Miscellaneous Hardware

Ensure that connections or splices, nuts, bolts, washers, and plates conform to AASHTO M 180, except as follows:

1. If high-strength bolts are shown on the Plans for bridge guide rail, use high-strength bolts, nuts, and washers conforming to ASTM A 325, Type I, and galvanized according to ASTM A 153.
2. For base plate assemblies on bridge guide rail, use an adhesive anchor system with galvanized bolts as specified in 908.01.04 or galvanized anchor bolts, nuts, and washers as specified in 908.01.03.
3. Use plates for guide rail on bridges and buried guide rail terminals conforming to ASTM A 36 and galvanized according to ASTM A 123.

Submit a certification of compliance as specified in 106.07. The ME may randomly inspect hardware for quality assurance.

913.03 FENCE

913.03.01 Chain-Link Fence

Ensure that the materials for chain-link fence conform to AASHTO M 181. Submit certifications of compliance, as specified in 106.07, for fence materials. Attach mill certification to the certification of compliance.

913.03.02 Caution Fence

Ensure that the materials for caution fence conform to the following:

1. **Fabric.** Fabricate the fabric for plastic caution fence from HDPE with a minimum tensile strength of 5,000 pounds per square inch when tested according to ASTM D 648. Use fabric that is blaze orange in color that matches FED-STD-595B color chip No. 38915 and is ultraviolet stabilized.
2. **Posts.** Use posts made of high carbon steel with a flanged leg channel section or flanged leg U-bar section having a uniform thickness of metal of not less than 1/8 inch. Ensure that the posts weigh at least 2 pounds per linear foot, exclusive of ground plate, and are designed to be easily driven into the ground. Equip each post with at least 11 riveted lugs. Do not equip posts with punched or welded lugs. Galvanize posts.

913.03.03 Snow Fence

Ensure that the materials for snow fence conform to the following:

1. **Wires.** Use wires of a galvanized stay-cable type, with a diameter of not less than 12 1/2 gauge.
2. **Wooden Pickets.** Use unpainted, wooden pickets made from cedar, spruce, maple, or other satisfactory species of wood. Ensure that the pickets are free from knots with a diameter greater than one-half of the width of the picket.
3. **Posts.** Use posts as specified in 913.02.02.2.

Submit certifications of compliance, as specified in 106.07, for fence materials.

SECTION 914 – JOINT MATERIALS

914.01 PREFORMED JOINT FILLER

Use preformed joint fillers conforming to AASHTO M 33 or AASHTO M 213. For concrete pavement applications, punch holes in preformed joint filler to admit the dowels. Provide the filler for each joint in a single piece for the full depth and width required for the joint. If the RE approves the use of more than 1 piece for a joint, fasten the abutting ends securely, and hold to shape by stapling or other means of means of positive fastening.

Submit a certification of compliance, as specified in 106.07, for joint filler.

914.02 JOINT SEALER

For sealing joints and cracks in HMA and concrete pavements, use a hot-poured joint sealer that is listed on the QPL and conforms to ASTM D 6690. Use the following types in the listed applications:

1. For sealing cracks in HMA, use Type II sealer.
2. For sealing cracks and joints in concrete pavement and HMA saw and seal applications, use Type IV sealer.
3. In structural applications, use Type II sealer.

For concrete pavements, use cold-poured joint sealer that is listed on the QPL and conforms to ASTM D 5893, Type SL, except that

ultimate elongation is required to be a minimum of 1,200 percent.

In vertical applications, use cold-poured joint sealers that are listed on the QPL and conform to ASTM D 5893, Type NS, with a minimum ultimate elongation of 600 percent. If recommended by the manufacturer, apply primer before applying the sealer.

Use backer rod in conjunction with cold-poured joint sealer that conforms to ASTM D 5249, Type 1. Use backer rod with a width that is at least 25 percent greater than the width of the pavement joint or crack. Ensure that the backer rod is clean and dry at the time of installation.

Submit a certification of compliance, as specified in 106.07, for joint sealers and backer rods. Attach test results to the certification. The ME will randomly sample joint sealers at the source of manufacture or at the work site.

SECTION 917 – LANDSCAPING MATERIALS

917.01 TOPSOIL

Provide approved topsoil containing no stones, lumps, roots, or similar objects larger than 2 inches in any dimension. Ensure that topsoil meets the following quality standards:

1. **Unacceptable Topsoil Sources.** Do not obtain topsoil from the following sources:
   a. Areas containing chemically contaminated soils.
   b. Areas from which the original surface has been stripped or covered over, such as borrow pits, open mines, demolition sites, dumps, and landfills.
   c. Wet excavation.
   d. Acid producing soils.
2. **pH.** Provide topsoil that conforms to the pH requirements specified in Table 917.01-1 when tested according to ASTM D 4972.

Table 917.01-1 Requirements for pH of Topsoil

pH Range	Acceptability/Remediation
pH < 4.1	Topsoil is unacceptable.
4.1 ≤ pH < 5.8	Add pulverized lime to increase the pH to 6.5 before use.
5.8 ≤ pH < 7.0	Topsoil is acceptable. No remediation needed.
7.0 ≤ pH < 7.2	Decrease pH to at least 6.8 before use.[1]
pH ≥ 7.2	Topsoil is unacceptable.[2]

1. Obtain Departmental approval of remediation method to lower pH.
2. The Department may approve the use of existing topsoil stripped from the Project.

3. **Organic Content.** Ensure that topsoil has a minimum organic content of 2.75 percent by weight. If the organic content is less than 2.75 percent, increase the organic content by adding soil additives, as specified in 917.02, at a rate necessary to attain the minimum organic content. The Department will determine the organic content of soils according to AASHTO T 194, except that the sample is to be taken from oven-dried soil passing a No. 10 sieve.
4. **Gradation/Particle Size.** Provide topsoil conforming to the particle size requirements in Table 917.01-2 and that has no more than 20 percent retained on a No. 10 sieve when mechanically graded. The Department will determine the particle size distribution for the portion of the topsoil passing the No. 10 sieve using hydrometer analysis according to AASHTO T 88.

Table 917.01-2 Particle Size Distribution for Topsoil

Particle Size	Percent
Sand (2.0 mm to 0.05 mm)	40 – 80
Silt (0.05 mm to 0.005 mm)	0 – 30
Clay (0.005 mm and smaller)	10 – 30[1]

1. If more than 50 percent of the sand portion is larger than 0.5 millimeters, the allowable range for clay is 15 to 30 percent.

The Department will sample all topsoil sources at a rate of at least 1 sample per source to ensure conformance to the requirements. The Department may approve topsoil obtained from stripping even when it does not pass all of the testing quality requirements.

917.02 SOIL ADDITIVES

917.02.01 Compost

Use compost that is a stable, humus-like organic material produced by the biological and biochemical decomposition of source-separated compostable materials. Materials used in producing compost may include leaves, yard trimmings, food scraps, food processing residuals, manure, other agricultural residuals, forest residues, bark, and paper. Do not add non-organic materials such as sand, soil, or glass to the compost. Ensure that the compost contains no heavy metals or substances toxic to plants and has no objectionable odor. Ensure that the raw materials have decomposed sufficiently to be unrecognizable and that the compost meets the requirements of Table 917.02.01-1.

Table 917.02.01-1 Requirements for Compost

Property	Test Method	Requirement
Organic Content, minimum	ASTM D 2974	30 %
Moisture Content	ASTM D 2974	35 – 60 %
Particle Size (percent passing the 1" sieve)	AASHTO T 27	100 %
pH	TMECC 04.111[1]	5.5 – 8.0
Maturity	Solvita Maturity Test	6 or higher
Soluble Salt, maximum	Determined using 1 part compost to 1 part distilled water	4.0 mmhos/cm

1. Electrometric pH determination according to the Test Methods for the Examination of Composting and Compost (TMECC) by the US Composting Council

Provide compost that is either commercially packaged or in bulk form. Obtain compost material from NJDEP regulated, permitted or approved facilities. For shipments of compost, provide delivery tickets with the certified weight and the name of the producer or supplier. The Department may take samples to verify the organic content, pH, and water content.

917.02.02 Fertilizer

Use fertilizer for establishing turf and sod that is a minimum 20 percent slow release nitrogen that matches the needs determined by soil testing in accordance with P.L 2010, Chapter 112.

If the fertilizer is to be applied with mechanical spreader in dry form, ensure that a minimum of 75 percent passes a No. 8 sieve, a minimum of 75 percent is retained on a No. 16 sieve, and the maximum free moisture content is 2 percent.

With each delivery of fertilizer, provide a delivery ticket showing the weight and a certified chemical analysis of the composition of the fertilizer from the manufacturer.

917.02.03 Pulverized Limestone

Use pulverized limestone composed of more than 85 percent calcium and magnesium carbonates equivalent to more than 40 percent calcium and magnesium oxides.

With each delivery of pulverized limestone, provide a delivery ticket indicating its weight and a certified analysis of the chemical composition and gradation, including calcium and magnesium oxide equivalents.

917.03 SEED MIXTURES

917.03.01 Grass Seed Mixtures

Provide grass seed mixtures that are not older than the sell by date and that conform to the requirements specified in Table 917.03.01-1 through Table 917.03.01-7.

Table 917.03.01-1 Type A Grass Seed Mixture

Kind of Seed	Minimum Purity, Percent	Minimum Germination, Percent	Percent of Total Weight of Mixture
Kentucky Bluegrass	85	75	20
Red Fescues (Creeping or Chewings)	95	80	35
Kentucky 31	95	80	20
Redtop	92	85	10
Perennial Ryegrass	98	85	10
White Clover	97	90	5

Table 917.03.01-2 Type A-3 Grass Seed Mixture

Kind of Seed	Minimum Purity, Percent	Minimum Germination, Percent	Percent of Total Weight of Mixture
Tall Fescue	95	80	60
Kentucky Bluegrass	85	75	10
Chewing or Hard Fescue	95	85	20
Perennial Ryegrass	98	85	10

Table 917.03.01-3 Type A-4 Grass Seed Mixture

Kind of Seed	Minimum Purity, Percent	Minimum Germination, Percent	Percent of Total Weight of Mixture
Spreading Fescue	95	80	30
Chewing or Hard Fescue	95	85	30
Kentucky Bluegrass	85	75	30
Perennial Rye	98	85	10

Table 917.03.01-4 Type B Grass Seed Mixture

Kind of Seed	Minimum Purity, Percent	Minimum Germination, Percent	Percent of Total Weight of Mixture
Redtop	92	85	10
Red Fescues (Creeping or Chewings)	95	80	55
Blackwells Switchgrass	95	85	15
Perennial Ryegrass	98	85	5
Kentucky 31	95	80	15

Table 917.03.01-5 Type D Grass Seed Mixture			
Kind of Seed	Minimum Purity, Percent	Minimum Germination, Percent	Percent of Total Weight of Mixture
Kentucky Bluegrass	85	75	50
Red Fescues (Creeping or Chewings)	95	85	35
Redtop	92	85	5
Perennial Ryegrass	95	80	10

Table 917.03.01-6 Type F Grass Seed Mixture		
Kind of Seed	Minimum Purity, Percent	Minimum Germination, Percent
Perennial Ryegrass	95	90

Table 917.03.01-7 Type W Wetland Grass Seed Mixture			
Kind of Seed	Minimum Purity, Percent	Minimum Germination, Percent	Percent of Total Weight of Mixture
Blackwell Switchgrass (*Panicum virgatum*)	95	85	25
Virginia Wildrye (*Elymus virginicus*)	95	85	25
Red Top (*Agrostis alba*)	92	85	25
Annual Rye (*Lolium multiflorum*)	85	85	25

917.03.02 Wildflower Seed Mixture

Provide a wildflower seed mix prepared by an established and reputable seed company employing professional seed consultants that conforms to the following requirements:

1. Contains a mixture of 15 - 20 predominantly native species suitable for the appropriate geological region and specific site conditions.
2. Contains a combination of annuals (minimum 1, maximum 5 species) and perennials (fall seeding will not require annuals).
3. Contains species providing a food source for pollinators.
4. Has a purity of 95 - 99 percent and a minimum germination rate of 85 percent.
5. Has an application rate of 8 - 24 pounds per acre depending on actual seed mixture composition and as recommended by the seed consultant.
6. Contains sheep fescue at the rate of 1/4 pound per 1/2 pound of wildflower.

917.03.03 Shipment and Certification

With each shipment of seed mixture, provide a certified weigh ticket and an analysis of the composition, purity, germination, germination test date, and sell by date of the seed mixture, certified by the seed house.

The Department may sample and test seed according to the New Jersey State Seed Law and with the Rules and Regulations for Testing Seeds adopted by the Association of Official Seed Analysts.

917.04 MULCH

917.04.01 Straw

Use straw that is derived from threshed, unrotted stalks of oat, wheat, rye, or barley and that is relatively free from seeds, noxious weeds, and other foreign material.

917.04.02 Wood Cellulose Fiber

Use wood cellulose fiber containing no growth or germination inhibiting materials. With each shipment, provide a manufacturer's certification indicating composition and weight.

917.04.03 Shredded Wood and Wood Chip

Use shredded wood mulch produced by a shredding machine that produces a wood particle varying in size from 5/8 to 3 inches, or use wood chip mulch produced by a wood chipping machine that produces a wood particle varying in size from 5/8 to 3 inches.

Ensure that the shredded wood mulch and wood chip mulch are clean, hard, and not decomposed and contain no leaves, twigs, wood shavings, dirt, stones, toxic material, or other foreign material. Do not use wood pallets, chemically treated wood, or materials from building demolition to produce mulch. Ensure that the pH is above 3.0.

Submit samples of shredded or wood chip mulch before delivery to the Project. The Department will visually inspect each shipment of shredded or wood chip mulch. Obtain the Department's approval before using wood mulch that is produced within the Project Limits.

With each shipment, provide a delivery ticket and a certification that the material was not derived from wood pallets, chemically treated wood, or material from building demolition.

917.04.04 Shredded Hardwood Bark

Use shredded hardwood bark mulch derived from the bark of hardwood trees. Ensure that it contains no leaves, twigs, wood shavings, dirt, stones, weed seeds, toxic material, or other foreign material. With each shipment, provide a delivery ticket indicating source and weight of the shredded hardwood bark.

917.04.05 Stone

For stone mulch, use coarse aggregate No. 4, as specified in 901.03.01. Before use, submit a sample for the Department's approval of size and color. With each shipment, provide a delivery ticket indicating source and weight of the stone mulch.

917.04.06 Gravel

For gravel mulch, use an uncrushed washed gravel No. 4, as specified in 901.03.02. Before use, submit a sample for the Department's approval of size and color. With each shipment, provide a delivery ticket indicating source and weight of the gravel mulch.

917.05 TACKIFIERS

Provide one of the following tackifiers for straw mulch:

1. **Synthetic Plastic Emulsion.** Use synthetic plastic emulsion that is miscible with all normally available water when diluted to any proportions, is not soluble or dispersible in water after drying, and remains tacky until the grass seed has germinated. Ensure that the plastic binder is physiologically harmless and does not have phytotoxic or crop-damaging properties.
2. **Vegetable Based Gels.** Vegetable based gels are naturally occurring powder-based hydrophilic additives formulated to produce gels and form membrane networks of water insoluble polymers after curing. Ensure that the vegetable gel is physiologically harmless and does not have phytotoxic or crop-damaging properties.

917.06 TOPSOIL STABILIZATION MATTING

917.06.01 Type 1 Mat

Provide Type 1 Mats conforming to the following:

1. **Excelsior Mat.** Provide wood excelsior, 48 ± 1 inch in width and weighing 0.8 pounds per square yard ±5 percent that is covered on both sides with a biodegradable netting to facilitate handling and to increase strength.

2. **Jute or Coconut Fiber (Coir) Mat.** Provide a cloth of a uniform plain weave of undyed and unbleached single jute or coir yarn, 48 ± 1 inch in width and weighing an average of 1.2 pounds per linear yard of cloth with a tolerance of ±5 percent, with approximately 78 warp ends per width of cloth and 41 weft ends per linear yard of cloth. Ensure that the yarn is of a loosely twisted construction having an average twist of not less than 1.6 turns per inch and does not vary in thickness by more than one-half its normal diameter.

917.07 SOD

Machine cut sod at a uniform soil thickness of 5/8 - 3/4 inch at the time of cutting. Exclude top growth and thatch when measuring for thickness. Ensure that individual strips of sod are of a uniform width. The Department may reject broken strips and torn or uneven strips. If using strip sod, ensure that the strips of sod are strong enough to support their own weight and retain their size and shape when suspended vertically from the upper 10 percent of the strip. If using rolled sod, ensure that the sod is strong enough to be mechanically laid and adjusted without tearing.

Use sod that is Kentucky Bluegrass blend or Kentucky Bluegrass-fescue blend, fescue blend or as specified in the Special Provisions, inspected and certified by the New Jersey Department of Agriculture. Fasten sod on slopes using pegs of wood lath or similar pieces of wood that are at least 9 inches long. Submit certification at the time of delivery that lists the blend of grass seed used.

917.08 PLANT MATERIALS

A. **Nomenclature.** Plant materials are trees, shrubs, vines, seedlings, ground covers, perennials, bulbs, corms, tubers, ornamental grasses, and other plants conforming to the American Standard for Nursery Stock (ANSI Z60.1) sponsored by the American Nursery and Landscape Association. *Hortus III* is the authority for all plant names. Ensure that all plants are legibly labeled with their botanical names, including English name, genus, species, variety, and cultivar.

B. **Quality Requirements.** All plant material shall be grown in the same Plant Hardiness Zone as the project location according to the 2012 USDA Plant Hardiness Zone Map. Ensure that the plant materials are healthy, vigorous, and true to species, variety, and cultivar, with well-developed branch and root systems typical of the genus, species, variety, and cultivar. Use plant materials that are free from disfiguring knots, gall, sun scald injuries, bark abrasions, fresh or healed mechanical wounds, or other objectionable disfigurements. Ensure that the average plant size falls within the middle of the allowable size range. The Department will reject plant materials that are weak or thin or that have been cut back from larger grades. Ensure that container-grown plants are well established in the container and have a root mass that will retain its shape and hold together when removed from the container, but that does not exhibit circling or kinked roots. Do not use collected or salvaged plant material except as specified. Provide certifications to the RE that the plant materials were inspected for diseases and infestation according to the applicable Federal, State, and local laws, rules and regulations.

1. **Trees.** Ensure that the following quality standards are met:
   a. Tree crowns are well balanced, symmetrical, and typical for the genus, species, and cultivar.
   b. Trees have a single, relatively straight, central leader and tapered trunks and are free of co-dominant stems and vigorous upright branches that compete with the central leader. Ensure that if the original leader has been headed, a new leader at least 1/2 the diameter of the original leader is present.
   c. Main branches exhibit uniform scaffolding both radially around and vertically along the trunk, are well spaced with diameters no greater than 2/3 the diameter of the trunk measured 1 inch above the branch, and are free of included bark.
   d. Trunk diameters and tapers are sufficient so that the trees will remain vertical without the support of a nursery stake.
   e. Root collars (root crowns) and large roots are free of circling or kinked roots.
2. **Shrubs.** Ensure that the following quality standards are met:
   a. Shrubs have the correct number of canes for the genus, species, cultivar and size, and are not several individual plants combined to appear as one plant.
   b. Branches and canes are strong enough to support themselves.
   c. Roots are well developed and free of circling or kinks.
   d. Container grown plants are transplanted and grown in the same container for a sufficient period of time so that new fibrous roots have developed and the root mass will retain its shape and hold together when removed from the container.
3. **Perennial Plants.** Ensure that the following quality standards are met:

a. Provide bulbs, corms, and tubers that are firm, free of rot and disease, and were not previously frozen.
b. For *Hemerocallis*, provide plants that are established and have 1 to 2 fan divisions with a heavy root system. Ensure that container grown plants were transplanted and grown in the same container for a sufficient period of time so that new fibrous roots have developed and the root mass will retain its shape and hold together when removed from the container.
c. For *Narcissus*, provide bulbs that are, at a minimum, large size grade designated as DNII or RDII.
d. For other perennials, flowers, and ornamental grasses, provide plants according to the supplier's recommendations for each individual cultivar. Ensure that plants are established plants and are a single species plant grown, or transplanted and grown, in the same container for a sufficient period of time so that fibrous roots have developed and so that the root mass will retain its shape and hold together when removed from the container.

C. Substitutions. To request substitutions, provide written verification to the Department that an attempt was made to locate the contract item at a minimum of 9 different nursery sources that would normally supply the item, but that the item was found to be unavailable for planting for each available optimum planting season before the Completion. Upon receipt of the documentation, the Department may allow alternates for unavailable plant materials. Do not make substitutions without the Department's approval.

D. Ball Sizes for Nursery Grown Trees and Shrubs. Ensure that the ball sizes of nursery grown trees and shrubs conform to the requirements specified in Table 917.08-1 through Table 917.08-5.

Table 917.08-1 Required Ball Sizes of Shade Trees and Deciduous Shrubs

Shade Trees		Deciduous Shrubs	
Caliper (inches)	Minimum Diameter (inches)	Height (feet)	Minimum Diameter (inches)
1/2 – 3/4	12	1 – 1 1/2	8
3/4 – 1	14	1 1/2 – 2	9
1 – 1 1/4	16	2 – 3	10
1 1/4 – 1 1/2	18	3 – 4	12
1 1/2 – 1 3/4	20	4 – 5	14
1 3/4 – 2	22	5 – 6	16
2 – 2 1/2	24	6 – 7	18
2 1/2 – 3	28	7 – 8	20
3 – 3 1/2	32	8 – 9	22
3 1/2 – 4	38	9 – 10	24
4 – 4 1/2	42	10 – 11	26
4 1/2 – 5	48	–	–
5 – 5 1/2	54	–	–

Table 917.08-2 Required Ball Sizes of Small Trees

Height (feet)	Minimum Diameter (inches)	Caliper (inches)	Minimum Diameter (inches)
1 1/2 – 2	10	3/4 – 1	16
2 – 3	12	1 – 1 1/2	18
3 – 4	13	1 1/2 – 1	20
4 – 5	15	3/4	22
5 – 6	16	1 3/4 – 2	24
6 – 7	18	2 – 2 1/2	28
7 – 8	20	2 1/2 – 3	32

8 – 9	22
9 – 10	24
10 – 12	26
–	–
–	–

3 – 3 1/2	38
3 1/2 – 4	42
4 – 4 1/2	48
4 1/2 – 5	54
5 – 5 1/2	–

Table 917.08-3 Required Ball Sizes of Columnar Conifers			
Regular Growing Type		Rapid Growing Type	
Height (feet)	Minimum Diameter (inches)	Height (feet)	Minimum Diameter (inches)
1 – 1 1/2	10	1 – 2	8
1 1/2 – 2	10	2 – 3	9
2 – 3	12	3 – 4	11
3 – 4	13	4 – 5	12
4 – 5	14	5 – 6	14
5 – 6	16	6 – 7	16
6 – 7	18	–	–
7 – 8	20	–	–
8 – 9	22	–	–
9 – 10	24	–	–
10 – 12	27	–	–
12 – 14	30	–	–
14 – 16	33	–	–
16 – 18	36	–	–
18 – 20	40	–	–

Table 917.08-4 Required Ball Sizes of Conifers and Broadleaf Evergreens			
Spreading, Semi-Spreading, and Globe or Dwarf Type		Conical and Broad Upright Type	
Height (feet)	Minimum Diameter (inches)	Height (feet)	Minimum Diameter (inches)
3/4 – 1	8	1 1/2 – 2	10
1 – 1 1/4	9	2 – 3	12
1 1/4 – 1 1/2	10	3 – 4	14
1 1/2 – 2	10	4 – 5	16
2 – 2 1/2	12	5 – 6	20
2 1/2 – 3	14	6 – 7	22
3 – 3 1/2	16	7 – 8	24
3 1/2 – 4	18	8 – 9	27
4 – 5	21	9 – 10	30
5 – 6	24	10 – 12	34
6 – 7	28	12 – 14	38
7 – 8	32	14 – 16	42
8 – 9	36	16 – 18	46
–	–	18 – 20	50

Table 917.08-5 Container Sizes		
Container	Minimum Diameter (inches)	Minimum Depth (inches)
4 "	4	4
No. 1	7	7
No. 2	8	9
No. 3	10	10
No. 5	11	10
No. 7	12	14
No. 10	15	15
No. 15	17	15

E. **Ball Sizes for Collected Trees and Shrubs.** Ensure that the ball sizes of collected trees and shrubs are greater than or equal to that specified for the next larger size for nursery grown trees and shrubs. Consider trees grown in plantations, reforestation plantations, or without the benefit of root pruning as collected material, and ball and burlap the trees as specified for collected trees.

F. **Ball Depths.** Ensure that balls are of sufficient depth to encompass the fibrous and feeding root system necessary for the full recovery of the plant and conform to the requirements specified in Table 917.08-6.

Table 917.08-6 Required Ball Depths			
Diameter of ball[1], inches	Up to 20	Over 20 to 30	Over 30 to 48
Minimum depth of ball[1], percentage of diameter	75	67	60
1. Dimensions may vary according to site and type of plant material as provided in the American Standard for Nursery Stock.			

G. **Plant Support Materials.** Provide the following materials, as necessary, to support plants during the establishment period:

1. **Posts.** Use white cedar posts that have a diameter of not less than 2 or more than 3 inches at the thinner end, or use wooden posts that have a nominal size of 2 × 2 inches, of solid, reasonably knot free lumber. Ensure that the length of either post is one-half the height of the plant to be supported, plus a minimum of 2 feet for setting in the ground, except the maximum overall length of any post is 8 feet.
2. **Wood Guy Stakes.** Use wood guy stakes with a nominal size 2 × 4 inch lumber with a minimum length of 2 feet of solid and reasonably knot free wood, or use 2 1/2 inch diameter white cedar with a minimum length of 2 feet. Measure the diameter of the cedar stakes at the thinner end. Ensure that the stakes are pointed on the thinner end. Notch guy stakes 4 inches from the top for fastening the guy wires.
3. **Guy Wire.** Use 14 gauge steel wire for guy wire.
4. **Hose.** Use 1/2 inch OD black corded-rubber hose.
5. **Tree Protectors.** Use one of the following tree protectors:
   a. Plastic, wrap-around-the-trunk type, dark brown, dark gray, or dark green in color.
   b. Wire mesh, 1/4 × 1/4 inch mesh, forming a 6 inch diameter cylinder around the trunk, with the abutting edges fastened together with wire.

H. **Inspection.** Inspect and seal all plants with serialized cargo seals in the nursery before they are shipped. If requested by the Department, make the following available for inspection:

1. Containerized plants before shipping and in-ground plants before digging.
2. Delivered plants.
3. Plants during installation.

The Department may inspect plant materials before delivery to the Project Limits and upon delivery to the Project Limits before installation. The Department may seal the inspected plant materials. For plant material originating

from nurseries further than 100 miles from the Project Limits, stock plant material at a Contractor-provided holding yard that is acceptable to the Department. The Department may inspect plant material originating from nurseries within 100 miles of the Project Limits at the nursery. Ensure that all plant material is untied and located so that trunk or stem and branch structure can be easily inspected. Provide sufficient notice to allow Department inspection at the nursery or holding yard and to allow time for Contractor reordering of rejected material. Notify the RE at least 72 hours, unless otherwise specified in the Special Provisions, in advance of delivery to the Project Limits for installation. The Department may reject materials arriving with broken or missing seals, broken or loose balls, broken or pruned leaders, insufficient protection, or that have been damaged in transit. The Department may randomly inspect the root system of the plant material by breaking open the earth balls. Provide necessary assistance during Department inspections.

I. **Shipment.** Ensure that deciduous materials have sufficient root systems for the size and species and are completely dormant (this varies by species) when they are dug. To prevent injury to fibrous roots, carefully dig plant materials immediately before shipment. Ball and burlap plant material marked "B&B" on the Plans.

Ensure that the following plant materials are drum laced or machine dug with wire baskets:

1. Shade trees – 1 1/4 inch caliper and larger.
2. Small trees – 1 1/2 inch caliper and larger.
3. Columnar conifers – 6 feet and taller.
4. Spreading, semi-spreading, and globe or dwarf type conifers – 42 inches in diameter and larger.
5. Conical and broad upright type conifers – 5 feet and taller.
6. Spreading, semi-spreading, and globe or dwarf type broadleaf evergreens – 42 inches spread and larger.
7. Conical and broad upright type broadleaf evergreens – 42 inches and taller.

Use biodegradable materials for burlapping and tying. Do not use non-biodegradable materials such as plastic or nylon. Wire baskets will be removed during planting.

Protect material that is shipped in open vehicles to prevent desiccation from exposure to the wind and sun. Adequately ventilate material shipped in enclosed vans or boxcars. At time of delivery, provide a delivery ticket indicating the date and origin of shipment, and the botanical names, sizes, grades, and the quantities of plants. Provide a nursery certification that the plants are true to specified genus, species, and variety, and are of the specified size and quality.

For *Hemerocallis, Narcissus*, bulbs, corms, tubers, roots, rhizomes, and other perennials, provide supplier's certification of botanical name, including genus, species, variety, and cultivar. The Department will verify the variety and cultivar before use on location.

917.09 MISCELLANEOUS LANDSCAPE MATERIALS

917.09.01 Disinfectant

Use methyl alcohol at 70 percent (denatured wood alcohol diluted appropriately with water) or commercial bleach.

917.09.02 Antidesiccant

Use a polyvinyl antidesiccant.

917.09.03 Herbicides

Use a glyphosate based herbicide. Apply herbicides according to N.J.A.C 7:301 *et seq.*

917.09.04 Water Retaining Polymer

Provide water retaining polymers comprised of polyacrylamide polymer granules intended to be used as a planting backfill or topsoil amendment

SECTION 919 – MISCELLANEOUS

919.01 GEOTEXTILES

Provide geotextile rolls with protective wrapping and, before placement, store rolls in a manner that protects against moisture and minimizes exposure to ultraviolet radiation. For applications that are above ground or exposed to ultraviolet radiation, provide geotextiles that are inert to commonly encountered chemicals and are stabilized against ultraviolet light

degradation. Label each roll to provide product identification.

Use geotextiles conforming to the requirements in Table 919.01-1 for the intended use.

Table 919.01-1 Requirements for Geotextiles

Category	Test Method	Class
Subsurface Drainage Geotextile	AASHTO M 288	Class 2
Stabilization Geotextile	AASHTO M 288	Class 1
Temporary Silt Fence[1]	AASHTO M 288	–
Erosion Control Geotextile[2, 3]	AASHTO M 288	Class 1 or 2[2]
Paving Fabric	AASHTO M 288	–

1. Use the same geotextile requirements for both silt fence and heavy-duty silt fence. Reinforce heavy-duty silt fence with wire mesh as shown on the Plans.
2. For inlet filters, use Class 2 for woven monofilament geotextiles or Class 1 for all other types of geotextiles.
3. For inlet filter, Type 2, in addition to the AASHTO M 288 requirements, ensure that the geotextile's burst strength is at least 650 pounds per square inch when tested according to ASTM D 3786.

For geotextiles that are being permanently incorporated into the Contract, submit a certification of compliance as specified in 106.07.

919.02 SEDIMENT CONTROL BAG

Manufacture sediment control bags using polypropylene non-woven geotextiles conforming to the requirements in Table 919.02-1. Manufacture sediment control bag with a fill spout large enough to accommodate a 4 inch discharge hose and with straps to secure the hose and prevent pumped water from escaping without being filtered.

Table 919.02-1 Requirements for Sediment Control Bag Geotextile

Property	Test Method	Requirements
Weight, oz/yd^2, minimum	ASTM D 3776	10
Grab Tensile Strength, lbs, minimum	ASTM D 4632	250
Puncture Strength, lbs, minimum	ASTM D 4833	150
Flow Rate, gal/min/ft^2, minimum	ASTM D 4491	85
Permittivity, sec^{-1}, minimum	ASTM D 4491	1.2
Mullen Burst Strength, psi, minimum	ASTM D 3786	460
UV Stability, % , minimum	ASTM D 4355	70
Apparent Opening Size, mm, maximum	ASTM D 4751	0.150

919.03 HAY AND STRAW

Use stalks of oats, wheat, rye, or barley that is relatively free from seeds, noxious weeds, and other foreign matter as straw. Ensure that the stalks are free from decayed matter and from organic matter soluble in water.

Use timothy, redtop, or native grasses for hay. Bind haybales with wire or baling twine. Use an ultraviolet light stabilized polypropylene twine that has a knot strength of 170 pounds and straight break strength of 300 pounds.

919.04 EPOXY BONDING COMPOUND

For epoxy bonding, use a 2 component, epoxy-resin, bonding system for application to concrete. Ensure that the epoxy bonding compound conforms to ASTM C 881, Type 2, Grade 1 or 2, Class B or C, and is listed on the QPL.

Submit certifications of compliance for epoxy bonding compound as specified in 106.07.

919.05 WATER

Use water in mixing or curing of concrete that is free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product. Ensure that water conforms to AASHTO T 26. The Contractor may use water known to be of potable quality without testing. If the source of water is shallow, enclose the intake to exclude silt, mud, grass, or other foreign materials.

If requested by the ME or RE, submit copies of test results for water.

919.10 SLEEVES

Use Schedule 40 PVC drainage pipe according to ASTM D 2729.

919.11 EPOXY INJECTION MATERIAL

Provide epoxy injection material listed on the QPL that meets the requirements of ASTM C 881, Type I or IV, Grade 1, Class B or C. Submit certifications of compliance for epoxy injection material as specified in 106.07.

919.12 POLYETHYLENE SHEETING

Provide polyethylene sheeting that is at least 10 mil in thickness. For concrete curing process, use white polyethylene sheeting as specified in 903.10.03.

919.13 DETECTABLE WARNING SURFACE

For detectable warning surfaces, use a surface or a coating material that is safety red in color according to FED-STD-595B color chip No. 31350 and has a 35 BPN minimum slip resistance when tested according to ASTM E 303. Ensure that the finished product is stabilized against UV degradation and adheres to the substrate without peeling or blistering.

919.14 POLYESTER MATTING

Provide polyester matting of commercial quality that is a composite of polyester base fiber and vinyl chloride resin and is permeable to air and water, but shall prevent sunlight from reaching the soil. Ensure that the matting resists ultraviolet light, mildew, and algae. Ensure that the matting is self-extinguishing when removed from flame. Ensure that the matting has a minimum thickness of 1/4 inch.

DIVISION 1000 – EQUIPMENT

SECTION 1001 – TRAFFIC CONTROL EQUIPMENT

1001.01 FLASHING ARROW BOARD

Provide Type A and Type C flashing arrow boards according to the MUTCD and the following requirements:

1. Non-reflective, black boards equipped with battery-operated amber lights.
2. A minimum peak luminous intensity of 8,800 candelas and equipped with photocells that will automatically reduce the luminous intensity to 1,500 candelas when the ambient light level drops to 5 foot-candles.
3. A light on the rear face of the board to indicate that the lights are operating.
4. Solid state controls with polarity and surge protection.
5. Panel operation controls mounted in a lockable enclosure.

Ensure flashing arrow boards are equipped with a diesel charged battery system. Do not use gasoline powered systems. With RE approval, the Contractor may use flashing arrow boards equipped with solar charged battery systems in non-moving operations. The Department may require a solar charged battery system in noise sensitive areas.

Securely mount flashing arrow boards on a manufacturer-approved 2 wheeled towing trailer.

1001.02 PORTABLE VARIABLE MESSAGE SIGN

Provide a portable variable message sign capable of displaying messages that are visible under ideal day and night conditions from a minimum distance of 1/2 mile and that are legible from a minimum distance of 900 feet with a viewing angle of at least 25 degrees. Ensure that the portable variable message sign is able to operate in ambient temperatures of −30 to 160 °F and is capable of withstanding wind gusts up to 80 miles per hour when positioned. Provide a portable variable message sign with the following:

1. **Sign Panel.** Provide a sign panel capable of displaying 3 lines of a message, with each line capable of displaying up to 8 characters. Ensure that the characters have a minimum height of 18 inches, a minimum width of 12 inches, and are spaced at least 3 inches apart. Compose characters of a 5 wide by 7 high pixel matrix, with each pixel composed of between 4 and 6 LED lights. Ensure that the LED lights have a dominant wavelength between 585 and 595 nanometers and are set against a black background. Ensure that the LED lights provide a minimum daylight luminance of 1,000 candelas per square meter. Ensure that the sign is equipped with a photocell to automatically reduce the LED lights' luminance to between 30 to 100 candelas per square meter when the ambient light level drops to 5 foot-candles. Ensure that LED lights maintain constant luminance intensity with changes in battery voltage.

   Ensure that the sign panel is covered with an ultraviolet-resistant, clear polycarbonate.

2. **Controller.** Ensure that the controller is unaffected by radio transmissions. Ensure that the controller is capable of displaying 3 messages sequentially. Ensure that controller has an adjustable display rate with a minimum of 3 seconds per phase. Ensure that the controller is capable of storing 100 user programmed messages in nonvolatile memory that will retain the programmed messages when power is interrupted. Provide a controller display screen that allows the operator to review messages before displaying on the message sign. Ensure that the controller display shows the operator all programming instructions. Ensure that the messages are able to be programmed at the sign with an integral or plug-in keyboard, and remotely with a cellular telephone.

   Secure panel controls in a lockable weatherproof enclosure. Prevent unauthorized access to the controller by requiring a password to the keyboard. Prevent unauthorized remote access by requiring a password. If the correct password is not entered within 60 seconds of initial phone contact, the phone call will terminate.

3. **Power Source.** Equip portable variable message signs with either a diesel charged or a solar charged battery system. Ensure that the variable message sign is also capable of operating on 120 volt AC electrical service. The Department may require a solar charged battery system in noise sensitive areas. Provide the power with a battery back up system capable of providing continuous operation when the primary power source fails. Ensure that the power source meets the following requirements:

   a. **Diesel.** Ensure that the fuel tank is capable of operating the sign for a period of 72 hours without refueling. Equip with an exhaust muffler and a United States Department of Forestry approved spark arrester. Ensure that the engine is shock mounted to reduce vibration and locked in a ventilated enclosure.

   b. **Solar.** Provide solar panels capable of recharging the batteries at a rate of 4 hours of sun for 24 hours of sign usage. Ensure that the battery capacity is capable of operating the sign for a period of 18 days without sunlight.

4. **Structural Support System.** Mount the variable message sign on a portable 2 wheeled trailer. Ensure that the sign panel is capable of being raised or lowered during sustained wind speeds of 30 miles per hour. Ensure that the sign panel is capable of being locked into position and is capable of being positioned at the proper height and orientation required for visibility according to the MUTCD.

SECTION 1002 – COMPACTION EQUIPMENT

1002.01 PNEUMATIC-TIRED COMPACTOR

Provide a self-propelled, 2 axle, pneumatic-tired compactor equipped with pneumatic tires mounted to completely cover the area to be compacted in a single pass. Provide compactors with a minimum width of 5 feet. Ensure that the wheels on at least 1 axle oscillate vertically, either independently or in pairs. Equip wheels with smooth, wide-tread compactor tires of equal size and diameter. Ensure that the compactor is capable of producing a uniform, ground contact pressure on a level, unyielding surface through a range of 60 to 95 pounds per square inch on all wheels.

Uniformly inflate all tires. Ensure that tire pressures do not vary by more than 5 pounds per square inch. Provide charts and tabulations showing the contact areas and contact pressures for the full range of tire inflation pressures and for the full range of loadings for the tires used. Maintain operating tire contact pressure using ballast, and do not allow tire inflation pressure combinations to exceed the recommendations of the Tire and Rim Association Incorporated for the applicable tire size and ply rating. Do not provide wobble-wheeled compactors.

1002.02 DYNAMIC COMPACTOR

Provide a vibratory roller or vibratory pad-type compactor capable of operating at the optimum frequency of vibration required for the size and type of compactor used and for the type of material being compacted. Mount on the vibratory

roller a readily visible instruction plate containing the manufacturer's recommended operating frequency, amplitude, and roller speed.

Provide vibratory pad type compactors when access with a vibratory roller is not practical.

1002.03 STEEL-WHEEL ROLLER

Provide a power-driven, 2 axle tandem roller with a load of at least 250 pounds per inch of width of tread of drive roll and a total ballasted weight of at least 8 tons.

1002.04 PADFOOT ROLLER

Provide a tamping type or padfoot roller, with 1 or more cylinders, having pads of not less than 6 1/2 inches in length and capable of developing a pressure of not less than 200 pounds per square inch of bearing surface when a complete row of pads is in contact with a level surface.

SECTION 1003 – HMA SITE EQUIPMENT

1003.01 MATERIALS TRANSFER VEHICLE (MTV)

Ensure that the MTV is capable of independently delivering HMA from the hauling equipment to the paving equipment. Ensure that the MTV is equipped with a high-capacity truck unloading system to receive mixtures; a storage system capable of holding at least 15 tons of HMA; and a discharge conveyor capable of swiveling to either side to deliver HMA to the paving spreader while allowing the MTV to operate from an adjacent lane. Ensure that the MTV is equipped with an automatic audible warning signal when operating in reverse.

Provide a paver hopper insert with a minimum capacity of 14 tons in the hopper of conventional paving equipment.

Provide a remixing system to continuously blend the HMA before placement. Remixing may occur within the MTV or in the paver hopper.

1003.02 HMA CURB MACHINE

Provide a self-propelled, automatic HMA curb machine specifically designed to produce HMA curb, or a paver with attachments that produces curb of uniform texture, shape, and density.

1003.03 HMA PAVER

For paving widths of 8 feet or more, provide a self-propelled HMA paver with an activated screed or strike-off assembly capable of spreading and finishing HMA in the lane widths and thicknesses required. Ensure that the paver is capable of being operated at forward speeds consistent with satisfactory laying of the mixture. Ensure that the paver is equipped with an automatic audible warning signal when operating in reverse.

Ensure that the paver is also equipped with the following:

1. **Receiving Hopper and Distribution System.** Ensure that the receiving hopper is equipped with a distribution system capable of placing the HMA uniformly in front of the screed.
2. **Screed or Strike-off Assembly.** Ensure that the screed or strike-off assembly produces finished surface of the required evenness and texture without tearing, shoving, or gouging the HMA. Ensure that the screed or strike-off assembly compacts the full width of the course being laid.
3. **Screed Heater.** Ensure that the paver is equipped with a system for heating the screed or strike-off assembly.
4. **Sloped Plate.** When constructing longitudinal wedge joints, ensure that the paver is equipped with a sloped plate. Ensure that the sloped plate is attached to the paver screed extension and is capable of producing a wedge edge having a face slope of 3H:1V. Ensure that the plate can accommodate compacted layer thicknesses from 1 1/2 to 4 inches. Mount the bottom of the sloped plate 3/8 to 1/2 inch above the existing surface. Ensure that the sloped plate is interchangeable for use on either side of the screed.
5. **Automatic Slope Controls.** Ensure that the automatic slope control system maintains the screed or strike-off assembly in a constant position relative to profile and cross-slope references. Use references to ensure that control of the screed or strike-off position is independent of irregularities in the underlying surface and spreader operation. When paving in widths that exceed the manufacturer's recommendations for use of the automatic slope control, use an RE approved grade reference system on both sides of the

paver. If the RE determines that the automatic controls are ineffective, the Contractor may use other RE approved methods.

6. **Automatic Profile Control.** For the first lift of paving, use a stringline or an RE approved electronic grade reference system for longitudinal grade control. For a stringline reference system, provide a line supported by devices compatible with the type of automatic paver control system used. Use stringline and supports capable of maintaining line and grade at the point of support while withstanding the tensioning necessary to prevent sag in excess of 1/4 inch between supports spaced 50 feet apart. Install additional supports spaced 25 feet or less apart to remove any apparent deviation of the stringline from the specified grade. The RE may require spacings of 25 feet at the crest and bottom of vertical curves. If the first lift of paving is placed on or adjacent to a surface that has been placed to the specified line, grade, and cross section and has been approved by the RE, the Contractor may use a ski-type reference system.

   For subsequent lifts of paving, use a ski-type grade reference system. The RE may allow the use of a joint-matching shoe instead of the ski during paving.

7. **Manual Override System.** Ensure that the paver is capable of manual override of the automatic controls while the paver is in automatic operation.

For paving widths of less than 8 feet, provide a paver that is capable of spreading and finishing HMA to the shown widths and thicknesses.

NOTE: A Spray Paver as specified in 1003.04 may be used in lieu of a HMA Paver.

1003.04 SPRAY PAVER

Provide a self-propelled spray paver that meets the requirements in 1003.03 and is specifically designed and manufactured for applying tack coat and polymer modified tack coat immediately in front of, and just prior to applying, HMA in a single operation without trafficking and tracking of the tack coat. Ensure the spray paver is insulated and equipped with a heater to evenly heat, maintain, and apply the tack coat at the proper temperature recommended by the manufacturer. Ensure the spray paver can apply tack coat in a controlled manner which automatically adjusts the rate of tack coat application based on the speed of the paver to provide a uniform and complete tack coat coverage of the paving surface. Ensure that the spray paver is capable of spreading tack coat and HMA to the width, thickness, and application rates required without tearing, shoving, or gouging the mixture, to produce a smooth and homogeneous surface. Ensure the spray paver is capable of operation at forward speeds of at least 70 feet per minute. Ensure that the spray paver is equipped and operated using a heated vibratory screed or tamper bar to ensure material is capable of being placed and compacted to the required density and smoothness. Ensure that the paver is equipped with an automatic reverse signal alarm that is audible above the surrounding noise.

1003.05 HMA COMPACTOR

Provide to the RE the manufacturer's technical data sheets, including the weight and dimensions of the rollers to be used.

Ensure that the roller is equipped with adjustable scrapers to keep wheels clean and with a system to keep wheels moist to prevent HMA from sticking to the wheels. Use wheels free of flat areas, openings, or projections that may mar the surface.

Ensure that the roller is equipped with an automatic audible warning signal when operating in reverse. Use rollers capable of reversing direction without backlash and that conform to the following:

1. **Steel-Wheel Roller.** Provide a power-driven, 2 axle tandem roller with a load of at least 250 pounds per inch of width of tread of drive roll and a total ballast weight of at least 8 tons.

2. **HMA Vibratory Roller.** Provide a self-propelled vibratory roller with at least 2 smooth steel drums. Use a vibratory roller having a static weight of at least 6 1/2 tons and that is capable of maintaining the frequency and amplitude of vibration specified by the manufacturer. Ensure that the vibratory roller is also equipped with the following:

   1. One light on each fender, or alternatively, 1 light above the roller, visible from a distance of 200 feet. Ensure that the light blinks when the vibratory system is in operation.
   2. Provide a speed indicator in feet per minute or tenths of a mile per hour and a frequency indicator to allow the operator to closely control the rolling speed.

3. Equip rollers with an automatic vibration disconnect system that automatically shuts off the vibration when the roller is in a stationary position. Provide a mechanical override system in the event of temporary failure of the automatic system that shuts off the vibration when the roller is in a stationary position.

Provide instruction sheets for each vibratory roller used indicating operational instructions, recommended amplitude, vibrations per minute, and speed settings.

1003.06 VIBRATORY DRUM COMPACTOR

Provide a self-propelled vibratory drum compactor, equipped with 1 or 2 smooth steel drums having a minimum centrifugal force of 177 pounds per inch of width of tread of drive roll. Ensure that the self-propelled vibratory drum compactor is capable of maintaining the frequency of vibration and amplitude specified by the manufacturers. For each vibratory roller used, provide the manufacturer's recommendations indicating operational instructions, recommended amplitude, vibrations per minute, and speed settings.

1003.07 BITUMINOUS MATERIAL DISTRIBUTOR

Provide a pressurized bituminous material distributor capable of maintaining bituminous material within the specified temperature range and applying the material uniformly over variable surface widths of up to 15 feet. Ensure that the bituminous material distributor is equipped with the following:

1. Temperature gauge on the truck body to indicate the temperature of the contained bituminous material.
2. A separate power unit for the pump.
3. Full circulation spray bars that are adjustable laterally and vertically.
4. An analog or digital readout meter calibrated in English units.

1003.08 SEALER APPLICATION SYSTEM

Provide sealing equipment for sealing joints or cracks that consists of a kettle or melter and an applicator wand. Ensure that the melter is a double boiler, with the space between the inner and outer shells filled with oil or other heat transfer medium. Ensure that the melter includes positive temperature control, mechanical agitation, recirculation pumps, and thermometers for continuous reading of the temperature of both the sealing compound and the heat transfer medium. Use a heated or insulated applicator wand to maintain the pouring temperature of the sealant during the placing operation. Do not use pouring pots or similar devices to fill sawed joints or cracks.

SECTION 1007 – TRAFFIC STRIPING EQUIPMENT

1007.01 EPOXY STRIPING UNIT

Provide epoxy striping equipment designed to apply long-life material in variable widths at a consistent temperature. Ensure that the epoxy striping equipment is capable of continuously mixing and agitating the material and is equipped with the following:

1. **Epoxy Striping Units.** Provide the following with each epoxy striping unit:
   a. A calibration sheet, certified by the manufacturer or testing agency, that shows the number of the truck, the capacity, and an outage table in increments of not over 1/2 inch.
   b. A metal rod for each holding vessel, with accurate divisions marked and consecutively numbered starting at the bottom. Do not use a rod less than 1 foot longer than the depth of the vessel.
   c. Slip-proof steps with handrails to ground level and a slip-proof catwalk with handrail running along the top of the vessel.
2. **Epoxy Striping Applicator.** Ensure that the epoxy striping applicator is equipped with the following:
   a. A tachometer and a pressure gauge.
   b. A calibrated holding vessel for each long-life material component. Ensure that the holding vessels for the epoxy pigments and hardener have thermometers for measuring the temperature of vessel contents.
   c. A separate power unit for the pumps used to mix and distribute the components.
   d. Mixing and conveying parts and the shaping dies or spray gun that is capable of maintaining the material at optimum plastic temperature.
   e. A mechanical glass bead dispenser that automatically dispense beads uniformly on wet stripes or

markings at the rates specified.

1007.02 THERMOPLASTIC APPLICATOR

Provide a thermoplastic applicator designed to apply thermoplastic in multiple widths between 4 to 12 inches and multiple thickness settings to achieve above the pavement thickness of 90 to 120 mils. Ensure that the thermoplastic applicator is equipped with the following:

1. An oil-jacketed or air-jacketed pre-melting kettle equipped with an automatic thermostat control device to provide positive temperature control and continuous mixing and agitation of the thermoplastic material.
2. An applicator storage kettle with an automatic thermostat control device to maintain the thermoplastic material at the application temperature and provide continuous mixing and agitation of the thermoplastic material during installation.

Ensure that the thermoplastic applicator has a capacity for containing a minimum of 1,500 pounds of molten thermoplastic.

The Department may require special thickness equipment for in lane or shoulder transverse rumble strip pavement markings.

1007.03 TRAFFIC STRIPE AND MARKING REMOVAL EQUIPMENT

For removing traffic stripes and traffic markings, provide equipment containing a vacuum system to remove all millings from the pavement surface and prevent residue from becoming airborne.

SECTION 1008 – MISCELLANEOUS EQUIPMENT

1008.01 MILLING MACHINE

A. **Standard Milling Machine.** Provide a self-propelled planing, grinding, or cutting milling machine with variable operating speeds that is capable of removing HMA or concrete without the use of heat. Ensure that the milling machine is equipped with automatic grade controls. Use either a stringline or ski type reference system. If a ski type reference system is used, ensure that the ski has a minimum length of 20 feet. Ensure that the milling machine is equipped with an automatic audible warning signal when operating in reverse. The RE may not require use of the automatic grade controls at intersections and other locations.

Immediately replace teeth in the milling drum that become dislodged, broken, or unevenly worn with teeth of the same length as the remaining teeth in that row.

B. **Micro-Milling Machine.** Provide a standard milling machine as specified in 1008.01.A that is equipped with a cutting mandrel designed specifically for cold planing and texturing asphalt and concrete pavement surfaces to close tolerances as defined herein. Ensure that the cutting mandrel is equipped with four wraps of flighting with blocks that bolt in, each accepting 3 to 4 carbide or polycrystalline diamond (PCD) tipped cutting bits on the wear side of the flight. The cutting bits on the wraps at 0 degrees and 180 degrees repeat each other. Likewise the cutting bits at 90 degrees and 270 degrees also repeat each other, creating a double hit cutting mandrel. Ensure that tips of the cutting bits, on any given wrap, are spaced at a maximum of 1/4 inch axial distance between the tips of each bit,
±1/32 inch. Repeat the cutting bits on the second wrap to the proceeding wrap at 1/4 inch maximum.

Ensure that the cutting bits and height of the holder blocks are uniform so that the cutting radius of the mandrel is within ±0.02 inch. Ensure that the blocks are completely machined and capable of being easily removed from the cutting mandrel to check tolerance and height of the holders.

Ensure that the equipment used does not cause strain or damage to the underlying pavement surface course, causes excessive ravel, aggregate fractures, spalls, or disturbance of the transverse or longitudinal joints.

Replace cutting bits that become dislodged, broken, or unevenly worn. When only changing intermittent cutting bits, remove an existing "sample" cutting bit from the machine and measure amount of wear and/or gage height. Ensure that replacement bit is matched to existing height of the "sample" cutting bit, ±1/32 inch, to ensure even micro-milling.

1008.02 STRAIGHTEDGE

Provide an aluminum straightedge at least 10 feet in length. Provide up to a 16 foot straightedge if requested by the RE. Ensure that straightedges are kept clean and straight.

1008.03 MECHANICAL SWEEPER

Provide a self-propelled vacuum or vacuum assisted sweeper that is capable of collecting and containing debris. Do not use steel bristles. Ensure that the sweeper is equipped with an automatic audible warning signal when operating in reverse.

1008.04 PAVEMENT SAW

Provide a power-driven pavement saw capable of sawing to the required dimensions in 1 pass without causing uncontrolled cracking. Equip the pavement saw with water-cooled, circular, diamond-edge blades or abrasive wheels, and alignment guides. Ensure that the pavement saw is capable of immediately collecting the slurry produced from the operations. The Contractor may use a pavement saw that does not collect slurry if the RE approves an alternate slurry collection method.

When sawcutting grooves, use a multi-bladed saw with an adequate number of blades and alignment wheels.

Provide within the Project Limits spare saw blades and at least 1 standby saw that meets the above requirements.

1008.05 AIR COMPRESSOR

Provide compressors for air blowing that filter moisture and oil from the air, deliver air at a minimum of 125 cubic feet per minute, and develop a nozzle pressure of at least 87 pounds per square inch.

1008.06 HOT-AIR LANCE

Provide a compressed air system designed for generating hot air at a temperature of at least 2,000 °F. Ensure that the hot-air lance is capable of delivering air at the minimum rate of 80 cubic feet per minute at 100 pounds per square inch.

SECTION 1009 – HMA PLANT EQUIPMENT

1009.01 HMA PLANT

A. **Requirements for HMA Mixing Plants.** Use fully automated batch type or drum mixing type plants for the preparation of HMA mixtures. Ensure that the HMA plant is designed, equipped, calibrated, and operated to deliver well-coated, homogeneous HMA mixtures conforming to the job mix formula. Immediately correct defects that adversely affect the functioning of a plant or plant unit, or the quality of the mixture.

Ensure that all plant, laboratory, and truck scales are inspected and certified by an independent scale company accredited according to International Organization of Standards/International Electrotechnical Commission 17025, or a State or county Office of Weights and Measures. Ensure that certification is performed annually, or every 6 months if directed by the ME.

The HMA producer is required to have a quality control (QC) program plan approved annually by the ME as per Materials Approval Procedure MAP-102. The HMA producer is required to ensure that the QC plan conforms to the requirements outlined in the report entitled "Hot Mix Asphalt Quality Control Program Plan" prepared by the Department of Transportation and New Jersey Asphalt Paving Association. Failure to follow these requirements will result in rejection of HMA materials supplied by the HMA producer and removal of the HMA supplier from the QPL.

Ensure that the HMA plant is equipped with the following:

1. **Plant Laboratory.** Provide and maintain a plant laboratory at each plant site for the ME's use for sampling and acceptance testing, and for the producer's use for quality control testing during periods of production. Ensure that the plant laboratory has an unobstructed view of the trucks as they are loaded. Ensure that, excluding the sanitary facilities, the plant laboratory has a floor area of at least 350 square feet, a ceiling height of at least 7 1/2 feet, adequate ventilation, and artificial lighting. Provide sanitary facilities located within the same building. Ensure that the plant laboratory is weather-tight, heated, air-conditioned, and can maintain a temperature of between 68 and 80 °F. For plants producing more than 3,000 tons of HMA mixture per day, obtain the ME's approval of the laboratory size and available facilities.

   Ensure that the plant laboratory is equipped with the following:

   a. **General Equipment.** Provide the following:

      1. An office for the exclusive use of the ME with a floor area of at least 100 square feet, excluding the plant lab area.
      2. Work benches, totaling at least 3 × 15 feet.
      3. Two desks, 1 table, and at least 3 armed desk chairs.

4. Four-drawer, legal-size file cabinet with lock and 2 keys.
5. Shelves and supply cabinets.
6. Water cooler capable of dispensing hot and cold water, or a refrigerator supplied with bottled water.
7. Telephone, with a direct, private line with no monitoring or recording devices attached.
8. Class ABC fire extinguisher, meeting fire underwriters' approval.
9. A stocked, 5 person first-aid box according to ANSI standards.
10. Electrical outlets sufficient in number and capacity for operating equipment.
11. Approximately 4 × 4 feet of cork board or other mounting surface hung on a wall for the exclusive use of the ME.
12. Mechanical shakers, screens, and sieves according to AASHTO M 92. Install and bolt down the mechanical shaker in a sound-dampening and dustproof enclosure. Provide at least a 12 inch diameter exhaust fan in the enclosure.
13. Sink with hot and cold running water having adequate pressure, drainboard, and drain capable of handling elutriable material.
14. Stand that holds and elevates sieves to allow material to properly drain.
15. Two-element hot plate or electric range having dial-type thermostatic controls to adjust the heat for drying aggregates. Include a 12 inch fan capable of exhausting dust and fumes.
16. Small hand tools required for sampling and testing.
17. Computer and work station requirements as specified in 156.03.01.4.d. The ME may reduce or eliminate the requirement for the computer based upon operational needs.

b. **Testing Equipment.** Provide the following testing equipment:

1. Hood enclosed on 3 sides, top, and bottom, and of such size to enclose the operations of drying and weighing in which a vapor or gas is emitted. Ensure that the hood is designed and constructed so that any operation involving testing within the hood does not require the insertion of any portion of the tester's body, other than hands and arms. Ensure that the hood contains an exhaust system capable of exhausting air to the outside at 33 yards per minute, linear velocity, based upon an interior hood opening measuring 3 × 3 feet, with an exhaust fan rated at 80 to 118 cubic feet per minute.
2. When acceptance procedures for fully automated batch plants using hot bin samples according to NJDOT B-5 are used, an 8 inch shaker and a larger shaker are required.
3. Apparatus to perform testing according to AASHTO T 308, AASHTO T 166, AASHTO T 245, and AASHTO T 209.
4. Apparatus to perform testing according to AASHTO T 312. Calibrate the gyratory compactor using the internal angle.

2. **Aggregate Storage.** Provide storage space for each size and source of aggregate. Keep different aggregates separate until they have been delivered to the cold-feed belt or elevator. Maintain the aggregate storage area, and stockpile the separate materials as specified in 901.02.

3. **Aggregate Bins.** Ensure that the plant has cold-feed aggregate storage bins of sufficient number and capacity to store the amount of aggregate required to keep the plant in continuous operation. Ensure that the bins are designed to prevent overflow of material from each bin compartment to another. Provide at least 1 cold-feed aggregate bin for each stockpile of material to be used. Provide an indicator on each bin to show the gate opening.

4. **Equipment for Preparation of Asphalt Binder.** Ensure that the tanks for storage of asphalt binder are equipped to uniformly heat the material to the required temperature under effective and positive control at all times. Ensure that heating is accomplished so that no flame comes in contact with the heating tank.

   Provide a circulating system of sufficient capacity for the binder to ensure continuous circulation between the storage tank and proportioning units during the entire operating period. Ensure that the discharge end of the binder circulating pipe is maintained below the surface of the binder in the storage tank to prevent discharge of hot binder into the open air.

   Ensure that pipe lines and fittings are steam or oil jacketed, electrically or otherwise heated, and insulated to prevent heat loss.

   Provide valves according to AASHTO T 40, except ensure that a sampling valve is also located in the lowest third of each storage tank.

5. **Feeder for Dryer.** Provide separate feeders for each size and source of aggregate. Feed each size onto the belt going to the dryer by mechanical feeders with separate adjustable gates. Use adjustable feeders capable of

delivering the separate aggregates onto the belt in proper proportions to ensure a constant and uniform flow of material from each bin.

6. **Thermometric Equipment.** Affix an armored thermometer or dial thermometer of adequate range in the asphalt binder feed line near the charging valve at the mixer unit.

   Also ensure that plant is equipped with a recording thermometer, pyrometer, or other thermometric instrument positioned at the discharge chute of the dryer to indicate and automatically record the temperature of the heated aggregates.

7. **Dust Collector.** Ensure that the plant is equipped with a dust collector capable of wasting or uniformly returning to the plant all or any part of the material collected as directed. Install and operate dust collecting systems according to N.J.A.C 7:27-6.1 *et seq.*

8. **Safety.** Provide adequate and safe stairways to the mixer platform and sampling points. Place guarded ladders to other plant units at all points where accessibility to plant operations is required. Provide overhead protection at necessary locations. Provide ample and unobstructed space on the mixing platform. Maintain a clear and unobstructed passage at all times in and around the truck loading area. Keep this area free from drippings from the mixing platform.

   Provide accessibility to the top of truck bodies using 2 platforms located away from the mixing plant to enable samples and temperature data to be obtained from each side of loaded trucks. The Department will allow one platform if the truck has room to turn around and return to the platform.

   When plant production occurs during nighttime hours, provide permanently fixed lighting throughout the plant operations, plant laboratory, and truck scale areas to ensure a clear view of the operations. Also provide permanently mounted lighting at the sampling platforms to sufficiently illuminate the bed of the truck for inspection and sampling operations.

9. **Truck Scales.** Use direct-reading, cabinet dial type or an electronic load cell platform truck scales with a visual indicating device capable of automatically printing both gross and tare weights and time and date on the delivery ticket. Equip scales with a motion detection device or a time delay relay that prevents printing the weight on the delivery ticket until the scale is fully at rest. Remove or permanently lock tare beams in place.

   Ensure that the scale has a manufacturer's rating equal to or greater than the maximum gross load being weighed.

   Ensure that the approaches to the scale at both ends are at a level grade at the same elevation as the platform. House the scale cabinet and dial and the mechanical weight recorder in a suitable shelter with adequate heat and light.

10. **Automated Release Agent System.** Install and use a system that automatically sprays the truck bed with a release agent to prevent the buildup of HMA in the bed. Ensure that the equipment sprays a thin, even coat of release agent over the entire interior surface. Supply a non-petroleum based release agent to the system.

11. **Surge and Storage Bins.** A plant may store HMA in a surge or storage bin if the supplier has obtained Department approval.

    Ensure that each bin is equipped with a signaling device that automatically provides a visible or audible signal when the material in the bin reaches the 25 ± 5 ton level. Ensure that the signal device is visible or audible from within the batch room, and remains in operation until the bin level exceeds the specified minimum.

    The supplier may store the HMA in a surge or storage bin for up to 8 hours. In extreme circumstances, the ME may approve the storage of HMA in a surge or storage bin for up to 12 hours.

    If the surge or storage system is changed or altered, notify the Department of the modification. The Department may require reevaluation to continue operations.

B. **Requirements for Fully Automated Batch Type Plants.** Use fully automated batch type plants only for mixtures containing up to 25 percent RAP. Perform daily checks to ensure that hoppers are discharging completely and that the balance returns to zero tare whenever the hoppers are emptied. When directed, make checks to verify the accuracy of the batch scales within the normal weighing range, and to ensure that the interlocking devices and automatic recording equipment are functioning properly. When the accuracy of the batch scales is not within the required weighing tolerances, the Department may require weighing of all trucks on an approved truck scale.

Ensure that the batch plant is equipped with controls for proportioning the RAP into the mixture without damaging the asphalt binder in the reclaimed material. If the RAP is introduced into the system before the hot bins, ensure that the

proportioning controls include weigh belts or belt scales. Ensure that these items electronically interlock the new aggregate feed with the RAP feed and vary the feed rates, as required, to maintain the required ratio of new aggregate to RAP.

Prepare the recycled HMA mixtures by the heat transfer method of recycling. Ensure that the RAP does not come in direct contact with the flame in the dryer. Adjust the temperature of new aggregate leaving the dryer and the time interval of the dry and wet mixing cycles as needed.

Before combining with the heated new aggregate, ensure that the RAP passes through a 2 1/2 inch vibrating scalping screen.

Ensure that fully automated batch type plants are also equipped with the following:

1. **Dryer.** Provide a dryer or dryers that continuously agitate the aggregate during the heating and drying process. Use a dryer capable of drying and heating the aggregate to the specified moisture and temperature requirements without leaving any visible unburned oil or carbon residue on the aggregate when discharged.

2. **Screens.** Use plant screens that are capable of screening aggregates to the specified sizes and proportions, and have capacities greater than the capacity of the mixer.

3. **Aggregate Hot Bins.** Ensure that the plant is equipped with at least 4 aggregate storage bins of sufficient capacity to supply the mixer when it is operating at full capacity. Arrange the bins to ensure separate and adequate storage of appropriate fractions of the mineral aggregates. Provide separate dry storage when using mineral filler or hydrated lime, and ensure that the plant is equipped to feed such material into the mixer accurately and uniformly. Provide each bin with properly sized and located overflow pipes to prevent the material from backing up into other compartments or bins. Ensure that each compartment is provided with an individual outlet gate that is leak-free when closed and that will cut off flow quickly and completely. Provide bins with means to obtain representative samples. Ensure that each bin is equipped with a signaling device that automatically provides a visible or audible signal when the level of aggregate reaches the lowest 25 percent level, and remains in operation until the bin level exceeds the specified minimum.

4. **Plant Scales.** Use springless dial type or electronic load cell type plant scales with a readout accurate to within the tolerances allowed by the New Jersey Department of Law and Public Safety, Office of Weights and Measures.

   Locate scales so that they are plainly visible to the plant operator at all times.

   For aggregate amounts less than 5,000 pounds, ensure that the graduation of scales used in weighing is not greater than 5 pounds. For aggregate amounts from 5,000 to 10,000 pounds, ensure that the graduation of scales used in the weighing is not greater than 10 pounds. For aggregate amounts more than 10,000 pounds, ensure that the graduation of scales used in the weighing is not greater than 0.1 percent of the capacity of the scales.

   For weighting asphalt binder, use scales that conform to the requirements for aggregate scales, except that they shall read to the nearest pound and they shall have a capacity of not more than 250 percent of the normal amount of asphalt binder required.

   Ensure that plants are capable of continuously weighing the various components of the mixture for the full range of batch sizes within the tolerances specified in Table 1009.01-1. These tolerances are based on the total batch weight of the HMA mixture.

Table 1009.01-1 Weighing Tolerances

Mixture Component	Tolerance
Each Aggregate Component	±1.5 percent
Mineral Filler	±0.5 percent
Asphalt Binder	±0.1 percent
Zero Return (Aggregates)	+0.5 percent
Zero Return (Asphalt Binder)	+0.1 percent

   If mineral filler is used in a batch cycle, ensure that the allowable tolerance for the aggregate component weighed just before the filler in a cumulative weighing system is ±0.5 percent.

5. **Weigh Box or Hopper.** Ensure that the plant is equipped with the means for accurately weighing each size of aggregate in a weigh box or hopper suspended on scales that is sufficiently sized to prevent overflow to the pugmill.

Ensure that no material can leak into the mixer while a batch is being weighed when the discharge gate is closed. Support the weigh box or hopper on fulcrums and knife edges that are not easily thrown out of alignment or adjustment.

6. **Asphalt Binder Control.** When using an asphalt binder bucket, use a type recommended by the plant manufacturer. Ensure that the length of the discharge opening or spray bar is at least 3/4 the length of the mixer and that it discharges directly into the mixer. Ensure that the asphalt binder bucket discharge valve and spray are adequately heated. Ensure that the plant has an adequately heated, quick-acting, nondrip charging valve located directly over the asphalt binder bucket.

   When a volumetric meter is used, ensure that it automatically meters the asphalt binder into each batch. Ensure that the dial to indicate the amount of asphalt binder has the capacity to measure at least 10 percent more than the asphalt binder required in 1 batch. Ensure that the meter can be locked at any dial setting and automatically resets to this reading after the addition of asphalt binder to each batch. Locate the dial in full view of the mixer operator.

   Automatically control the flow of binder material to begin when the dry mixing period is finished. Ensure that all of the asphalt binder material required for 1 batch is discharged within 15 seconds after the flow has started. Ensure that the size and spacing of the spray bar openings provide uniform application of asphalt binder for the full length of the mixer.

7. **Mixer.** Use a batch mixer capable of producing a uniform mixture within the job mix tolerances. If not enclosed, equip the mixer box with a dust hood.

   Ensure that the clearance of paddles does not exceed 1 1/2 inches from all fixed and moving parts.

8. **Control of Mixing Time.** Ensure that the mixer is equipped with an accurate time lock to control the operations of a complete mixing cycle. It shall lock the weigh box gate after charging of the mixer until the closing of the mixer gate at the completion of the cycle. It shall lock the asphalt binder discharge throughout the dry mixing period and shall lock the mixer gate throughout the dry and wet mixing periods. The dry mixing period is defined as the interval of time between the opening of the weigh box gate and the start of introduction of asphalt binder. The wet mixing period is defined as the interval of time between the start of introduction of asphalt binder and the opening of the mixer gate.

   Ensure that timing control is adjustable and capable of being set at intervals of 5 seconds or less. As a part of the timing device, install a mechanical batch counter designed to register only completely mixed batches.

   Set time intervals in the presence of the ME to provide aggregate coating as specified in 903.02.

9. **Automated Batching and Mixing Control.** Ensure that fully automated plants include an automatic batching and mixing control system, including an automatic printer system conforming to the following:

   1. Ensure that the recording equipment and batch scales are interlocked. Maintain the panels providing access to interlocking devices under sealed conditions.
   2. Ensure that the system contains auxiliary interlocking cutoff circuits to interrupt and stop the automatic cycling of the batching operations any time the weighing tolerances are exceeded, when any aggregate bin becomes empty, or when there is a malfunctioning of any portion of the control system. A platform truck scale is not required. However, if the automatic proportioning or recording devices becomes inoperative or inaccurate, then manually operate the plant to complete the day's production with the approval of the RE. In this case, a platform truck scale is mandatory for manual operation.
   3. The Department will make independent checks on batch weights by weighing trucks before and after loading, and may request an inspection of the plant scales by the New Jersey Department of Law and Public Safety, Office of Weights and Measures for verification of the automatic printout tickets.

C. **Requirements for Drum Mixing Plants.** The Contractor may use drum mixing plants in the preparation of HMA paving mixtures. Heat, coat, and mix the HMA mixture in a parallel flow, counter flow, or other approved type of dryer-mixer.

Ensure that the drum mixing plant includes the following:

1. **Aggregate Bins.** Equip the fine aggregate bin compartments with a vibrator or other anti-bridging device that is automatically actuated when bridging of the material occurs. Ensure that this device automatically shuts off when continuous material flow is restored.

2. **Mineral Filler Bin.** When adding mineral filler, use a bin and feeder that is separate from the aggregate cold bins. Ensure that the equipment is capable of feeding the mineral filler at adjustable rates. Ensure that the mineral filler feed rate in tons per hour is accurate to within 3 percent of the indicated rate throughout the range of the plant's

production capacity. Ensure that the feeder is interlocked to stop production if the flow of mineral filler is interrupted.

3. **Aggregate Feeder.** Ensure that the plant is equipped with a mechanical system for uniformly and continuously feeding each aggregate in its proper proportion onto a collecting belt and then into the drum mixer.

   Ensure that the feeder system is designed so that the aggregates on the collector belt pass through a 2 inch scalping screen or other device to remove oversized material or debris before entering the mixer. Provide one feeder for each bin compartment. Ensure that each aggregate feeder is interlocked to stop production if flow of aggregate from any of the cold bins is interrupted.

   Use a variable speed system that provides for total and proportional control to regulate the quantity of aggregate fed to the drum mixer.

   Ensure that the individual bin feeder belts or the intermediate collecting belt that delivers the aggregate to the main feed for the drum mixer are equipped with belt type scales (load cells). Use belt type scales (load cells) that are capable of continuously displaying, at the operator's station, the weight of aggregate flow in tons per hour or the corresponding percentage of total mix from each individual bin and the accumulated total from each bin in tons. Ensure that the aggregate feed rate in tons per hour from each bin is accurate to within 1 percent of the indicated rate throughout the range of the plant's production capacity.

   Provide the means to conveniently divert the aggregate cold-feed delivery into trucks or other containers for checking the accuracy of the aggregate feed system. Provide the means to obtain representative samples of the composite aggregate from the main feed to the drum mixer at any time during production.

   For mixes containing RAP, the drum mix plant shall have a means for adding the RAP to the dryer-mixer in a manner that does not damage the asphalt binder in the reclaimed material. Provide control for proportioning the RAP into the mixture. Provide the means for compensating for the moisture in the RAP. Ensure that the RAP passes through a 2 1/2 inch vibrating scalping screen before being combined with the heated new aggregate.

4. **Asphalt Binder Metering System.** Ensure that the plant is equipped with a metering system that introduces the proper amount of asphalt binder into the mix.

   Use a system that is capable of measuring the quantity and temperature of the asphalt binder introduced into the mix and transmitting that data to the operator's station. Ensure that the metering system is interlocked to stop production if the flow is interrupted.

   Ensure that the metering system includes a temperature compensation device to correct the quantity of asphalt binder introduced into the mix to 60 °F. Ensure that the flow of asphalt binder to the drum mixer is continuously displayed at the operator's station in units of tons per hour, corrected to 60 °F, or as the corresponding percentage of total mix. Ensure that the feed rate in tons per hour is accurate to within 1 percent of the indicated rate throughout the range of the plant's production capacity. Ensure that the accumulated weight of asphalt binder fed to the mixer is totaled.

   Provide convenient means for diverting the asphalt binder into trucks or other containers for checking the accuracy of the metering system.

5. **Proportioning Controls.** Ensure that the combined aggregates pass over a weigh belt or belt scale that is electronically interlocked with the asphalt binder metering system to automatically vary the asphalt binder feed rate, as required, to maintain the required asphalt binder content in the mixture.

   Make provisions for introducing the moisture content of the cold-feed aggregates into the composite aggregate weigh belt signal and correcting wet aggregate weight to dry aggregate weight. Continuously display, by electronic readout at the operator's station, the dry weight of the composite aggregate flow in units of tons per hour and total. Ensure that the composite aggregate feed rate is accurate to within 1 percent of the indicated rate. Equip belt conveyors with scrapers or other suitable devices to prevent adherence or other loss of the weighed cold-feed aggregate.

   Before the start of production of Department mixes, ensure that plant controls are calibrated. Report to the ME any changes in or modifications to the equipment or operation occurring subsequent to the initial calibration. The ME may direct calibration checks or a new plant calibration. The ME may also direct recalibrating the plant if the finished mixture displays composition deficiencies. For each drum mix plant placed in operation, submit 2 complete sets of plant drawings, a plant operator's manual, and a plan detailing the method of plant calibration. The ME will witness the calibration of the individual cold-feeders at several production rates throughout the range of the plant's capacity. Submit a copy of the computations for the combined rate of flow, and a plot of calibration

charts, indicating the rate of aggregate delivery in tons per hour from each cold-feeder for particular dial settings and gate openings. Determine calibration points by independently diverting each cold-feed into trucks (or running each feed through the plant) and determining the proper console dial setting corresponding to the measured rate of delivery. Determine calibration points in increments of approximately 100 tons per hour of total aggregate flow.

The ME will witness a check on the mineral filler and asphalt binder feeds at several production rate increments throughout the range of the plant's capacity. Divert the asphalt binder into trucks or other containers for weight or volumetric measurements to calibrate the asphalt binder metering system and subsequent checks. The method used to calibrate the mineral filler feeder system is subject to approval.

6. **Drum Mixer.** Use a drum mixer that continually agitates the mixture of aggregate and asphalt binder during heating. The drum mixer should not adversely affect the aggregate or asphalt binder during drying and heating operations. Equip the mixer discharge with a pyrometer or thermometer probe to record the temperature of the mixture, with the data transmitted to the operator's station.

   Ensure that the mixer is equipped to safely and conveniently obtain representative mixture samples before introduction into the surge bin.

   The ME may perform test comparisons between the consistency of the asphalt binder in its original form from plant tank samples and in processed form from mixture recovery samples obtained before the mixture's introduction into the surge bin. The ME will use the results of the consistency tests to determine whether a processing improvement is necessary to eliminate excessive volatilization, oxidation, or other causes of premature hardening.

7. **Emission Control System.** Ensure that the plant is equipped with an emission control system conforming to all applicable emission limitations.

8. **Control Console.** Ensure that the following items are included in the control console at the operator's station:

   a. Cold aggregate feed controls capable of both total and proportional control of the aggregates.
   b. Dryer burner controls that automatically control the temperature of the mix and record the mix temperature at the dryer discharge.
   c. Aggregate weigh belt readouts displaying the weight of material being proportioned from each aggregate bin in tons per hour or the corresponding percentage of total mix weight and the total flow over the main feeder to the drum mixer in tons per hour. Ensure that the accumulated weights in tons from each bin and the total feed to the mixer are separately totaled and are continuously displayed or are available on demand from a printout device.
   d. Mineral filler readouts displaying the weight of material being proportioned from the mineral filler bin in tons per hour or the corresponding percentage of total mix weight together with an accumulative total in tons.
   e. Asphalt binder metering system readouts indicating the quantity of asphalt binder, corrected to 60 °F, being proportioned into the mix together with an accumulative total in tons, and a recording pyrometer or thermometer that records the temperature of the asphalt binder at the pump.
   f. Proportioning controls that set the asphalt binder content as well as the aggregate moisture adjustment.

9. **Modifications.** When producing mixes containing 26 to 50 percent of RAP, ensure that the mixing time allows thorough blending of new and reclaimed materials and complete coating all aggregate particles. If lumps of reclaimed material are observed in the mixture as it is discharged from the drum, adjust the mixing time in the drum or make other changes in the production process to correct this condition. Ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is maintained at or above the temperature required to deliver the material to the work site and achieve optimum compaction.

1009.02 HMA TRUCKS

Transport the mixture from the mixing plant to the Project Limits in trucks equipped with tight, clean bodies. The Contractor may lightly coat the trucks with a fine aggregate, soap or lime solution, or other such non-petroleum-based release agent. Do not use a petroleum-based product as a release agent.

Permanently equip trucks with an airfoil that is capable, at any speed or under any weather conditions, to deflect air over the tarp and to prevent air from going under the tarp. Ensure that the airfoil is affixed no more than 2 feet in front of the tarp roll and be at least as high as the top of the tarp roll.

Provide a waterproof tarp that is capable of withstanding normal handling and placement temperatures of up to 400 °F without damaging the fabric, has a minimum weight of 18 ounces per square yard, and is properly sized to

completely cover the load. Immediately cover each truckload after loading at the plant with the tarp to protect the mixture from the weather. Ensure that the tarp securely meets or overlaps the top of the tailgate and is securely held in place so as to prevent air from lifting the tarp during transportation.

Ensure that the truck body is heated or insulated as necessary to ensure delivery of the mixture at the specified temperature. Remove any truck from the work that does not have an airfoil or does not have an approved tarp until such conditions are corrected and the truck is presented for inspection to the RE. The RE or ME may require that the Contractor make available the vehicles used for transporting HMA mixture for inspection at the plant laboratory before shipping materials.

1009.03 ASPHALT-RUBBER BINDER BLENDING EQUIPMENT

Provide equipment for preparation of Asphalt-Rubber Binder. Ensure that the unit is equipped with a crumb rubber feed system capable of continuously supplying the asphalt cement feed system, and is capable of fully blending the individual crumb rubber particles with the asphalt cement. Use an asphalt-rubber binder storage tank that is equipped with a heating system capable of maintaining the temperature of the binder between 325 and 375 °F during the reaction. Ensure the asphalt-rubber binder storage tank is also equipped with an internal auger mixing device, oriented horizontally in the tank, capable of maintaining a uniform mixture of the asphalt-rubber binder.

Ensure that the tanks for storage of asphalt-rubber binder are equipped to uniformly heat the material to the required temperature under effective and positive control at all times. Ensure that heating is accomplished so that no flame comes in contact with the heating tank.

Provide a circulating system of sufficient capacity for the binder to ensure continuous circulation between the storage tank and proportioning units during the entire operating period. Ensure that the discharge end of the binder circulating pipe is maintained below the surface of the binder in the storage tank to prevent discharge of hot binder into the open air.

Ensure that pipe lines and fittings are steam or oil jacketed, electrically or otherwise heated, and insulated to prevent heat loss.

Provide valves according to AASHTO T 40, except ensure that a sampling valve is also located in the lowest third of each storage tank.

If the plant has been equipped with a water injection type asphalt foaming system, ensure that the system will allow the proper amount of asphalt rubber binder to be supplied continuously or provide a bypass to ensure that the proper amount of asphalt rubber binder is supplied to the mix.

SECTION 1010 – CONCRETE PLANT AND MIXING EQUIPMENT

1010.01 BATCHING PLANT

Ensure that plant, laboratory, and truck scales are inspected and certified by an independent scale company accredited according to International Organization of Standards/International Electrotechnical Commission 17025, or a State or county Office of Weights and Measures. Ensure that certification is performed annually or every 6 months if directed by the ME.

Ensure that aggregate reserves at the batching plant are stockpiled as specified in 901.02.

Provide a batching plant with the specified site, layout, and equipment features capable of ensuring a continuous supply of concrete to the work. Ensure that the batching plant is equipped with the following:

1. **Plant Laboratory.** Provide and maintain a plant laboratory at each plant site for the ME's use for sampling and acceptance testing, and for the producer's use for quality control testing during periods of production. Ensure that the plant laboratory has an unobstructed view of the trucks as they are loaded. Ensure that, excluding the sanitary facilities, the plant laboratory has a floor area of at least 350 square feet, a ceiling height of at least 7 1/2 feet, adequate ventilation, and artificial lighting. The ME may reapprove a previously approved concrete plant with an undersized laboratory if it functionally meets the needs for testing. Provide sanitary facilities located within the same building. Ensure that the plant laboratory is weather-tight, heated, air-conditioned, and can maintain a temperature of between 68 and 80 °F.

   Ensure that the plant laboratory is equipped with the following:

a. **General Equipment.** Provide general equipment as specified in 1009.01.1.a.

b. **Testing Equipment.** Provide the following testing equipment:

1. Platform scale of 200 pounds minimum capacity with a beam or dial with significant graduations of 1/10 pound or less.
2. Apparatus to perform testing according to AASHTO T 27, AASHTO T 248, AASHTO T 19, AASHTO T 119, AASHTO T 121, AASHTO T 196, AASHTO T 152, AASHTO T 84, and AASHTO T 85.
3. Miscellaneous items including rubber hammer, mason's trowels, pointed shovel, small and large sugar scoops, heavy galvanized pail (approximately 14 quart capacity), aggregate sample pans, brushes, flashlight, glassware, steel straightedge approximately 18 × 2 inches, and such expendable supplies necessary for the tests to be performed.

2. **Batch Counter.** Ensure that the batching plant is equipped with a non-resettable batch counter that indicates the number of batches proportioned.

3. **Bins and Hoppers.** Provide bins with separate compartments for fine aggregate, for each size of coarse aggregate, and for each brand and type of cement at the batching plant. Ensure that the weighing hoppers are sealed and vented to prevent dusting during operation. Use separate scales and hoppers for cement with a device to indicate the complete discharge of the batch of cement into the mixing drum. Ensure that the weighing hoppers and scales are of adequate size and capable of being locked. Ensure that the hopper discharge mechanism is interlocked against opening until the full batch is in the hopper and the scale is balanced, against opening while the hopper is being filled, against closing until the hopper is entirely discharged and the scale back in balance, and against opening if the batch in the hopper is either overweight or underweight by more than 1 percent of the amount specified. Ensure that the weighing hopper discharge gate operates in a manner that does not affect the scale balance. Ensure that the discharge chute, boot, or other such device is suspended from the encasement and not from the weighing hopper and is constructed so that cement does not lodge therein. Ensure that there is no loss of cement by air currents or otherwise. Ensure that there are means available to monitor the required cement content in each batch.

4. **Scales.** Use beam scales, springless dial scales, or electronic load cell scales with a readout when weighing aggregates and cement. Use scales that are accurate to within 0.5 percent for cement and within 1 percent for aggregate throughout the range of use. When using beam type scales, provide a dial for indicating to the operator the required load in the weighing beams and for indicating critical position. Ensure that the weigh beam and device are in full view of the operator who shall have convenient access to all controls while charging the hopper. Ensure that poises are capable of being locked in any position to prevent unauthorized change.

5. **Water Measuring Equipment.** Measure water by volume or by weight. Ensure that the range or error for water measuring equipment is less than 1 percent. Ensure that the measuring device automatically registers and stops the flow of water when the designated quantity has been delivered into the mixing drum. If measuring by volume, ensure that the water measuring device contains an auxiliary tank from which to fill the measuring tank. Ensure that the measuring tank is equipped with outside taps and valves, or equivalent means to accurately calibrate the tank, and to provide for the quick and accurate determination of the amount of water in the tank. Ensure that the volume of the auxiliary tank is at least equal to that of the measuring tank.

6. **Chemical Admixtures.** Use an automatic displacement dispenser for adding each admixture. Ensure that the plant is equipped with a separate dispensing system with a visual sight gauge for each chemical admixture incorporated into the concrete. Provide a system capable of dispensing the total amount required to within ±3.0 percent or 1 ounce, whichever is greater. Provide convenient means to calibrate each system. Provide chemical admixture devices with each truck mixer approved for dispensing admixtures at the placement site.

7. **Mineral Admixtures.** Ensure that mineral admixtures stored at the batching plant are located in a separate storage facility. Do not use a split silo to store mineral admixtures and cement, or 2 different mineral admixtures. Ensure that scales and batching tolerances are consistent with those specified for cement.

8. **Automatic Batching System.** Ensure that batching plants equipped to proportion aggregates and bulk cement by means of automatic weighing and recording devices contain the following:

a. **Automatic Batching Controls.** Ensure that batching equipment in the system for batching by weight is actuated by a single starting mechanism. The Department will allow a separate starting mechanism for volumetric batching of water or admixtures not batched at the time of initial weighing.

Ensure that each automatic batcher returns to zero balance and each volumetric device resets to start or

signal empty before it may be charged.

Ensure that the discharge of any ingredient in the system does not start until all weighed ingredients have been batched, until all batching controls have been cleared of the previous batch with scale returning to zero balance, and until volumetric devices reset to start or signal empty.

For cumulative batchers, provide interlocked sequential controls.

Ensure that automatic batching controls start the weighing operation of each material and stop automatically when the designated weight of each material has been reached, interlocked in such a way that:

1. The charging device cannot be actuated until the scale has returned to zero balance within ±0.3 percent of the scale capacity.
2. The discharge device cannot be actuated until the required material is within the applicable tolerances.
3. The discharge device cannot be actuated if the charging device or the discharge device is open.

b. **Recording Devices.** Ensure that automatic batching plants are equipped with an accurate recorder or recorders that provide a permanent and continuous record of batching operations. Provide a maximum of 2 recording units in lockable enclosures with each plant. Provide batching records as directed by the ME. Ensure each recorder produces a digital record on tickets, providing the following information:

1. The quantity or batched weights of each aggregate, cement, water, and admixture.
2. The zero-balance condition of each scale after batches have been discharged, or before the start of the batching operation.
3. A means of identifying each admixture batched.
4. The time, date, and batch number of each batch delivered.
5. Mix formula or concrete classification identification.

9. **Safety.** Provide adequate and safe stairways at access points to plant operations. Provide overhead protection at locations where deemed necessary. Ensure that gears, pulleys, chains, sprockets, and other hazardous moving parts are guarded and protected.

1010.02 CONCRETE TRUCKS

Ensure that mixers have a fixed metal plate or plates on which the following information is plainly marked:

1. The manufacturer's capacity rating in terms of the gross drum volume;
2. The capacity of the drum in terms of the volume of mixed concrete; and
3. The manufacturer's designated drum speed of rotation for both mixing and agitation.

The ME will inspect the mechanical condition of the truck mixer, the mixing and agitation rates, the accuracy of the water-measuring device, the sizes of the discharge opening and chutes, and the general condition and wear of the blades. The ME will not approve mixers if the pickup and throw-over blades are broken, missing, or excessively worn. Examine mixers on a daily basis for drum and blade cleanliness, leaks in the mixing water system, and the condition of the water-measuring device and revolution counter.

Ensure that the concrete supplier maintains, in a convenient location, a copy of the manufacturer's design for each size and type of truck showing the dimensions and arrangements of the blades, the dimensions of the drum, the gross volume of the drum, the recommended rates of rotation for all types of operations, and any other pertinent information.

Ensure that the mixing water-measuring device is plainly visible to the truck operator when operating the mixing water and the drum controls, and to the ME while standing on the ground. Keep measuring indicators clean and in good condition.

Ensure that trucks for the delivery of central-mix concrete have a revolving, watertight drum that is capable of uniformly transporting and discharging the mixed concrete. Ensure that the speed of the drum conforms with the manufacturer's stated agitating speed.

Ensure that the mixing water tank, pump, and the piping are kept clean and free of leaks.

Provide documentation showing the date and results of calibration of the water-measuring device on each truck mixer. Provide copies if requested. Ensure that "calibrated" with the date of the last calibration is stenciled on the mixing water tank near the measuring device.

1. **Central Mixing Plant Truck.** Ensure that mixers are equipped with electrically-actuated counters allowing

easy verification of the number of revolutions of the drum. Ensure that the counter unit is positioned on the truck and plainly visible if the driver's door is open.

2. **Transit Mixing Truck.** If necessary, each transit mixer shall only use the mixing water tank and measuring device for providing tempering water.

   Ensure that truck mixers used for transit mix concrete are equipped with an electrically operated counter unit, containing 2 counters, that is non-resettable except by use of a 110 volt device utilizing a nonstandard plug located at the batching plant. Use one counter to record only those revolutions at speeds recommended by the manufacturer of the truck mixer as mixing speed and to record the total of all such mixing revolutions from the time the truck is loaded. Use the other counter to record revolutions of the drum at all speeds and to record the total revolutions from the time the truck is loaded. Ensure that the unit includes an indicator on the front panel that shows if the instrument has been turned off or tampered with in any manner after being reset at the time of loading. Ensure that the counter unit and the resetting device conform to the NEC. Ensure that the counter unit is positioned on the truck and plainly visible if the driver's door is open.

1010.03 MOBILE MIXER

Ensure that the truck mixer is equipped with a cement bin of sufficient capacity to store and supply the quantity of dry cement required to produce the maximum volume as rated by the manufacturer. Ensure that the cement bin is free of moisture and contamination at all times.

Ensure that the truck mixer is equipped with aggregate bins of sufficient capacity to separately store the quantities of fine and coarse aggregates required to produce the maximum volume of concrete as rated by the manufacturer. Ensure that the truck mixer is equipped with the means to prevent contamination or intermixing of the fine and coarse aggregates during loading and transporting. Ensure that aggregate bins are covered when moisture can enter the bins.

Ensure that the truck mixer is equipped with the means for readily determining the level of aggregates within the aggregate bins without the need to climb up on the truck. Ensure that the aggregate is maintained at the proper level to allow the correct volume to enter the mix.

Ensure that the aggregate bins are equipped with vibrators or other means to maintain a smooth, even, and continuous flow of aggregate from the bins.

Ensure that the truck mixer is equipped with water tanks of sufficient capacity to store enough water to produce the maximum concrete volume at the slump specified for each concrete item, as rated by the manufacturer. When using concrete additives in the mix, ensure that the truck mixer is capable of storing the additives, incorporating them into the mix, and measuring the rate of flow of each additive into the mix.

Ensure that the truck mixer includes a feeder unit mounted under the compartment bins to deliver the ingredients to the mixing unit.

Ensure that each bin on the truck has an accurately controlled individual gate or feeding mechanism to form an orifice for volumetrically measuring the material drawn from each bin compartment. Ensure that the cement bin feeding mechanism is set to discharge, continuously and at a uniform rate, the required volumetric weight equivalent of cement. Ensure that the gates of the aggregate bins are calibrated at the various openings to discharge the required volumetric weight equivalent of aggregates. Equip the mixer truck with a material flow indicator attached to the metering gates to monitor the continuous flow of material. Ensure that the indicator sounds an alarm when a continuous flow of material does not pass through the metering gates.

Ensure that the truck mixer is equipped to allow checking of the calibration of the gate openings and meters by means of weight test samples.

Ensure that the calibration of the gate openings and meters are checked and certified for each concrete mix design at least once per year by a certified testing agency. If approved by the ME, a representative of the Contractor may perform the calibration if it can be shown that the representative is knowledgeable in the proper techniques of calibration. Notify the ME at least 1 week before the annual calibration date.

The ME may require a calibration check or a yield test at any time. The accuracy of the mixer to proportion the specified mix is acceptable if the calibration check shows that the equivalent weights of each component are within the tolerances specified in Table 1010.03-1.

Table 1010.03-1 Weighing Tolerances

Mixture Component	Tolerance

Cement	0 to + 4 percent
Fine Aggregate	±2 percent
Coarse Aggregate	±3 percent
Admixtures	±3 percent
Water	±1 percent

Ensure that the truck mixer is equipped with a revolution counter indicator allowing the reading of the volumetric weight equivalent of cement discharged during the concrete mixing operation.

Ensure that the truck mixer is equipped with fine and coarse aggregate dials to allow adjustment of the gates of the aggregate bins for volumetric proportioning of aggregates.

Ensure that the truck mixer is equipped with a water meter or gauge to register the discharge rate of water by volume entering the mix.

Ensure that the truck mixer is equipped with automatic means for maintaining the operating speed of the proportioning and mixing equipment. Ensure that the truck mixer is operated within ±8 percent of the manufacturer's rated speed. Ensure that the tolerance is met whether the mixer is moving or standing still. Ensure that the truck mixer is equipped with a tachometer mounted on the unit to measure the operating speed.

Ensure that all indicators, dials, meters, tachometers, and controls are easily visible, in full view, and close enough to be read or adjusted by the operator while mixing concrete.

Instead of a time clock, the counter unit may contain a third counter, an electrically-operated timer that is non-resettable except by use of the 110 volt device.

1010.04 SMALL-BATCH MIXER

Where small quantities of concrete or mortar are needed, provide a mixer with a minimum mixing capacity to produce a 1 bag mix. Use small-batch mixers according to the manufacturer's recommendations.

NJDOT TEST METHODS

NJDOT A-1 – MORTAR-MAKING PROPERTIES OF FINE AGGREGATE

A. Scope. This test method is used to determine the mortar-making properties of fine aggregate by tensile strength at the age of 7 days when compared to Standard Ottawa mortar.

B. Apparatus. Use apparatus as required in AASHTO T 132 and AASHTO T 162.

C. Procedure. Perform the following steps:

1. Prepare Standard Ottawa mortar according to AASHTO T 162 and test according to AASHTO T 132.
2. Using the fine aggregate sample, prepare the mortar according to AASHTO T 162 and test according to AASHTO T 132. Replace the Standard Ottawa sand with the same weight of fine aggregate sample and use sufficient mixing water to produce the same consistency as obtained with the Standard Ottawa mortar.

D. Report. Report the strength of the fine aggregate sample as a percentage of the Standard Ottawa mortar at 7 days.

NJDOT A-2 – DETERMINING PERCENTAGE OF MICA IN FINE AGGREGATE

A. Scope. This test method is used to determine the mica content of fine aggregate.

B. Apparatus. Use the following apparatus:

1. Binocular microscope (Leica, Zeiss, Wild, or equivalent) with 20 × minimum magnification and using a standard 10 × high quality lens.
2. No. 10 and No. 100 sieves conforming to AASHTO M 92.
3. Mechanical sieve shaker conforming to AASHTO T 27.
4. Microsplitter or spinning riffler splitter.
5. Balance conforming to AASHTO M 231 and having a minimum capacity of 100 grams with a precision of

0.1 gram.

6. Balance for weighing separated mica in stainless steel containers having a minimum capacity of 50 grams with a precision of 0.001 grams and conforming to AASHTO M 231.
7. Stainless-steel sample container with lid.
8. Oven for drying sample to a constant weight at a temperature of 230 ± 9 °F.
9. Stainless-steel spatula.
10. Size 000 or smaller paintbrush with loose hairs trimmed.
11. Microscopic picking tray as used by the American Association of Petroleum Geologists or equivalent for placement within microscope working area.
12. Water in a suitable container for wetting paintbrush.
13. Various suitable larger brushes for moving and spreading sample on picking tray.

C. **Procedure.** Perform the following steps:

1. Ensure that the examiner has a minimum 4 year degree in geology or a related science and an understanding of mineralogy, petrographic analysis, and optical microscopy.
2. Take the test sample from a representative sample from a field stockpile. After oven drying to a constant mass at a temperature of 230 ± 9 °F, split the sample into approximately 200 grams weighed to the nearest 1 gram.
3. Sieve the 200 gram sample according to AASHTO T 27 using a No. 10 sieve and a No. 100 sieve. Retain the material passing the No. 10 sieve and retained on the No. 100 sieve.
4. Reduce the retained sample to approximately 20 grams. Using a microsplitter or a spinning riffler further split the sample into 20 approximately 1 gram samples of fine aggregate. Choose 2 of the twenty 1 gram samples at random for analysis.
5. Place the first chosen sample on a microscopic picking tray and quarter using a stainless-steel spatula. With a large brush, sweep 3 of the 4 sample aliquots to the periphery of the picking tray for possible further analysis.
6. Wet the bristles of the small paintbrush and under 10-20X viewing power, separate the mica minerals from the rest of the fine aggregate
7. After picking at least 95 percent of the mica from the sample aliquot, carefully brush the separated mica into pre-weighed and labeled stainless-steel sample container with lid. Brush the mica-free portion of the sample aliquot into another pre-weighed and labeled sample container with lid.
8. If deemed necessary, the examiner may analyze other quarter aliquots of the sample brushed aside in Step 5. Follow Steps 6 and 7 to analyze additional aliquots brushing the mica and the mica-free portions into their respective containers with the first aliquot analyzed.
9. With the lids off, dry both portions of the sample to constant weight.
10. Using a scale with a precision of 0.001 grams, weigh both samples with the lids on to prevent loss. Record weights of the mica and the mica-free portions. The sum of these is the "Weight of Sample" and should be approximately 0.25 grams for each aliquot analyzed.
11. Repeat Steps 5 through 10 for the second randomly chosen 1 gram sample.

D. **Calculations and Report.** Calculate the percent of mica for each sample analyzed using the following equation:

$$\text{Percent of Mica} = \frac{\text{Weight of Mica in Grams}}{\text{Weight of Sample}} \times 100$$

E. **Report.** Report the final mica content as the average of the results of the 2 samples to the nearest 0.1 percent.

NJDOT A-3 – PETROGRAPHIC ANALYSIS TO DETERMINE LITHOLOGICAL COMPOSITION OF COARSE AGGREGATE

A. **Scope.** This test method is used to determine the quantity of the rock types and deleterious material components in coarse aggregates or in the coarse aggregate fraction of a DGA or soil aggregate. Determinations may include the carbonate rock content of crushed gravels and the weathered and decomposed content of crushed stone or soil aggregate.

B. **Apparatus.** Use the following apparatus:

1. Binocular microscope (Leica, Zeiss, Wild, or equivalent) with 20 × minimum magnification and using a standard 10 × high quality lens.
2. No. 4 and No. 8 sieves conforming to AASHTO M 92.
3. Mechanical sieve shaker conforming to AASHTO T 27.
4. Balance conforming to AASHTO M 231 and having a minimum capacity of 100 grams with a precision of 0.1 gram.
5. Oven for drying sample to a constant weight at a temperature of 230 ± 9 °F.
6. 10:1 dilute hydrochloric acid (HCl) in an eye-drop container.
7. Geology or mason hammer.
8. Scratching devices with known Moh's hardness values.

C. **Procedure.** Perform the following steps:

1. Ensure that the examiner has a minimum 4 year degree in geology or a related science and an understanding of mineralogy, petrographic analysis, and optical microscopy.
2. Oven dry sample to a constant weight. Split the sample to a sample size that will result in a testing sample size as specified in Table A-3-1 after sieving.

Table A-3-1 Test Sample Size

Aggregate Size	Sieve Size for Retention	Approximate Test Sample Size
No. 67 or larger	No. 4	1,000 grams
No. 7 or No. 8	No. 8	500 grams
DGA or I-5	No. 4	1,000 grams

3. For aggregate sizes No. 67 and larger, sieve the sample over a No. 4 sieve. For aggregate size No. 7 or No. 8, sieve the sample over a No. 8 sieve. Ensure that the sample size after sieving is as specified in Table A-3-1.
4. Wash the sample to remove any coating that would make particle examination difficult. If needed, use a mild detergent, such as Calgon to clean the aggregate. After washing, oven-dry the sample to a constant mass at a temperature of 230 ± 9 °F.
5. Separate the prepared sample into rock types as defined in ASTM C 294. Perform the separation using visual examination with the aid of the binocular microscope, dilute HCl, hammer, and scratching implements.
6. Examine the sample for deleterious material such as weathered, leached, porous, friable, fault-fractured, altered, or otherwise unsound particles that could impair coarse aggregate performance. Use the following guidelines to determine if coarse aggregate particles are deleteriously weathered or decomposed:
   a. Can be broken into several pieces by a light hammer tap.
   b. Show more than superficial oxidation or alteration of feldspars.
   c. Appear porous or are determined by the examiner to be porous.
   d. Show numerous microfractures, cleavage planes or slickensides due to faulting.
   e. Are of abnormal coloration throughout due to chemical or mechanical alteration.
7. Separate the deleteriously weathered and decomposed fraction into its own group.
8. Weigh the rock types and deleterious material group to the nearest 0.1 grams and record.

D. **Calculations.** Calculate the percentage of rock types and percentage of deleterious material by dividing the individual weight by the weight of the total sample and multiplying by 100.

E. **Report.** Report the percentage by weight of individual rock types, as defined in ASTM C 294, and percentage by weight of deleterious material.

NJDOT A-4 – DETERMINING PERCENT OF ADHERENT FINES PRESENT IN COARSE AGGREGATE

A. **Scope.** This test method is used to determine the percentage of adherent fines present in coarse aggregate.

B. **Apparatus.** Use apparatus as required in AASHTO T 11 and a No. 16 sieve conforming to the requirements of AASHTO M 92.

C. **Procedure.** Perform the following steps:

1. Obtain a test sample from a representative field sample.
2. Dry the test sample to constant mass at a temperature of 230 ± 9 °F.
3. Weigh the sample to the nearest 0.1 percent.
4. Sieve the sample for less than 1 minute over a No. 16 sieve. Weigh the material retained on the No. 16 sieve. Consider the material passing the No. 16 sieve as non-adherent fines.
5. Test the material retained on the No. 16 sieve according to AASHTO T 11 to determine the weight of material passing the No. 200 sieve. Consider material passing the No. 200 sieve as adherent fines.

D. **Calculations.** Calculate the percentage of non-adherent fines and the percentage of adherent fines as follows:

$$\text{Percent of Non - Adherent Fines} = \frac{W_T - W_{16}}{W_T} \times 100$$

$$\text{Percent of Adherent Fines} = \frac{W_{16} - W_A}{W_{16}} \times 100$$

Where

W_T = Total weight of test sample as determined in Step 3.

W_{16} = Weight retained on No. 16 sieve as determined in Step 4.

W_A = Weight of sample after washing over the No. 200 sieve as determined in Step 5.

E. **Report.** Report the percent non-adherent fines and the percent adherent fines.

NJDOT A-5 – SCRATCH HARDNESS TEST FOR COARSE AGGREGATE PARTICLES

A. **Scope.** This test method is used to determine the percent of soft particles contained in coarse aggregates on the basis of scratch hardness. This test method is suitable for use on No. 67, No. 57, or equivalent sized coarse aggregate.

B. **Apparatus.** Use the following apparatus:

1. Scratch hardness apparatus consisting of a brass rod, 1/16 inch in diameter, with a rounded point, mounted in a device so that a load of 2 ± 0.1 pounds is applied to the specimen tested. Ensure that the brass rod is of suitable hardness so that when filed to a sharp point, it will scratch a copper penny (US Lincoln design), but fail to scratch a nickel (US Jefferson design).
2. Sieve sizes 1 inch, 3/4 inch, 1/2 inch, and 3/8 inch conforming to AASHTO M 92.
3. Apparatus required to perform AASHTO T 27.

C. **Procedure.** Perform the following steps:

1. Dry the coarse aggregate sample and split into portions for the various tests to be performed. Ensure that the portion of the sample for scratch hardness testing is sized so that it will yield not less than the amounts of the sizes specified in Table A-5-1 that are available in amounts of 10 percent or more.

Table A-5-1 Minimum Size of Sample to be Tested

Sieve Size (Inches)	Sample Mass (grams)
3/8 to 1/2	200
1/2 to 3/4	600
3/4 to 1	1 ,500

2. Perform a gradation test on 1 portion according to AASHTO T 27 to determine the percent retained on the 3/4, 1/2, and 3/8 inch sieves and the percent passing the 3/8 inch sieve.
3. Separate the test sample into fractionated sizes as specified in Table A-5-1. Discard material passing the 3/8 inch sieve or retained on the 1 inch sieve. Also, discard fractions on sieves that represent less than 10 percent of the overall sample.
4. If the sample contains less than 10 percent of any of the sizes specified in Table A-5-1, do not test that size. For the purpose of calculating test results, consider the fractionated size to contain the same percentage of soft particles as the average of the next larger and the next smaller size. If one of these sizes is absent, consider the fractionated size to contain the same percentage of soft particles as the next larger or next smaller size, whichever is present.
5. Take a representative sample meeting the sample size requirements in Table A-5-1 of each of the fractionated sizes to be tested.
6. Test each particle of aggregate in a fractionated size using the following Steps:
    a. Place the piece of coarse aggregate under the scratch hardness apparatus forcing the piece of aggregate to touch the sharpened, brass rod.
    b. Push up on the 2 pound weighted brass rod with the piece of aggregate and pull the aggregate forward. Ensure that the brass rod remains in firm contact with the piece of aggregate at least from the center to the edge of the aggregate on one face.
    c. Examine the particle to determine if it was scratched. Consider the particle to be soft if a groove was made in it without deposition of metal from the brass rod or if separate particles are detached from the rock mass. Consider the particle to be hard if a metal streak was made on it by the brass rod and no groove was made. If a particle contains more than one type of rock and is determined to be partly hard and partly soft, consider the particle soft if the soft part is more than 30 percent of the particle.
    d. Assign the particles to groups of soft or hard particles.
7. Separately weigh the hard and soft particles groups for the fractionated size to the nearest 0.1 percent.
8. Repeat Steps 6 and 7 for each of the fractionated sizes.

D. Report. Report the following:

1. For each fractionated size, mass of particles tested with the brass rod.
2. For each fractionated size, mass of particles classified as soft in the test.
3. For each fractionated size, percent of test sample classified as soft by mass.
4. For the sample, percent of soft particles calculated by weighted average based on the original gradation. Round the sample percent of soft particles to the nearest whole number.

NJDOT A-6 – DETERMINING GRADATION OF DENSE-GRADED AGGREGATE CONTAINING RAP

A. Scope. This test method is used to rapidly determine the gradation of DGA containing more than 10 percent RAP. Due to the melting and adhering of the asphalt portion of RAP, typical oven or hotplate drying of the sample is detrimental. This test method is a modification of AASHTO T 27.

B. Apparatus. Use apparatus according to AASHTO T 2, T 11, T 27, and M 92.

C. Procedure. Perform the following steps:

1. Sieve a minimum 5,000 gram sample of DGA without drying (wet-sieved) through the following sieves: 2 inch, 1 1/2 inch, 3/4 inch, and No. 4. Weigh the material retained on each sieve and the material passing the No. 4 sieve. Record the weights.
2. Reduce the material passing the No. 4 sieve to a 500 gram sample.
3. Spread the 500 gram sample out in a pan and put it in an oven preheated to 175 ± 5 °F for approximately 1.5 hours. At 15 minute intervals, remove the sample from the oven and weigh it. Remix the material to promote even and thorough drying then return it to the oven. Continue to dry the material until it reaches a

constant weight.

4. After drying the material passing the No. 4 sieve to a constant weight, record the final weight.
5. Wash the material passing the No. 4 sieve according to AASHTO T 11 and dry the sample using the procedure in Step 3.
6. Determine the gradation of the sample according to AASHTO T 27.
7. Mathematically combine the gradation results of the plus No. 4 and minus No. 4 portions of the material for a final gradation.

D. Report. Report the mathematically combined gradation results reported as a total percent passing the required sieves.

NJDOT B-2 – SAMPLING HMA MIXTURES

A. Scope. This test method is used to sample HMA mixtures at the plant.

B. Apparatus. Use the following apparatus:

1. Table of random numbers.
2. Shovel.
3. Bucket or pail of suitable size to collect sample.
4. Scoop and spatulas.

C. Procedure. Perform the following steps:

1. **Lot Sizes.** When taking samples from the truck at the plant, apply the rates of sampling to the plant's production for all Department projects rather than for individual projects. Divide the production into successive lots of the size as specified in Section 902 for the mixture being sampled. Take 5 samples for volumetric acceptance testing, composition testing, maximum specific gravity testing, and comparison testing from each lot. The ME will assign consecutive lot numbers for each type of mix at the plant. Include the assigned lot identification number on each weigh ticket.

2. **Obtaining Samples.** The ME will use a table of random numbers to select the ton of mix to be sampled for each sample in the lot. Based on the ton of mix, determine the truckload to be sampled. Obtain samples from the designated truckloads of material using the following method:

   a. Flip a coin to determine which half of the truck to sample. If **HEADS**, sample the front half of the truck. If **TAILS**, sample the rear half of the truck.
   b. Do not sample at the very bottom of a pile or in areas between piles to reduce the possibility of including segregated material in the sample.
   c. Dig a furrow 3 to 6 inches deep that extends along the conical pile within the half of the truck to be sampled. Follow the slope of the pile starting as near to the center of the truck as possible.
   d. From the furrow, shovel approximately equal volumes of material from the top third, center third, and bottom third of the pile. Sample enough material to perform all required testing.

3. **Mixing and Reducing Samples.** Mix the sample taken from the truck using a scoop. Clean all tools by scraping with spatulas before and after each remixing to prevent build-up of asphalt and fines on the tools. Do not use solvents to clean tools between uses. After mixing, reduce the sample as follows:

   a. **Gyratory Specimen.** Scoop a representative portion of HMA from the container of material to be molded into one specimen for volumetric testing according to AASHTO T 312. Ensure that the HMA is at the specified compaction temperature when molding the specimen.

   b. **Composition Sample.** After the removal of material for the gyratory specimen, remix the remaining material. Perform composition testing by the ignition method by taking a representative sample from the remixed material and testing according to AASHTO T 308. If composition analysis is being performed by hot bin analysis, NJDOT B-5, a composition sample of HMA mix is not necessary.

   c. **Maximum Specific Gravity Sample.** Remix the remaining material. Take a sample for determining maximum specific gravity and test according to AASHTO T 209.

   d. **Comparison Sample.** Remix the remaining material and prepare a comparison sample weighing approximately 9 pounds. Place the comparison sample in a container that is sealed and labeled. Store the comparison sample at the plant for at least 3 months so it will be available for selection by the ME.

4. **Identifying Samples.** Identify samples by lot number and position in the lot's sampling sequence. Use a number followed by a letter to identify the sample. Use the lot number as the number and label the first, second,

third, fourth, and fifth samples in the lot as "A", "B", "C", "D", and "E", respectively. If multiple samples are taken from the same truckload of mix, assign the same identification code to each of the samples.

D. Report. Report deviations to the specified sampling procedure.

NJDOT B-3 – SELECTING CORES FOR MAXIMUM SPECIFIC GRAVITY TESTING IN AIR VOIDS DETERMINATION

A. Scope. This test method is used to randomly select the core samples on which the maximum specific gravity will be determined according to AASHTO T 209 for use in the calculation of air voids for acceptance of a lot, and the procedure to be followed in the event of a possible failing lot.

B. Procedure. Perform the following steps:

1. Determine the bulk specific gravity according to AASHTO T 166 on each core from the lot.
2. Randomly select 1 core sample from a 5 core sample lot using a computer-generated random number selection program.
3. Determine the maximum specific gravity of the randomly selected core according to AASHTO T 209.

   NOTE: For Recore Lots and Statistical Outlier Lots, do not randomly select a core for maximum specific gravity testing. The entire core lot must be tested for maximum specific gravity.

4. Determine the air void comparison limits based on air void acceptance limits specified for the mix being tested. Add 0.5 percent to the lower acceptance limit for the lower comparison limit and subtract 0.5 percent from the upper acceptance limit for the upper comparison limit.
5. Calculate the air void content for the randomly selected core using its maximum specific gravity determined in Step 3 and its bulk specific gravity determined in Step 1.
6. If the percent air voids for the randomly selected core is outside the comparison limits determined in Step 4, perform maximum specific gravity testing on the remaining cores in the lot. Do not perform Steps 7 to 9.
7. If the air void content for the randomly selected core is within the comparison limits determined in Step 4, use the maximum specific gravity of the randomly selected core and the individual bulk specific gravities to determine the air void content of the remaining cores in the lot.
8. If the air void content of any 1 of the cores in the lot as calculated in Step 7 falls outside of the comparison limits as determined in Step 4, perform maximum specific gravity testing on the remaining cores in the lot. Use the individual maximum specific gravities and bulk specific gravities to determine the air void content of each core.
9. If the air void content of all of the cores in the lot as calculated in Step 7 fall inside of the comparison limits as determined in Step 4, use the air void contents for the individual cores as determined in Step 7.
10. If the lot has an outlier or is a recore lot, the entire lot must be tested for maximum specific gravity. Calculate air voids using each individual core maximum specific and bulk specific gravity.

C. Calculations. Calculate the air voids for each core as follows:

$$\text{Air Voids} = \frac{A - B}{A} \times 100$$

Where:

A = Maximum Specific Gravity

B = Bulk Specific Gravity

D. Report. Report the air void content for each core to the nearest 0.1 percent.

NJDOT B-4 – MEASURING THICKNESS OF HMA CORES

A. Scope. This test method is used to measure the individual lift thicknesses of drilled HMA cores.

B. Apparatus. Use the following apparatus:

1. Caliper device to measure the axial lengths of individual lifts to the nearest 0.001 inch mounted on a support.

2. Support designed to hold the specimen with its axis in a horizontal position by 2 metal roller bearings sufficiently rigid and stable to maintain alignment without distortion or deflection.
3. Gauge to calibrate and check the zero reference point of the apparatus.

Ensure that the apparatus accommodates specimens from 1/2 to 12 inches in length.

C. **Procedure.** Perform the following steps:

1. If the caliper device is electronic, turn it on. Ensure that the caliper device is zeroed and set to the correct units of measure.
2. Place the specimen in the measuring apparatus with the smooth end of the core, which is the top or upper surface of the pavement, firmly against the zero reference point.
3. Take 4 length measurements approximately 90 degrees apart around the circumference of the specimen using the caliper device to measure the distance from the zero reference point (top of the core) to the bottom of the first lift. If a measuring point is not representative of the plane of the core lift because of a small projection or depression, rotate the specimen slightly about its axis and take the measurement at the nearest representative point.
4. Read each of the 4 measurements for the lift to the nearest 0.001 inch. Calculate the average of the 4 measurements for the lift to the nearest 0.01 inch and record.
5. Repeat Steps 3 and 4 for each lift to be measured by measuring from the zero reference point (top of the core) to the bottom of the lift being measured.

D. **Report.** Report the following to the nearest 0.01 inch:

1. Average thickness of the first lift, which is the average distance for the first lift as determined in Step 4.
2. Average thickness of the second lift, which is determined by subtracting the average thickness for the first lift from the distance measured in Step 4 for the second lift.
3. Average thickness of subsequent lifts, which is determined by subtracting the average thicknesses for all preceding lifts from the average distance measured in Step 4 for the lift.

NJDOT B-5 – DETERMINING COMPOSITION OF HMA MIXTURE USING HOT BIN SAMPLE ANALYSIS

A. **Scope.** This test method is used to determine the gradation and asphalt content of a HMA mixture by use of bin samples and printout ticket.

B. **Apparatus.** Use apparatus according to AASHTO T 11, T 27, and T 37.

C. **Procedure.** Perform the following steps:

1. When taking samples for hot bin analysis, apply the rates of sampling to the plant's production for all Department projects rather than for individual projects.
2. Divide the production into successive lots of the size as specified in Section 902 for the mixture being sampled. Take 5 samples for composition testing from each lot. Take 5 samples of the HMA as specified in NJDOT B-2 for volumetric acceptance testing, maximum specific gravity testing, and comparison testing from each lot. Time the HMA sampling to correspond with the hot bin samples.
3. The ME will assign consecutive lot numbers for each type of mix at the plant. Include the assigned lot identification number on each weigh ticket.
4. The ME will use a table of random numbers to select the ton of mix to be sampled for each sample in the lot. Based on the ton of mix, determine the portion of the production to be sampled.
5. The supplier's quality control technician shall take random samples of not less than 25 pounds from each hot bin for each 600 tons batched as directed by the ME. When mineral filler is used, take a minimum of one filler sample per lot.
6. Use a minimum sample weight for testing of 25 pounds for bins No. 5 and No. 4, 10 pounds for bin No. 3, and 2 pounds for bin No. 2. Use a minimum test sample weight of 500 grams for bin No. 1 and 100 grams for mineral filler.
7. For test samples from bins No. 2, 3, 4, and 5, weigh the sample and sieve the aggregate according to AASHTO T 27 down to the No. 8 sieve with a catch pan underneath. Conduct the sieving operation by means of a mechanical sieve shaker. If more than 2 percent of the aggregate is passing the No. 8 sieve, wash and grade that portion according to AASHTO T 11 and T 27.
8. Wash and grade the bin No. 1 test sample according to AASHTO T 11 and T 27.

9. For each bin, record the weight retained on each sieve determined in the grading process and the wash loss and pan weights for determination of the percent passing the No. 200 sieve.
10. Wash and grade the mineral filler sample according to AASHTO T 37.

D. **Calculations.** Calculate the asphalt content by dividing the recorded delivery ticket asphalt cement weight for the load by the total load weight.

Calculate the percent of material from each bin by dividing the recorded delivery ticket weights for each bin by the total aggregate weight of the load. Calculate the mix gradation by computing the percentage of material passing each sieve for each bin and multiplying the percentage by the individual bin percentage and then summing the products for each sieve.

E. **Report.** Report the asphalt content to the nearest 0.01 percent on the work sheet and the daily inspection report and rounded to the nearest 0.05 percent when reported on the lot data report.

Report bin percentages, bin gradations, and the mix gradation to the nearest 0.1 percent on the work sheet and daily inspection report. On the lot data report, report the mix gradation to the nearest 0.5 percent on the No. 8 sieve, to the nearest 0.1 percent on the No. 200 sieve, and to the nearest 1 percent on all other sieves.

NJDOT B-10 – OVERLAY TEST FOR DETERMINING CRACK RESISTANCE OF HMA

A. **Scope.** This test method is used to determine the susceptibility of HMA specimens to fatigue or reflective cracking. This test method measures the number of cycles to failure.

B. **Apparatus.** Use the following apparatus:

1. Overlay Tester. An electro-hydraulic or electro-pneumatic system that applies repeated direct tension loads to specimens. The machine features 2 blocks, one is fixed and the other slides horizontally. The device automatically measures and records a time history of load versus displacement every 0.1 second at a selected test temperature.

   The sliding block applies tension in a cyclic triangular waveform to a constant maximum displacement of 0.06 centimeter (0.025 in). This sliding block reaches the maximum displacement and then returns to its initial position in 10 seconds (one cycle).

2. Temperature Control System. The temperature chamber must be capable of controlling the test temperature with a range of 50 to 95 °F (10 to 35 °C).

3. Measurement System. Fully automated data acquisition and test control system. Load, displacement, and temperature are simultaneously recorded every 0.1 second.

4. Linear Variable Differential Transducer (LVDT). Used to measure the horizontal displacement of the specimen (± 0.25 in). Refer to manufacturer for equipment accuracy for LVDT.

5. Electronic Load Cell. Used to measure the load resulting from the displacement (5,000 lb capacity). Refer to manufacturer for equipment accuracy for load cell.

6. Specimen Mounting System. Used two stainless steel base plates to restrict shifting of the specimen during testing. The mounting jig holds the two stainless steel base plates for specimen preparation.

7. Cutting Template.

8. Two Part Epoxy. Two part epoxy with a minimum 24 hour tensile strength of 600 pound per square inch (4.1 MPa) and 24 hour shear strength of 2,000 pound per square inch (13.8 MPa).

9. 10 pound weight (4.5 kg). Used to place on top of specimens while being glued to specimen platens.

10. 1/4 inch Width Adhesive Tape. Placed over gap in plates to prevent the epoxy from bonding the plates together.

11. Paint or Permanent Marker. Used to outline specimens on platens for placement of epoxy.

12. 3/8 inch Socket Drive Handle with a 3 inch (7.6 cm) extension.

C. **Procedure.** Perform the following steps:

1. **Sample Preparation.**

   a. **Laboratory Molded Specimens** – Use cylindrical specimens that have been compacted using the gyratory

compactor (AASHTO T 312). Specimen diameter must be 6 inches (150 mm) and a specimen height must be 4.5 inches ± 0.2 inches (115 ± 5 mm).

Note - Experience has shown that molded laboratory specimens of a known density usually result in a greater density (or lower air voids) after being trimmed. Therefore, it is recommended that the laboratory technician produce molded specimens with an air void level slightly higher than the targeted trimmed specimen. Determine the density of the final trimmed specimen in accordance with AASHTO T 166.

b. **Core Specimens** – Specimen diameter must be 6 inches ± 0.1 inch (150 mm ± 2 mm). Determine the density of the final trimmed specimen in accordance with AASHTO T 166.

2. **Trimming of Cylindrical Specimen.** Before starting, refer to the sawing device manufacturer's instructions for cutting specimens.

   a. Place the cutting template on the top surface of the laboratory molded specimen or roadway core. Trace the location of the first 2 cuts by drawing lines using paint or a permanent maker along the sides of the cutting template.
   b. Trim the specimen ends by cutting the specimen perpendicular to the top surface following the traced lines. Discard specimen ends.
   c. Trim off the top and bottom of the specimen to produce a sample with a height of 1.5 inches ± 0.02 inches (38 mm ± 0.5 mm).
   d. Measure the density of the trimmed specimen in accordance with AASHTO T 166. If the specimen does not meet the density requirement as specified for performance testing for the mix being tested, then discard it and prepare a new specimen.
   e. Air dry the trimmed specimen to constant mass, where constant mass is defined as the weight of the trimmed specimen not changing by more than 0.05 percent in a 2 hour interval.

3. **Mounting Trimmed Specimen to Base Plates (Platens).**

   a. Mount and secure the base plates (platens) to the mounting jig. Cut a piece of adhesive tape approximately 4.0 inches (102 mm) in length. Center and place the piece of tape over the gap between the base plates.
   b. Prepare the epoxy following manufacturer's instructions.
   c. Cover a majority of the base plates (platens) with epoxy, including the tape. Glue the trimmed specimen to the base plates.
   d. Place a 10 pound (4.5 kg) weight on top of the glued specimen to ensure full contact of the trimmed specimen to the base plates. Allow the epoxy to cure for the time recommended by the manufacturer. Remove the weight from the specimen after the epoxy has cured.
   e. Turn over the glued specimen so the bottom of the base plates faces upward. Using a hacksaw, cut a notch through the epoxy which can be seen through the gap in the base plates. The notch should be cut as evenly as possible and should just begin to reach the specimen underneath the epoxy. Great care should be taken not to cut more than 1/16 inch (1.58 mm) into the specimen.
   f. Place the test sample assembly in the Overlay Tester's environmental chamber for a minimum of 1 hour before testing.

4. **Start Testing Device.** Please refer to manufacturer's equipment manual prior to operating equipment.

   a. Turn on the Overlay Tester. Turn on the computer and wait to ensure communication between the computer and the Overlay Tester occurs.
   b. Turn on the hydraulic pump using the Overlay Tester's software. Allow the pump to warm up for a minimum of 20 minutes.
   c. Turn the machine to load control mode to mount the sample assembly.

5. **Mounting Specimen Assembly to Testing Device.** Enter the required test information into the Overlay Tester software for the specimen to be tested.

   a. Mount the specimen assembly onto the machine according to the manufacturer's instructions and the following procedural steps.

      1. Clean the bottom of the base plates and the top of the testing machine blocks before placing the specimen assembly into the blocks. If all four surfaces are not clean, damage may occur to the machine, the specimen, or the base plates when tightening the base plates.
      2. Apply 15 pounds inch of torque for each screw when fastening the base plates to the machine.

6. **Testing Specimen.**

   a. Perform testing at a constant temperature recommended by the New Jersey Department of Transportation for the mixture in question. This is typically either 59 °F (15 °C) or 77 °F (25 °C).

      Note - Ensure the trimmed specimen has also reached the constant temperature required.

   b. Start the test by enabling the start button on the computer control program. Perform testing until a 93 percent reduction or more of the maximum load measured from the first opening cycle occurs. If 93 percent is not reached, run the test until a minimum of 1,200 cycles.

   c. After the test is complete, remove the specimen assembly from the Overlay Tester machine blocks.

D. Report. Include the following items in the report:

1. Date and time molded or cored.
2. NJDOT mixture identification.
3. Trimmed specimen density.
4. Starting Load.
5. Final Load.
6. Percent decline (or reduction) in Load.
7. Number of cycles until failure.
8. Test Temperature.

NJDOT C-4 – SLUMP FLOW TEST AND VISUAL STABILITY INDEX TEST

A. Scope. The slump flow is used to assess the horizontal free flow of self-consolidating concrete (SCC) in the absence of obstructions. The test method is based on the test method for determining the slump (AASHTO T 119). The diameter of the concrete circle is a measure for the flowability of the SCC. The visual stability index (VSI) is a visual evaluation of the segregation of the SCC during the slump flow test.

B. Apparatus. Use the following apparatus:

1. Mold in the shape of a truncated cone with the internal dimensions 8 inch diameter at the base, 4 inch diameter at the top, and a height of 12 inches.
2. Base plate of a stiff non-absorbing material, at least 30 inches square, marked with a circle marking the central location for the slump cone.
3. Hand-held wood or metal float or trowel.
4. Wheelbarrow or other container to hold at least 0.2 cubic feet of SCC.
5. Ruler or tape measure at least 30 inches long.
6. A scoop or suitable container for filling specimen molds with SCC. Experience has shown pails and plastic cylinder molds to be suitable containers.

C. Procedure. Perform the following steps:

1. Sample the freshly mixed SCC according to AASHTO T 141.
2. Observe the SCC in the wheelbarrow for segregation.
3. Moisten the base plate and inside of slump cone.
4. Place base plate on level stable ground. Place the inverted slump cone centrally on the base plate and hold down firmly.
5. Fill the cone with the scoop or other suitable container in 1 lift. Do not tamp, rod, or vibrate. Strike off the SCC level with the cone with the trowel.
6. Remove any surplus SCC from the base plate around the cone.
7. Raise the cone vertically and allow the SCC to flow out freely.
8. Measure the final diameter of the SCC in 2 perpendicular directions.
9. Calculate the average of the 2 measured diameters (this is the slump flow in inches).
10. Rate the stability of the mixture in 0.5 increments by visual examination as specified in Table C-4-1.

Table C-4-1 Visual Stability Index (VSI) Rating Criteria	
Rating	**Criteria**
0	No evidence of segregation in slump flow patty or in the wheelbarrow.
1	No mortar halo or aggregate pile in the slump flow patty but some slight bleed or air popping on the surface of the concrete in the wheelbarrow.
2	A slight mortar halo (<3/8 inch) and/or aggregate pile in the slump flow patty and highly noticeable bleeding in the wheelbarrow.
3	Clearly segregating by evidence of a large mortar halo (>3/8 inch) and/or large aggregate pile in the center of the concrete patty and a thick layer or paste on the surface of the resting concrete in the wheelbarrow.

D. Report. Report the following:

1. Identification number.
2. Location of concrete represented.
3. Date and time of testing.
4. Slump flow in inches.
5. VSI rating.
6. Results of any other tests on the fresh concrete.

NJDOT R-1 – DETERMINING RIDE QUALITY OF PAVEMENT SURFACES

A. Scope. This test method is used to determine the ride quality of a pavement surface using a Class 1 Inertial Profiler System (IPS). If any part of this test procedure is in conflict with the referenced documents, such as ASTM or AASHTO standards, this test procedure takes precedence for its purpose.

B. Apparatus. Use the following apparatus:

1. Class 1 IPS that meets the requirements of ASTM E 950, Sections 4.0, 5.0, and 6.0 of AASHTO M 328, and the following:
   a. Valid certification approved by the Department.
   b. The data system provides the raw profile data in an ASCII format acceptable to the Department.
   c. Current version of ROADRUF, ProVal, or other Department approved pavement profile analysis software installed on the IPS computer to compute the IRI. Obtain approval prior to performing ride quality testing.
2. Base plate and gauge blocks, of 1 inch and 2 inch thickness, provided by the manufacturer to verify daily vertical calibration.
3. Retroreflective traffic marking tape or other approved mechanism to automatically trigger the start and stop of profile measurements.

C. Procedure. Perform the following steps:

1. Turn on the inertial profiler and warm up all electronic equipment in accordance with the manufacturer recommendations in advance of testing.
2. Perform Block and Bounce tests each day prior to collecting data. Record the results in the calibration log. Ensure tolerances are within the certified limits.
3. Ensure retroreflective traffic marking tape or other approved mechanism is placed at the beginning and end of each direction of travel lane.
4. Enter Project information in the system.
5. Make provisions to start and stop recording profile at the beginning and end of testing. If automatic trigger mechanism is not install, make provision to initiate start and end data recording manually by pressing a specific key on the computer.
6. Ensure that the required speed is achieved and system is collecting profile data prior to recording profile.
7. For each test section, perform 3 test runs to collect data of both wheel paths of each lane in the longitudinal direction of travel. The wheel path is defined as being located approximately 3 feet on each side of the centerline of the lane and extending for the full length of the lane. Lanes are defined by striping.
8. Save data from each run separately prior to subsequent run or lane testing, clearly identifying each test section, lane identification, and run number.

D. Report. Generate an electronic report in excel format, compatible with the Department's version, of ontinuous

IRI for each 0.01 mile lot after applying 300 feet high-pass filter. The report shall contain the following information:

1. Date of testing, IPS identification number used for testing, and name of operator.
2. Route, milepost location, direction, lane identification, run number, IRI of each wheel path, and average speed.